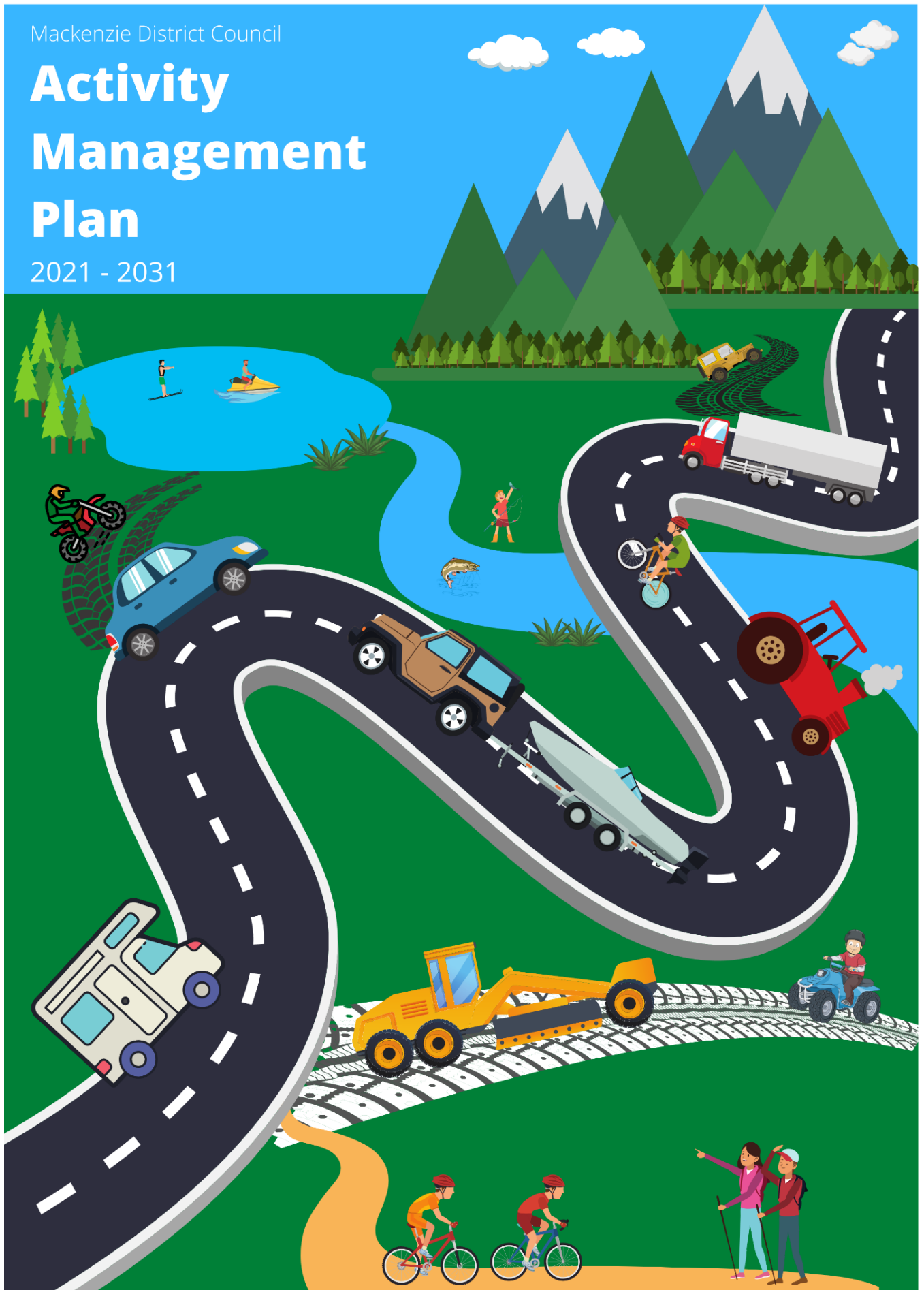


Mackenzie District Council

Activity Management Plan

2021 - 2031



MACKENZIE DISTRICT COUNCIL

**ACTIVITY MANAGEMENT PLAN FOR
TRANSPORTATION**

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Version 9	July 2020	Updated costings, alignment, responses to auditing questions	Kate Jackson Business Case Advisor Scott McKenzie Rooding Manager, Mackenzie District Council

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The following terms and acronyms (in brackets) are used in this Plan.

ACCRUAL ACCOUNTING

The recognition of revenues as they are earned and expenses as they are incurred.

ANNUAL PLAN

A document produced annually by an organisation to inform stakeholders of its objectives, intended activities, performance, income and expenditure required for a period of one financial year. It may also indicate anticipated future short-term income and expenditure

ASSET

A physical component of a facility, which has value, enables services to be provided and has an economic life of greater than 12 months. Dynamic assets have some moving parts, while passive assets have none.

ASSET MANAGEMENT (AM)

The combination of management, financial, economic, engineering, risk and other practices applied to physical assets with the objective of providing the required level of service in the most cost-effective manner.

ACTIVITY MANAGEMENT PLAN

A plan developed for the management of one or more infrastructure assets that combines multidisciplinary management techniques (including technical and financial) over the lifecycle of the asset in the most cost-effective manner to provide a specified level of service. A significant component of the plan is a long-term cash flow projection for the activities.

ASSET MANAGEMENT STRATEGY

A strategy for asset management covering the development and implementation of plans and programmes for asset creation, operation, maintenance, rehabilitation/ replacement, disposal and performance monitoring to ensure that the desired levels of service and

other operational objectives are achieved at optimum cost.

ASSET REGISTER

A record of asset information considered worthy of separate identification including inventory, historical, financial, condition, construction, technical and financial information about each.

BENEFIT-COST RATIO (B/C)

The sum of the present values of all benefits (including residual value, if any) over a specified period, or the lifecycle, of the asset or facility, divided by the sum of the present value of all cost.

CAPITAL EXPENDITURE (CAPEX)

Expenditure used to create new assets or to increase the capacity of existing assets beyond their original design capacity or service potential. CAPEX increases the value of asset stock.

COMPONENTS

Specific parts of an asset having independent physical or functional identity and having specific attributes such as different life expectancy, maintenance regimes, risk or criticality.

CURRENT REPLACEMENT COST

The cost of replacing the service potential of an existing asset, by reference to some measure of capacity with an appropriate modern equivalent asset.

DEFERRED APPROACH

The shortfall in rehabilitation work required to maintain the service potential of an asset.

DEPRECIATED REPLACEMENT COST (DRC)

The replacement cost of an existing asset less an allowance for wear or consumption having regard for the remaining economic life of the existing asset.

DEPRECIATION

The wearing out, consumption or other loss of value of an asset whether arising from use, passing of time or obsolescence through technological and market changes. It is accounted for by the allocation of the cost (or revalued amount) of the asset less its residual value over its useful life.

DETERIORATION RATE

The rate at which an asset approaches failure.

DISPOSAL

Activities necessary to dispose of decommissioned assets.

ECONOMIC LIFE

The period from the acquisition of the asset to the time when the asset, while physically able to provide a service, ceases to be the lowest cost alternative to satisfy a particular level of service. The economic life is at the maximum when equal to the physical life; however, obsolescence will often ensure that the economic life is less than the physical life.

FACILITY

A complex comprising many assets (e.g., a hospital, water treatment plant, recreation complex, etc.) which represents a single management unit for financial, operational, maintenance or other purposes.

FINANCIAL STATEMENTS

Balance sheets, profit and loss accounts, statements of changes in financial position, notes another statement which collectively are intended to give a true and fair view of the state of affairs and profit or loss for an entity for a defined period.

GAP ANALYSIS

A method of assessing the gap between a business's current asset management practices and the future desirable asset management practices. Also called needs analysis or improvement planning.

INFRASTRUCTURE ASSETS

Stationary systems forming a network and serving whole communities, where the system as a whole is intended to be maintained indefinitely at a particular level of service potential by the continuing replacement and refurbishment of its components. The network may include normally recognised ordinary assets as components.

LEVELS OF SERVICE

The defined service quality for a particular activity (i.e., roading) or service area (i.e. street lighting) against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental acceptability and cost.

LIFE

A measure of the anticipated life of an asset or component, such as time, number of cycles, distance intervals etc.

LIFECYCLE

The cycle of activities that an asset (or facility) goes through while it retains an identity as a particular asset i.e., from planning and design to decommissioning or disposal.

LIFECYCLE COST

The total cost of an asset throughout its life including planning, design, construction, acquisition, operation, maintenance, rehabilitation and disposal costs.

LIFECYCLE COST ANALYSIS

Any technique which allows assessment of a given solution, or choice from among alternative solution, on the basis of all relevant economic consequences over the service life of the asses

MAINTENANCE

All actions necessary for retaining an asset as near as practicable to its original condition but excluding rehabilitation or renewal. Fixed interval maintenance is used to express the

maximum interval between maintenance tasks.

On-condition maintenance is where the maintenance action depends upon the item reaching some predetermined condition.

MAINTENANCE PLAN

Collated information policies and procedures for the optimum maintenance of an asset or group of assets.

MAINTENANCE STANDARDS

The standards set for the maintenance service, usually contained in preventive maintenance schedules, operation and maintenance manuals, codes of practise, estimating criteria, statutory regulations and mandatory requirements, in accordance with maintenance quality objectives.

ONE NETWORK ROAD CLASSIFICATION

(ONRC) is a classification system, which divides New Zealand's roads into six categories based on how busy they are, whether they connect to important destinations, or are the only route available:

- National
- Arterial
- Regional
- Primary collector
- Secondary collector
- Access

Classification of New Zealand's roads using the ONRC was completed in 2013.

The ONRC is the primary tool developed through REG to enable operational and culture change in road activity management. It facilitates a customer-focused, business case approach to budget bids for the National Land Transport Programme.

ONE NETWORK ROAD FRAMEWORK

The project to evolve the ONRC to a new One Network Framework (ONF) aims to align the ONRC more closely with the Government's

outcomes focus areas. It recognises the value of integrated land and transport planning for creating greater liveability and prosperity and acknowledges the distinct geographical challenges of our country's transport network.

Introducing a more granular 'Movement and Place' approach will allow us to better consider different mode priorities, surrounding land use, community wellbeing, economic activity and growth aspirations for the future.

The new classifications in the ONF will help to provide more detail on the function of corridors and differentiate areas of on-street activity.

OPERATION

The active process of utilising an asset, which will consume resources such as staff time, energy, chemicals and materials. Operation costs are part of the lifecycle costs of an asset.

OPTIMISED DEPRECIATED REPLACEMENT COST (ODRC)

The optimised replacement cost after deducting an allowance for wear or consumption to reflect the remaining economic or service life of an existing asset. ODRC is the surrogate for valuing assets in use where there are no competitive markets for assets, or for their services or outputs.

PERFORMANCE MONITORING

Continuous or periodic quantitative and qualitative assessments of the actual performance compared with specific objectives, targets or standards.

PLANNED MAINTENANCE

Planned maintenance activities fall into three categories:

- Periodic – necessary to ensure the reliability or to sustain the design life of an asset.

- Predictive – condition-monitoring activities used to predict failure.
- Preventive – maintenance that can be initiated without routine or continuous checking (e.g., using information contained in maintenance manuals or manufacturers' recommendations) and is not condition based.

REHABILITATION

Works to rebuild or replace parts or components or an asset, to restore it to a required functional condition and extend its life, which may incorporate some modification. Generally, involves repairing the asset to deliver its original level of service (i.e., heavy patching of roads, slip-lining of sewer mains, etc.) without resorting to significant upgrading or renewal, using available techniques and standards.

RENEWAL

Works to upgrade refurbish or replace existing facilities with facilities of equivalent capacity or performance capability.

REMAINING ECONOMIC LIFE

The time remaining until an asset ceases to provide the required service level or economic usefulness.

REPAIR

Action to restore an item to its previous condition after failure or damage.

REPLACEMENT

The complete replacement of an asset that has reached the end of its life, so as to provide a similar or agreed alternative, level of service.

REPLACEMENT COST

The cost of replacing an existing asset with a substantially identical new asset.

RESIDUAL VALUE

The net market or recoverable value that would be realised from disposal of an asset or facility at the end of its life.

RISK MANAGEMENT

The application of a formal process to the range of possible values relating to key factors associated with a risk in order to determine the resultant ranges of outcomes and their probability of occurrence.

ROAD ASSESSMENT MAINTENANCE MANAGEMENT SYSTEM (RAMM) (Think Project)

The computerised road maintenance management software system originally developed by Transit New Zealand (now Waka Kotahi (NZTA)) for use nationally by all New Zealand road asset managers. This is still used today as the consistent Asset Management system throughout the transportation sector and by Waka Kotahi (NZTA). This is now owned and managed by Think Project.

ROUTINE MAINTENANCE

Day-to-day operational activities to keep the asset operating (replacement of light bulbs, cleaning of drains, repairing leaks, etc.) and which form part of the annual operating budget, including preventive maintenance.

SERVICE POTENTIAL

The total future service capacity of an asset. It is normally determined by reference to the operating capacity and economic life of an asset.

STATEMENT OF FINANCIAL PERFORMANCE

A report on the net surplus/deficit, and its components, arising from activities or events during a given period, that is significant for the assessment of both past and future financial performance.

STRATEGIC PLAN

A plan containing the long-term goals and strategies of an organisation. Strategic plans

have a strong external focus, cover major portions of the organisation and identify major targets, actions and resource allocations relating to the long-term survival, value and growth of the organisation.

UNPLANNED MAINTENANCE

Corrective work required in the short-term to restore an asset to working condition so it can continue to deliver the required service or to maintain its level of security and integrity.

USEFUL LIFE

May be expressed as either:

- The period over which a depreciable asset is expected to be used, or
- The number of production or similar units (i.e., intervals, cycles) that is expected to be obtained from the asset.

VALUATION

Assessed asset value, which may depend on the purpose for which the valuation is required, i.e., replacement value for determining maintenance levels, market value for lifecycle costing and optimised deprival value for tariff setting

Kaitiakitanga

*Stewardship - We work actively to protect the people,
environment, knowledge, culture, language and
resources for future generations*

Due to budget constraints the Mackenzie District Council has limited ability to apply best practice asset management. As a result, this Activity Management Plan (AMP) must reduce its work programme in order to meet financial constraints.

This AMP will note where budgetary constraints have reduced the level of works being undertaken and show the 'Best Practice' activities in comparison to the actual activities being undertaken.

'Best Practice' activities will be highlighted in blue text boxes

'Actual' activities will be highlighted in green text boxes

1 EXECUTIVE SUMMARY

The Mackenzie District is a special place -

- A historic trail route, food basket, and place of learning that holds a significant spiritual connection for our Rūnanga.
- It has been a home to families for generations.
- A diversified primary industry sector for New Zealand's export market
- For the generation of a high proportion of the country's electricity supply.
- A must see for domestic and international visitors alike.
- A significant feature of NZ Inc's tourism postcard
- A summer and winter recreational playground.

Our roads connect people and places.

Each day thousands of people move around and through the district – doing so safely is the road users and customers' expectations (and rights) and as council, our ultimate goal.

We have established levels of service with the community to target. Achieving these targets requires the right investment and dedication to meet or exceed these goals.

The climate is continuously challenging for transportation asset management – considerable variation requires customised approach and adaption district wide across varying locations treating each site individually. While not forgetting to spread our supply chain learnings across the district, we continue to innovate, and enable balancing of risk. This relies on all parties buy in and input while not just being accepting of affects or a fait accompli.



Risks associated with climate change cannot always be resolved quickly and easily in a short period. Therefore, we are continuously adapting our maintenance regimes now, enabling Council to meet current challenges, manage, and treat these into the future. So as climate change progresses and the effects increase, the impacts will be lessened, and Council can cope with the increases beyond what we acknowledge now.

Council has ambitious plans for the future considering growth projection works. International tourism will return at some point and visitors will continue to explore the district using a range of modes of transport.

Te Manahuna Ki Uta 'Destination Mackenzie' is a multi-agency project with our treaty partners and stakeholders with interests in the Mackenzie. This will guide the direction of tourism, future district direction, interagency projects, development, and planning in a coordinated approach.

Our spatial planning project and district plan review will guide and control land use development in the districts towns and settlements supporting our transport system through provisioning requirements.

Our environment is a taonga (treasure), and the commitment to a sustainable future is the key focus of our community and Council. This focus is backed up closely by a thriving economy and diverse community.

The environment breathes the life into our district, our network is explored by many because of it, telling many of stories of who we are from our cultural roots, through the pioneering age, farming roots, hydro stories to where we are today. As we acknowledge our past both successes and failures as we walk into the future as one.

2 OVERVIEW

2.1 INTRODUCTION

This Activity Management Plan (AMP) for Roading has been developed to provide the Mackenzie District Council and our stakeholders with a long-term management tool for the road asset. It sets out the current asset condition, what issues are currently and likely to impact on the asset and the costs associated with maintaining, operating, renewing, developing, and disposing of the asset. This asset management plan is a transition from council historic asset management plan approach to focus on a sustainable infrastructure strategy for all district infrastructure assets. The Strategic & Programme Case Document, prepared as part of the application for Waka Kotahi (NZTA) funding, adds to this content both summarising and building on the AMP document as part of the Road Efficiency Group work to support Waka Kotahi (NZTA) funding bids.

In terms of population, the Mackenzie District is the third smallest territorial authority in New Zealand with a normally resident population of approximately 4,300, with unprecedented growth in some areas of greater than Queenstown. In contrast to its small population, the area of the District is large, comprising 745,562 hectares. Fairlie, Lake Takapō/ Tekapo and Twizel are the main towns and there are villages at Albury, Kimbell, Burkes Pass and Mount Cook (which is under the control of the Department of Conservation).

The District is severed by State Highways 8 and 79 primarily with State Highway 80 servicing the Mount Cook Village. These highways form the backbone of the network, connecting the district demographics and have resulted in a relatively large lowly trafficked network historically for the Local network. This is beginning to change with traffic volumes increasing as the profile is raised of the Mackenzie District, Commercial activities being established and with development and growth.

2.2 PURPOSE OF TRANSPORTATION ACTIVITY MANAGEMENT PLAN

The purpose of this AMP is to provide a tool combining management, planning, financial, engineering, and technical practices to ensure that the level of service required by customers is provided at the lowest long-term cost to the community. The plan is intended to outline and demonstrate to customers how Council manages the communities' assets responsibly and how works will be prioritised, how points of invention will be determined, when to undertake improvements and how any price/quality trade-offs will be managed, engaged and/or consulted on resulting from alternative levels of service driven by the One Network Framework (ONF).

2.3 PLAN LEVEL

Council considers the required sophistication of their plan in the short to medium term need not progress beyond a "Core+" planning level, which would be classed as intermediate under IIMM as:

- the cost at this time to move to an advanced plan would provide little significant benefit to Council or its' customers.
- the size, complexity is consistent with a rural sparsely populated District, but the use of the asset is changing with growth and development in the rural area creating more rural residential zoning. Urban areas are beginning to evolve further from rural towns to more built-up urban centres. Continued further developing existing zoned areas

causing out of context use with school buses as well as people exercising on unsealed carriageways with no appropriate facilities to deal with this.

- the risks associated with failure are low but continues to increase at very degrees with growth in traffic and development, climate change affects and seasonal variation and the continued reduced investment by Central Government in the transportation sector. We are continually adapting work processes to optimise our spend but this just is not sustainable into the future. This is especially relevant for rural Local Authorities which are carrying the majority of the Heavy Commercial Vehicle (HCV) freight movement.

This AMP is the main component of Council's suite of plans and documents which is summarised and supported by the Strategic and Programme Business case that together describe the services, workload and documented process for asset management, level of service, direction, etc. for the district. This demonstrates to the community outcomes that can be expected the items seen as important for the Council to provide and sustain an appropriate transport network which is fit for purpose into the future and to support the economic development of the district. The document outlines the basic methodologies Council will use to achieve the strategic objectives promoted in the Council LTP 2021 - 2031 and thus move towards achieving the "outcomes" and the communities' "vision" of a society they wish to be a part of and that supports their health, safety and wellbeing.

2.4 SCOPE OF ACTIVITY MANAGEMENT PLAN

This revision provides a full update to Version 7 of the AMP originally produced by Mackenzie District Council's consultants, at version 1 and considerably reviewed and updated to version 7 by Council Staff. It provides a medium to long term indication of asset management requirements and specific work programmes over the planning period from 1 July 2021 to 30 June 2031.

The plan will continue to be periodically reviewed to incorporate, as appropriate new asset information, updated data, Councils strategic plans, high level guidance documents and improved knowledge of customer expectations. The objective is to optimise life cycle asset management activities and provide a greater degree of confidence in financial forecasts.

2.5 TRANSPORTATION ASSET MANAGEMENT ACTIVITY

Council is responsible for the management of road assets with an optimised depreciated replacement cost of \$116,561,399 (July 2019 valuation). For 2021/22 Council has budgeted to spend a total of \$4.47 million on the transportation network maintaining, operating, and renewing these assets (including staff and overhead costs).

The following list summarises the Transportation Asset Management activities:

- Asset Management
- Safety Management
- Road Maintenance
- Road Data Management
- Project Management
- Environmental Management
- Network Inspections

- Legislative Compliance Management
- Network Management
- Customer Management

2.6 ASSET DESCRIPTION

2.6.1 Location

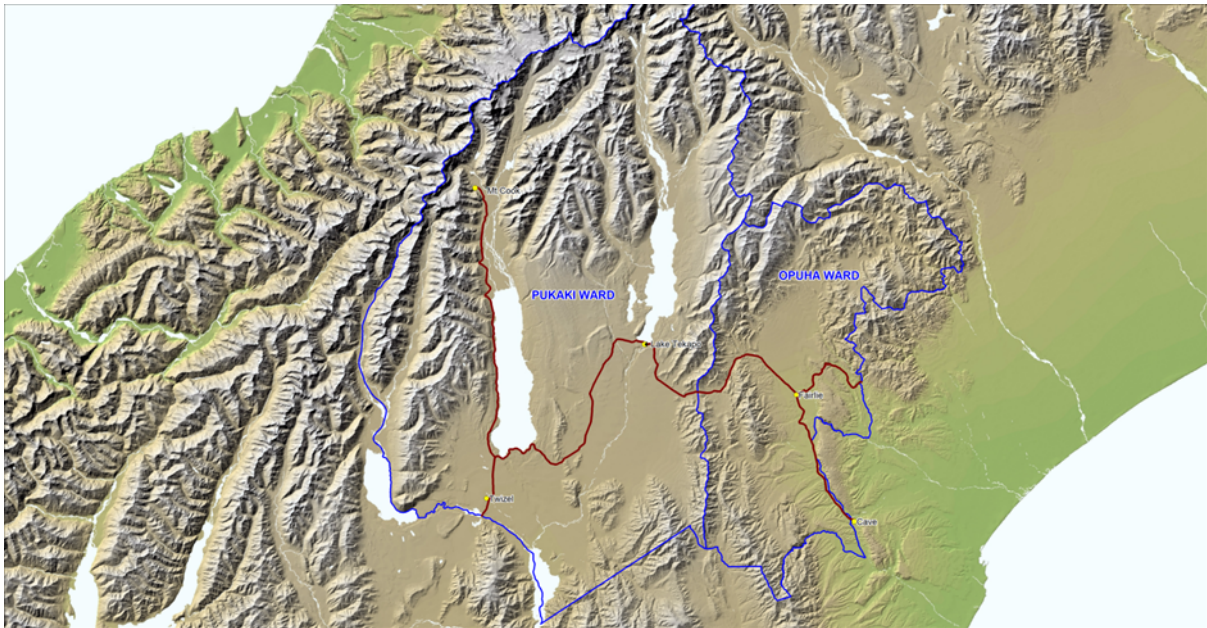


Figure 1 Map of the Mackenzie District

The Mackenzie District is bounded in the south and east by the Timaru and Waimate Districts, in the south west by the Waitaki District and to the West by the Southern Alps/ Westland District boundary. There are two wards: Pukaki which in effect takes in the Mackenzie Basin and Opuha being the remaining area to the west of a line following the upper reaches of the Hakataramea River through Burkes Pass to Mt Musgrove in the Two Thumb Range.

The backbone of the roading network in the district is provided by the following State Highways which are the responsibility of Waka Kotahi New Zealand Transport Agency (NZTA).

- | | |
|--------------------|--|
| • State Highway 8 | Timaru - Fairlie - Lake Takapō/ Tekapo Twizel Omar Omarama |
| • State Highway 79 | Fairlie - Geraldine |
| • State Highway 80 | Twizel - Mt Cook Village |

The Mackenzie District roading consists of a network of Secondary Collector, Access and Access (Low Volume) “Principal” and “Local” roads leading from the state highways to many remote localities and providing convenient access in and around the three main urban centres of Twizel, Lake Takapō/ Tekapo and Fairlie (Mt Cook Village is administered by the Department of Conservation). The network is predominantly rural (93%), unsealed (71%) and with light average daily traffic volumes (less than 500 vehicles per day).

2.6.2 The Asset

The transport asset includes all Council owned & managed road reserve, roads, streets, bridges, footpaths, and related infrastructure within the District as shown in [Table 1](#).

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Table 1: Transportation assets included in this plan.

Asset Description	Sub-Asset Description	Quantity	Quantity	Unit
Land		1,395Ha		
Roads	All roads	732.19km		
	Urban - Sealed	50.07km	1,486,074	m2
	Urban - Unsealed	5.12km	2,357,730	m2
	Rural - Sealed	163.3km		
	Rural - Unsealed	513.65km		
Footpaths		59km	163,743	m2
Drainage	Culverts	18.07km	18,040	
	Catch Pits	309	309	
	Side Drains	16.1km	16,102	
	Soak Pits	40	61	
	Earth Surface Water Channel	739.97	632,269	m
	Kerb and Channel	63.8km		
Bridges	Bridges - Timber	7	8,377	m2
	Bridges – Other (Including 7 large Box Culverts)	88		
	Cattle stops	58	56	each
	Concrete Fords	20	45	each
Signage	Signs	3342	5,984	each
	Posts	1145		
Lighting	Lanterns (include brackets)	791	1,008	each
	Columns	696		
Features (gates, Intersections, Monuments, stockpile sites) 164				

Unformed and paper roads are not included except in the land area.

2.7 KEY STAKEHOLDERS AND CUSTOMERS

2.7.1 Key Stakeholders

The Council (on behalf of our customer the ratepayers of the Mackenzie District) is the ultimate guardian of the network and owner of assets and the Crown (through Ministry of Transport financial assistance rate) is administered by Waka Kotahi (NZTA) meaning they are the majority shareholder of our transport network. Waka Kotahi (NZTA) carry out audits to ensure that their investment is secure, and that the operational capability of the network is ensured. The Crown entity established to manage transportation activities on behalf of the Ministry of Transport (MoT) is Waka Kotahi (NZTA). Other key stakeholders of the roading network include:

- Regional council
- Department of Conservation
- Our Local Rūnanga (Arowhenua, Moeraki & Waihao)
- Owners and operators of inter-connecting or co-located networks, including Waka Kotahi (NZTA) state highways.
- Significant representative user-groups such as Road Transport Association (RTA)

2.7.2 Funding

Funding is provided by several parties and in particular the following are significant contributors:

- Waka Kotahi (NZTA)– The District Transportation Programme is financially assisted by Waka Kotahi (NZTA)– in accordance with operational requirements set out in Waka Kotahi (NZTA) Programme and Funding Manual.
- Ratepayers – Rates provide funding for non-subsidised activities and the Council's local share of subsidised works road the Transportation Programme.
- From time-to-time central government funding is also made available in which case Mackenzie District Council has been a beneficiary of these funds on multiple occasions over and above standard funding levels. The local share value is typically the restriction as a relatively small district with a relatively small rate payer base limiting investment opportunities, given the funding restrictions. The tourist adds pressure to the area accelerating deterioration with overall limited contribution to local funding levels being made.

Funding Assistance rates are one tool within the land transport system that Waka Kotahi (NZTA) uses which, assists local government (and other approved organisations) and Waka Kotahi (NZTA) to work together to achieve:

- Optimal national land transport outcomes within their combined financial resources, and
- An integrated and appropriately consistent land transport network throughout the country, and
- Enables the costs of the land transport network to be shared appropriately between direct land transport system users and local communities.

Funding assistance is not a subsidy, but part of a co-investment system that recognises there are both national and local benefits from investing in the land transport system.

Prior to 30 June 2014 Council received a financial assistance rate of 53% for maintenance works and 63% for capital improvements until 30 June 2015. From that time the normal FAR rate for Council will be 51%. The rate was transitioned on a reducing scale until 2015 when the 51% was confirmed. This was confirmed in 2018.

Council has now transitioned to a financial assistance rate of 51% across maintenance operations and renewal works and capital improvements. There has been no change in this over the last 3 years.

It also should be noted that generally the funding allocation over the last nine years has been held at a level that was not adjusted to match inflation. The Financial assistance has been falling behind the actual needs for some years increasing risks across the transport network both through safety and levels of service. The district has a small population of around 5,000 (normally resident). This equates to seven people funding each kilometre of local road, nationally sixty people fund each km. Council has adapted its works practices and budgets to keep up and on top of maintenance, but this is not sustainable and goes against good asset management practice with continuous increases in vehicle size, mass and carrying capacity with limited investment to cater for this, resulting in nationally reduced level of service throughout the transportation network. This is especially evident when council has historically maintained the network in perpetuity with traffic wear increasing and costs going up and the network deteriorating, this is not ideal.

Council have embarked on proceeding into the future with a sustainable infrastructure strategy. This is currently a work in progress which will develop over time, but this AMP is the line in the sand for a new approach. which will build on to the maintained network currently building toward a sustainable future. Council is therefore seeking a step change to deliver on their vision.

Customer Groups

Council's customers fall into three different groups: associated service providers, users, and the wider community. These are detailed in [Table 2](#).

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Table 2: Council's Roading Customer Groups

Customer Group	Description	Customers
Associated Service Providers	These are other service providers who rely on the transportation network	<ul style="list-style-type: none"> • Contractors • Utilities service providers – use the road corridor to access their assets • Transport operators • Emergency Services
Users	Those who directly use the service	<ul style="list-style-type: none"> • Private drivers • Commercial road users • Drivers of public and other transport services (e.g., tourist buses) • Pedestrians and cyclists

Customer Group	Description	Customers
The Wider Community	Non-users that are affected if the service is not provided	<ul style="list-style-type: none"> • Citizens • Residents who live beside the roads • Local businesses – requiring access • Tourists • Larger corporate businesses transporting freight or reliant on the movement of people and patronage to remain commercially viable.

Other Parties

Other parties with an interest in Council's AMP include Council employees, Waka Kotahi (NZTA) Staff consultants and contractors who manage and work on the asset.

2.8 COUNCIL LEVEL OF SERVICE

Council's current and target levels of service as to be consulted on in the 2021-2031 LTP are summarised in

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Table 7 and Table 15, and are summarised below.

- Council provides safe, smooth, quality sealed roads in order to reduce travel times and vehicle wear.
- Council provides a safe and efficient roading network.
- Ready access is provided around the District except in extreme weather conditions.

These show how levels of service contribute to the community outcomes and provides a technical measure that enables Council to monitor current levels of service against target levels of service.

The current LOS are documented as a combination of:

- LTP LOS documentation based on real or interpreted customer feedback
- Contract processes which describe some elements of the quality of service provided, mainly travelling surfaces and intervention levels

These have been based on Levels of Service (LOS) outlined in the 2012-2022 LTP as modified during the 2014/15 Annual Plan community consultation and this has progressed through to where we are today. There have not been dramatic changes in levels of service, this has been evolutionary, and legislation changes, and government direction have changed focus areas during this time with additional work categories and funding made available

Changes that may affect future LOS include:

- Changes in government requirements
- Funding requests not being funded from a Community, Council and Waka Kotahi (NZTA).
- Continual drops in Funding Assistance Rate (FAR) from a base level of 51%
- Funding shortfalls caused by natural disasters, such as Canterbury Earthquakes
- One Network Framework.
- Change in land use and intensification associated with the roading network.
- Increased pressure from Central Government to allow heavier vehicles on the network.
- Climate Changes affects and failure to address these in a timely fashion with continually changing weather patterns and seasons. Dry conditions with limited rainfall events to provide sufficient moisture for maintenance activities.
- Availability of natural resources i.e., gravel availability
- Changes in crown ownership meaning access to land is more difficult in relation to construction activities and high costs with consenting and compliance issues
- Technological advances

2.9 WAKA KOTAHI (NEW ZEALAND TRANSPORT AGENCY (NZTA))– ONE NETWORK ROAD CLASSIFICATION – LEVEL OF SERVICE

This AMP was written based on agreed levels of service, consulted on through the LTP process since 2009 and built on since this time to reflect where we are today, with our customers. Waka Kotahi's One Network Road Classification (ONRC) confirmed late January 2015 and now transitioning to the ONF in 2021 involves considering levels of service from a different customer perspective rather than

just the traditional best for asset approach that the council has previously practiced. This system prioritises the network in terms of deterioration meaning lower volume roads typically will see less of the spend in comparison to high volume areas of the network. This differs from previous level of service that were historically confirmed by Council. The lateness of delivery of this new ONF system means it has not yet been applied across the network as part of this AMP or LTP process. The previous system (ONRC) focused on only movement. The new system (ONF) now takes both movement and place into consideration. This allows future benefits, activities and outcomes to be realised and incorporated into the government well beings.

Historically, a gap analysis has been undertaken internally as well as data quality studies carried out by the Road Efficiency Group (REG). This has identified there are several areas that require attention in terms of refinement or additional data collection to ensure ONRC levels of service can be measured as well as Council's levels of service. Our Transitional Plan has been worked through historically. It is likely with transitioning process to ONF will require a similar transitional process the detail will depending on the automatic reclassification or transition completed. We will not know the extent of this until this new system is finalised, released to the sector and the transition has begun. The ONF should be better for the district overall in terms of Level of service, but until this is finalised it is hard to draw conclusions and it will determine how place is assessed with our district containing several hanging roads and dead ends.

2.10 FUTURE DEMAND

The Mackenzie District Roding network predominantly carries low volume rural traffic on unsealed roads. Only 55.19km of the total 732km in the network is urban. The districts population of approximately 4,950 in 2020 is low but the growth since the 2006 census has been approximately 27% this is a significant change from the 2001-2006 period where the population grew by a modest 2.3%.

Predominantly the growth we are experiencing in traffic volumes is due to increasing Visitor numbers, people moving from the main centres of other district to the rural communities for the lifestyle, and economic development due to irrigation and changes in farm practices.

Future demand on the network will continue to be driven by Economic development, Environmental Park protection areas, Geography, Geology, Visitors, Business growth, domestic migration with the improvements of technology land use changes and intensification brought about through changes to farming practices in the area within the district.

With the effects of Covid 19 and the rapid transitioning to working from home and remotely now being a lot more accepted practice makes Mackenzie District a lot more viable and easier to live or establish business in, for example, lifestyle of working from a pre-existing holiday/ investment home or in turn moving into the district. This is made easier and enabled through the provisioning of Ultra-Fast Broadband 2 (Fibre) rollout by the government across the three major townships across the district. 5G mobile provisioning across the district has also begun by other suppliers to future aid communication and data sharing from the Mackenzie district to the rest of the world. This technology and reliability of services and coverage has not been previously available to our communities. It is still too early to tell if this will have a dramatic effect of growth of the district given the full roll out of UFB 2 across the district is yet to be fully completed but it is an enabler into the future.

The release of data from the 2018 Census has been significantly delayed. High level insights were first released in September 2019, approximately one year later than expected. At the time of writing, July

2020, the Statistics New Zealand (Stats NZ) growth projections had not been released and are not expected until late 2020/21.

Due to the delayed release of the Stats NZ growth projections based on the 2018 Census and their typically conservative nature, Mackenzie has commissioned Rationale Consulting to carry out a growth study as part of the current District Plan review. This is to provide a single source of the truth for Council and to help understand the future growth in their district.

In the past MDC have used the growth projections prepared by Statistics New Zealand (Stats NZ). Since 2013, growth in the district has far exceeded even the most ambitious predictions, as seen in Figure below.

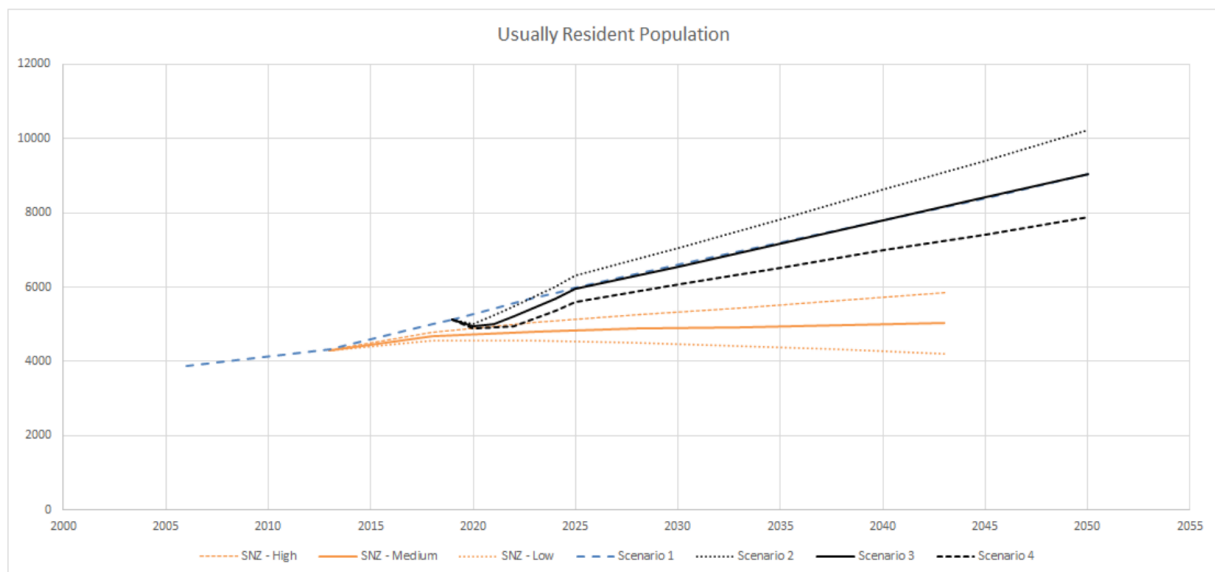


Figure 2 Mackenzie's usually resident population compared to the 2017 Stats NZ predictions.

The COVID-19 Pandemic has influenced the make up on our district with the majority moving back to the grass roots of primary industry that the Mackenzie has been historically known for. With the borders closed this has had a significant effect on the domestic visitors visiting the district who would have previously gone on holiday internationally at this time of year previously. This has resulted spending in the district being up on last year except the spend is focused in different areas to what it would have been previously. Weekdays have typically been quieter, but both our majority ski fields in the District have had record days this season with limited international visitors remaining in the country.

Recommendation from the Rationale growth study report is that MDC adopt growth Scenario 3 as the expected level of growth for the next thirty years and use this information to inform key projects, plans and strategies.

Scenario 3 has been recommended as there will clearly be short term effects due to COVID-19. However, it is not yet known what the long-term effects will be.

Due to this uncertainty, it is recommended that annual "check-ins" are completed with the most up-to-date data to monitor the impact of COVID-19 and the progress of recovery, in particular the border reopening and international tourism resuming. At this time growth can be re-projected.

2.10.1 Population

This has been driven by growth in the tourism industry, which has attracted both visitors and residents. It is anticipated that over the next ten years (2021-31) Mackenzie District will have a growth in population of around 33%, from around 4,950 at present to 6561.

2.10.2 Usual, Resident Population

MDC's population is predicted to continue to grow in all areas, at differing rates.

Both Lake Takapō/ Tekapo is predicted to reach dwelling capacity in approximately 2030 and Twizel approximately 2040. This capacity is calculated based on the currently zoned residential land in MDC's Operative District Plan and current development patterns.

Following capacity being reached, the additional population, and dwellings, (i.e., unrestricted growth) fall into the district overflow category. At this point there is too much uncertainty to predict exactly where these people will live. It is assumed that the 'District Overflow' will remain in the district if more dwellings and land are made available. This is predicted to occur in Lake Takapō/ Tekapo between 2040 and 2045. It is not predicted to occur in Twizel before 2050.

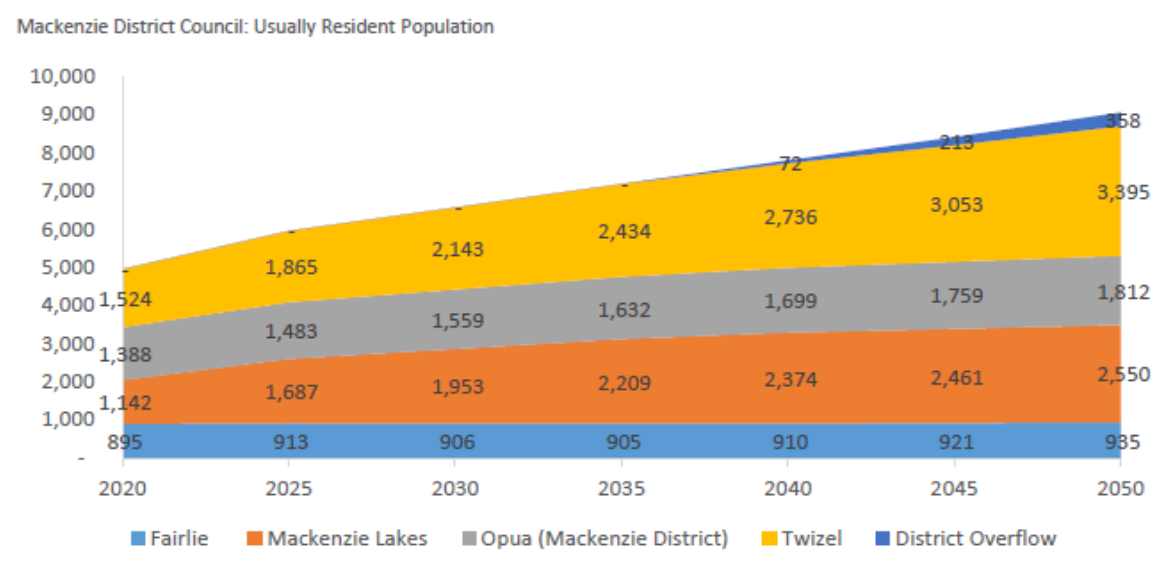


Figure 3 MDC's Resident population

Given population growth is projected to grow by a third over ten years it is important that a step change is adopted now for the future and a vision of sustainable infrastructure strategy is provisioned for across the district. These predicted increases in growth will significantly impact on the maintenance, operations, renewals, and improvements across the transport activity in the short term. This will require refinement of this AMP to incorporate and monitor this change in strategy during this LTP and into next. By then we should be able to see this strategy fully incorporated into work practices and ensure a sustainable infrastructure network being delivered or being worked toward.

2.10.3 Dwellings

As the population increases and towns begin to reach their capacity in terms of available zoned land for residential housing, the proportion of occupied dwellings to unoccupied dwellings will begin to

increase. With some properties beginning to be subdivided and in filled or redeveloped to allow for higher intensification.

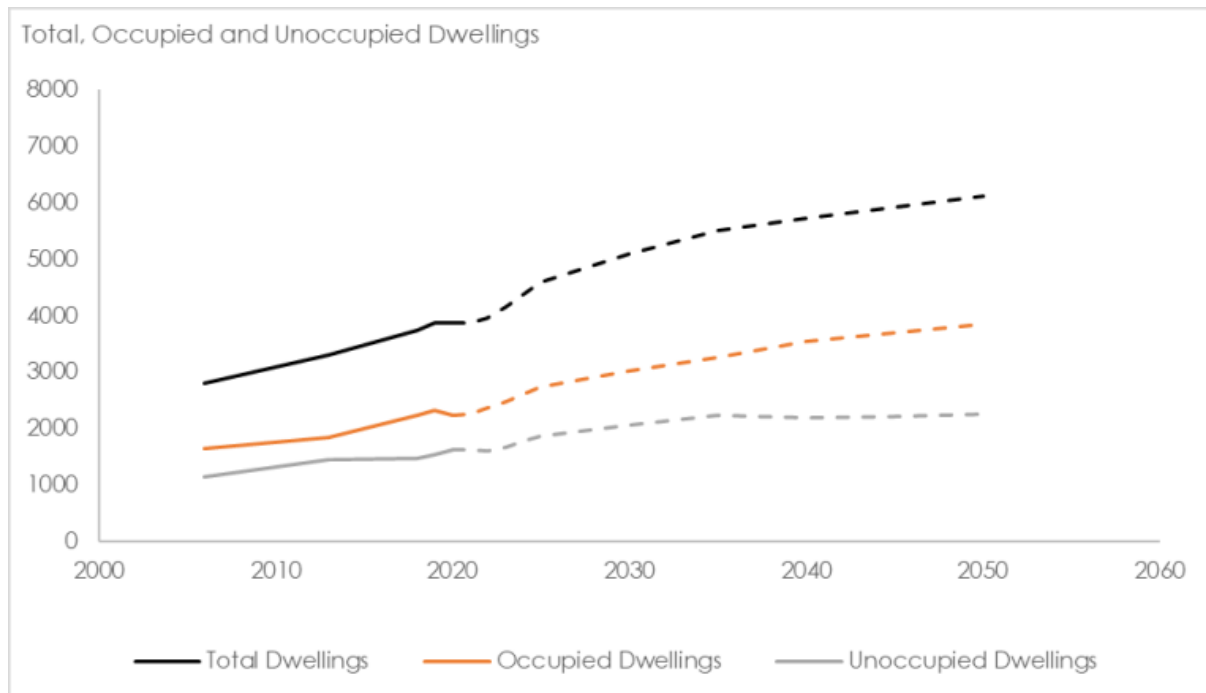


Figure 4 Total, occupied and unoccupied dwellings

It is projected that over the next ten years Mackenzie District will have:

- A growth in household numbers consistent with the population growth trajectory;
- Household numbers are projected to increase from 3872 in 2020 to 5089 in 2030 (+31 per cent) by 2028 (Statistics New Zealand) - Development

2.10.4 Total Rating Units

The total number of rating units is predicted to continue to increase. Mackenzie District sets rates based on the Separately Used or Inhabited Rating Units (SUIP) encompassing all rating units including all non-residential.

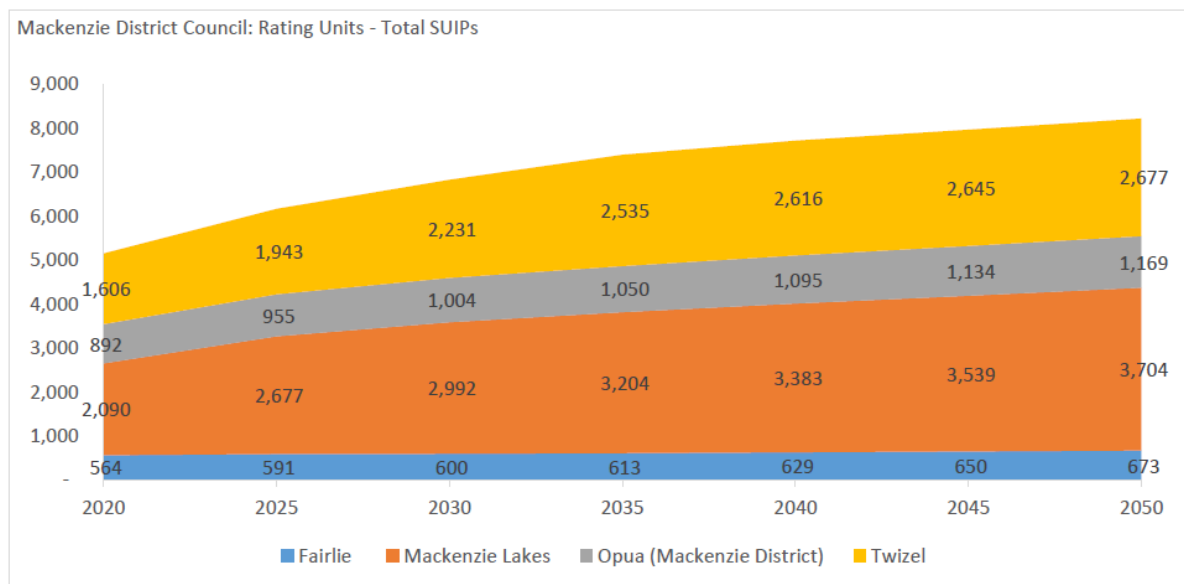


Figure 5 MDC's Rating Unit projections

Analysis of the future urban and rural-residential subdivision over the next 4 years shows an average of 10 sections per year, along with associated infrastructure, to be vested in Lake Takapō/ Tekapo and an average of 46 per year in Twizel. This will depend on the demand, given the absence of tourism and uncertainty around investment at this stage. Equally it will be dependent on the property availability for the local market to purchase. Several subdivisions are still under construction that have multiple stages and are likely to continue, providing there is demand.

During the 2019/20, 1.5km of sealed road was vested in Council. Whilst developers must construct this to Council's standard before vesting the ongoing maintenance costs have to be allowed for.

Initially it was assumed that the level of development experienced during 2015-20 would slow down due to COVID-19 but so far indications are that this has not be the case. We have modified our projections to allow for this growth.

2.10.5 Change in Land Use

Change in land use is ongoing throughout the district and is characterised by change of land use and intensification. Over the last decade, the Mackenzie District has seen a change from pastoral farming to more intensive practises in particular dairy conversions, cropping and stock rearing/ finishing. This significant change in land use impacts on the road network in terms of increased heavy vehicle volumes. Each dairy conversion adds at least four heavy truck and trailer movements on the adjacent roading network a day, minimum. Some of those roads are narrow gravel roads with limited structural strength.

These changes will be limited in part by planning restrictions within the Mackenzie Basin, water availability, and the state of the economy. It is important to recognise that it will happen and plan for it early, as the knowledge and effects become better understood.

2.10.6 Tourism

Due to COVID-19 and the closure of New Zealand's borders, the number of international tourists visiting Mackenzie has significantly reduced in the projections from 2020 to 2025. Based on the

current Tourism New Zealand modelling, it has been assumed that tourism will return to the business-as-usual scenario by 2025.

The reduced number of visitors will have flow on effects in the district in terms of employment and population growth.

With the evolution of vehicle technology, style, availability, and affordability in both the private sector, business and rental fleet means there are a lot more people able to explore the district further than ever before. This is also compounded with the number of campervans and caravans been purchased for free independent travellers, people being members of associated clubs, freedom camping, etc. With electronic maps on smart phones and through social media, previously special “out of the way” locations are becoming commercialised through this unofficial advertising through social media and articles with numerous people wanting to experience the same as others have. It is no longer only by word of mouth.

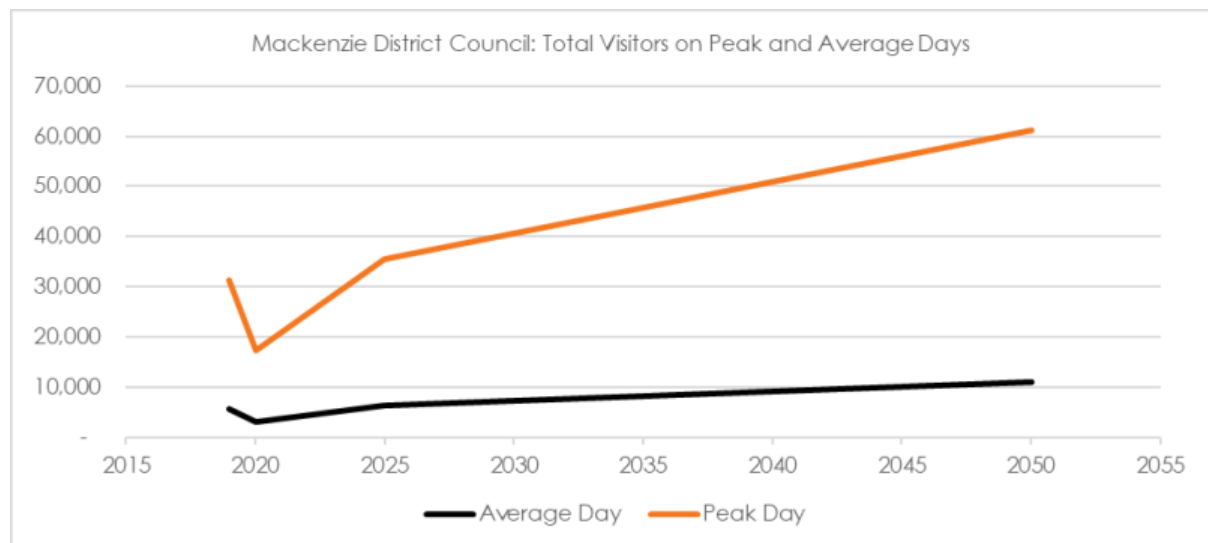


Figure 6 MDC's total visitors on peak and average days

Mackenzie has experienced unprecedented growth in visitor numbers (both domestic and international) in recent years, as indicated by a range of data, including the Statistics New Zealand Commercial Accommodation Monitor, which for the year ended September 2016 compared with the year ended September 2015 reported:

- Guest nights rose 23.1 per cent to 705,316
- International guest nights rose 19.9 per cent to 489,769
- Domestic guest nights rose 31.1 per cent to 215,547
- The average length of stay rose from 1.32 nights to 1.33 nights
- The overall occupancy rate rose from 44.4 per cent to 50.2 per cent
- Accommodation capacity, excluding holiday parks, rose 3.1 per cent

International tourism numbers are expected to continue by 5.4 per cent per annum from 2016 until 2022. Based on this, there could be nearly 6 million tourists visiting New Zealand by 2028. Council is assuming average growth in international visitors to the district will be at least equivalent to or greater than the growth in international visitors forecast for NZ. Growth in domestic visitor numbers is also expected to occur at a similar rate.

Tourism makes up a large proportion of transportation demand within the district both international and domestic. The Mackenzie has experienced increasing numbers of free independent travellers, with

fewer tourists opting for commercial tour groups. Where previously commercial tourism groups favoured the State Highway network, free independent travellers are increasingly using the local roading network and exploring.

Many international tourists are accustomed to travelling on the right-hand side of the road. On unsealed roads there is no centreline to provide visible orientation, in addition, the majority of the unsealed roading network is operated at open road speed limits.

The influx of domestic holidaymakers into the district, particularly the Mackenzie Basin, has a significant impact on roading. On some unsealed roads summer traffic volumes double or triple, at a time when the roads are extremely dry and particularly sensitive to wear. The route from State Highway 1 at Albury over the Mackenzie Pass to Lake Benmore is an example of this traffic loading.

2.10.7 COVID-19

The COVID-19 pandemic and lockdown occurred in New Zealand during the development of the 2020 growth projections. The pandemic has had significant and lasting social and economic effects on New Zealand, which will likely impact the future growth in Mackenzie in the short term.

As a district that has experienced strong growth in recent times driven by the tourism industry, the effect of the border closure and the domestic lockdown has halted tourism to the area and lowered gross domestic product (GDP).

MDC's future growth will be dependent on:

- New Zealanders continuing to travel domestically while the borders remain closed
- Whether or not an Australian bubble develops
- The length of time the border remains closed, and the time taken for tourism numbers to return to 'normal'

Note: the data used in these growth projections is based on the most accurate information available as of May 2020.

2.11 RISK MANAGEMENT

Risk management is "the systematic application of management policies, procedures and practices to the task of identifying, analysing, evaluating, treating and monitoring those risks that could prevent a Local Authority from achieving its strategic or operational objectives or plans, or from complying with its legal obligations".

Council has developed a Risk Management process for the Transportation activity within Council. A risk management strategy has been described in Section 8 of this AMP. This joint risk strategy was developed with our Aoraki Roads Collaboration as most of the transport risks are common across the four local authorities. Issues surrounding emergency management and insurance require full review and inclusion in this plan.

2.12 LIFE CYCLE MANAGEMENT PLANS

Life cycle management plans outline the work planned to keep the assets operating at the current levels of service defined in Section 4 while optimising lifecycle costs. The overall objective of the Life Cycle Management Plan is:

To provide the identified Levels of Service at the lowest lifecycle cost for present and future needs

In this AMP, the lifecycle management plan has been separated into asset groups. Each section of the Lifecycle Management plan covers the following:

- Background Data- including current capacity and performance, current condition and historical data including costs.
- Operations and Maintenance Plan- covering planning for on-going day to day operation and maintenance to keep assets serviceable and prevent premature deterioration or failure.
- Renewal/Replacement Plan- covering major work which restores an existing asset to its original capacity or its required condition (e.g., resurfacing, rehabilitation, or footpath reconstruction).
- Asset Development/Improvement Plan- covering the creation of new assets (including those created through subdivision and other development) or works which upgrade or improve an existing asset beyond its existing capacity or performance in response to changes in usage or customer expectations (e.g., forestry harvesting routes).
- Disposal Plan- covering activities associated with the disposal of a decommissioned asset.

The review the AMP completed in January 2015 focused strongly on “Section 9 – Life Cycle Management” This section needs to be read in its entirety.

2.12.1 Asset Condition and Performance

The basis of the lifecycle management plans is the current condition and performance of the asset. These allow comparison with the prescribed level of service, and from this a gap analysis can be completed to determine future work requirements.

Council has implemented RAMM Finance (previously Contractor) and Pocket RAMM, and is utilising this, along-side their contractor, to undertake more formal condition and performance analysis of the network. Historically, Council have relied on the practical experience and knowledge of the engineering staff to provide a gauge of the network’s overall performance. This knowledge is still used extensively and is very valuable for planning purposes. Regular condition surveys of the asset components are undertaken, and results recorded within the RAMM database. Intermediate and long-term planning of asset renewal are influenced, based on the results of these surveys, the performances obtained compared to that desired, the remaining expected life of the asset component and the decision-making processes outlined within this plan.

2.12.2 Asset Condition

Specific condition for each asset is not currently measured. There is reasonable condition information for sealed roads, but these only make up 23% of the network. Figure 7 shows that over the last three

years there has been a static or slight rise in PII and CI, albeit small at less than 2%. Roughness has also remained static corresponding to the STE stabilising on 97%.

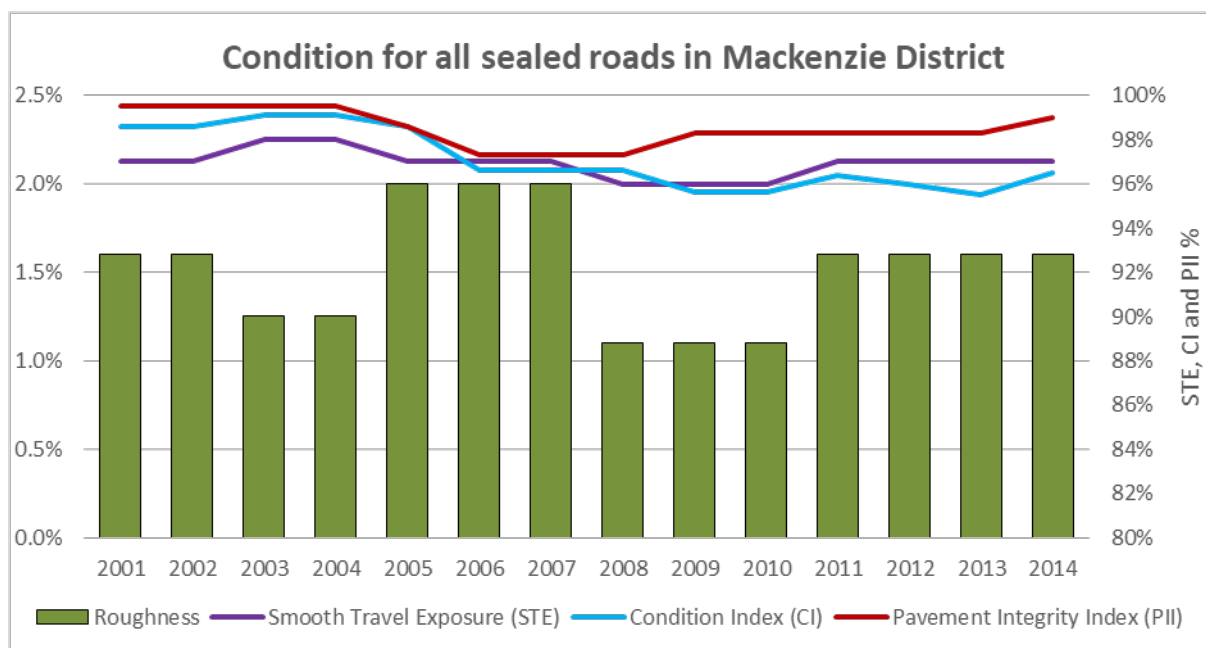


Figure 7 Condition for all sealed roads in Mackenzie District (2014)

2.12.3 Safety Performance

The Crash Analysis Canterbury Region 2013 to 2020 Briefing Notes, outlines crash statistics for Mackenzie District local roads. CAS data 7/4/2021 between 2013 and 2020 in Mackenzie District, there were 118 reported injury and non-injury crashes on local roads. [Table 3](#) shows the number of injuries resulting from these crashes by rural or urban areas. Rural is defined as an area with a speed limit of 80km/h or more. 74% of injuries were caused by crashes on rural roads.

Table 3: Injuries resulting from crashes on Mackenzie District Roads 2013 to 2020

	Fatalities	Serious Injuries	Minor Injuries	Total
Rural	8	12	40	60
Urban	1	5	7	13
Total	9	17	47	73

The figure below shows that loss of control crashes represents 71% of fatal and serious crashes and 79% of all injury crashes. The two most common types of crashes are: loss of control on bend (94 crashes), followed by a 'loss of control on straight road' (71 crashes).

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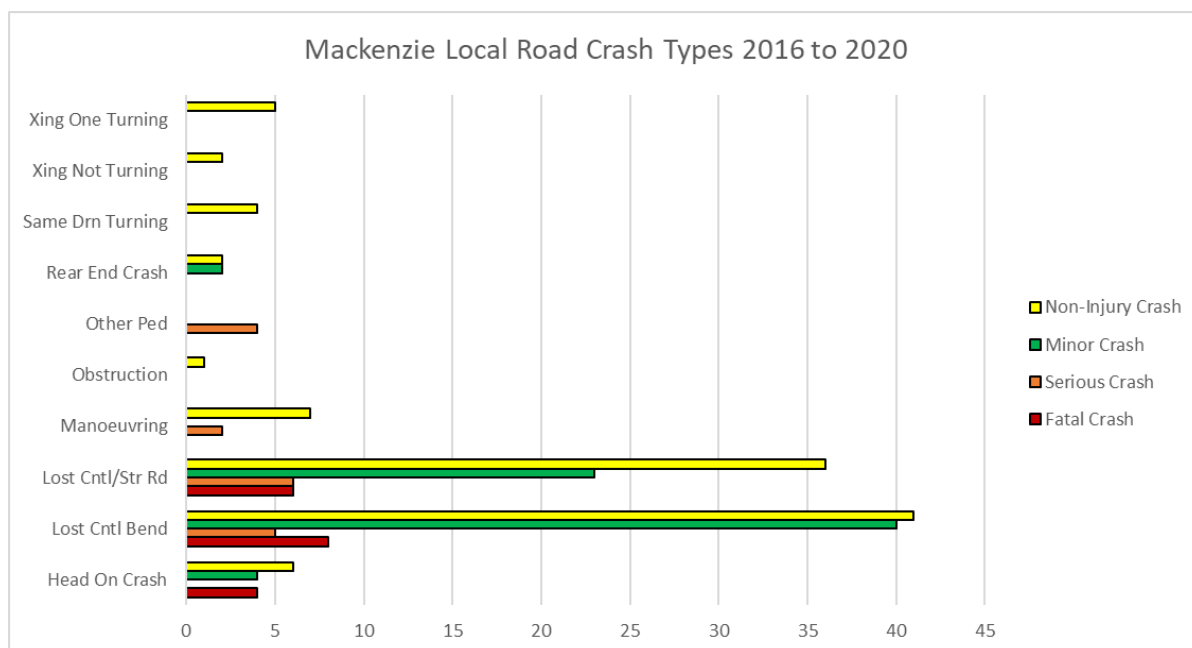


Figure 8: Crash types in the Mackenzie District

31% of all crashes and 33% of serious and fatal crashes were related to road factors.

The most common type of crash involves loss of control on a bend which may indicate a lack of appropriate signage, poor road maintenance, vehicle related issues or driver related issues. Road widths and specifically lack of shoulders could be a concern on some of our roads. Inappropriate speeds entering bends is a major contributing factor for lost control at bend crashes.

Within the Council, road safety outcomes are influenced by the following:

- Community safety programmes
- Road engineering improvements, Low Cost Low Risk Project Programme, delineation, signage, etc.
- Road maintenance programme (grading, re-metalling, drainage improvements, etc.)
- Regional Safety Programmes in conjunction with TDC & WDC

The outcomes that these programmes are focused on are varied but the overall aim is to reduce the number and cost of crashes on the District's roads as reported each year by Waka Kotahi (NZTA). The new national road safety strategy is 'Road to Zero' which sets a target to reduce deaths and serious injuries on New Zealand's roads, streets, cycleways and footpaths by 40 percent over the next 10 years. Reaching this target would mean reducing annual road deaths to 227 and serious injuries to 1,680 by 2030 across the country.

There are five key focus areas under Road to Zero:

1. Infrastructure improvements and speed management.
2. Vehicle safety.
3. Work-related road safety.
4. Road user choices.
5. System management

The Mackenzie District Council, Waimate District Council and Timaru District Council all belong to the South Canterbury Joint Road Safety Committee which is tasked with delivering community road safety

initiatives. Each Council makes a financial contribution towards the employment of a Road Safety Coordinator for South Canterbury.

For the 2021 – 2024 LTP allowance has been made for greater investment in road safety. Given the step change of “road to zero” initiative. This is to provide further resource to deliver on the new road safety strategy and complete further education and interventions to reduce the deaths and serious injury on our network. Mackenzie, as part of our investment, wants to see a step change and focus on new initiatives while continuing to deliver on wide ranging safety messages. Currently Mackenzie District combine road safety coordination with Timaru and Waimate Districts. Funds will be used to continue to co-fund a joint road safety resource providing the focus is around a step change focused on survey information and progressing toward delivering the road to zero vision. If a step change strategy is not programmed Mackenzie, plan to work alongside Timaru and Waimate strategy as part of Aoraki Roding collaboration and hire a resource whether part or full time to aid in the delivery of road safety for the Mackenzie. This will involve submission of a road safety strategy to Waka Kotahi for co- funding on the local share investment. We take road safety very seriously and we want to work toward removing any deaths and serious injuries from our district.

There are ever-increasing unofficial reports of near misses occurring on our network. Majority of these incidents would result in a serious crash or fatality if the three factors (that influence crashes) were to align. Currently this is a large gap in our data given majority of these incidents go unreported, are discussed word of mouth once or twice removed or are received with sketchy details. Some work has been done to date on developing a tool to capture this information, but this has not yet been fully developed and remains a work in progress. We are aware of other data sources that have been used to provide interesting, meaningful data by but often these data sources are not readily available. One example of this is the trial of displaying *555 data by Abley Consultants for the Mackenzie District. Given the lower volumes of traffic using our roads and surrounding areas compared to some other local authority’s, majority of incidents currently remain near misses and do not develop any further. The increases in tourism, intensification of farming and a greater numbers of holiday makers and outdoor enthusiasts frequenting the district, increases this potential of these incidents occurring and raises the risk of these becoming more significant.

The risk of harm is made higher by the following:

- Occupancy in vehicles being at or near capacity in most.
- A high proportion of tourist using our roads.
- Fatigue being high (midpoint between Christchurch & Queenstown).
- Inexperience driving on a rural network (surfacing’s, alignments, etc.)
- International visitors coming from where they drive in the opposing lane.
- Driver frustration due to indecision, convoy travelling parties, reduced travel speeds due to sightseeing.
- The wide-open spaces increasing the risk of speed.
- Impatience and risk of making mistakes due to alignment.
- Limited infrastructure and traffic services being a rural network of lower classification.
- Confusion and lack of consequence and understanding when driving on rural roads at higher speeds.

Greater number of people choosing other transport modes e.g., walking and cycling increasing risks which have not existed historically. Also, the significant use of unfamiliar vehicles i.e., rentals which handles differently with varying technology or functionality.

- Large proportions of long rural roads made up of many straight sections results in higher speeds.
- Climatic conditions snow/ ice, flooding, wind in the alpine environment.

Part of our gap analysis is to try and capture this data/ evidence from the source. It is thought at this stage the easiest way to do this is via building or use of an existing mobile application. This would capture the location and as well as many other details of the incident using several simple questions with drop downs to discover hotspots, frequencies, trends, and any other relevant information. Some work has been done to date on this initiative, but further work is required to enable this data collection to take place.

2.12.4 Routine Maintenance Plan

Council staff manage the roading network with some assistance from consultants. For the 2021- 31 LTP council have programmed to employ two additional resources in the transportation space. One of the proposed resources to assist with data management analysis while aiding in the Asset and Activity Management Plan development. We also look to recruit a network inspector to assist in day-to-day operations of running the maintenance contract, aid in network inspection, collection of data aid in decision making, dealing with network issues, inputting into forward works programming and providing inputs into the strategic direction and vision for the transportation network of the district. Currently we are primarily delivering most of the strategic and operational management of the contract through one full time equivalent (FTE). A second FTE is currently working on road opening notices, traffic counting, traffic management, service request access control.

The maintenance on the network over the last 5 – 6 years has been delivered through a competitively tendered independent multi-year collaboratively written contract between 4 councils. Any large renewal projects are let as a variation to the maintenance contract depending on the scope of the project or as competitively priced contract(s) on an annual basis. With a higher proportion of renewal and improvements predicted in the future, Council considers a higher level of resource and assistance will be required to deliver on the outcomes sought. The resurfacing contract is a shared service agreement with Timaru District Council partnering with Waimate District Council and is tendered and let biannually. Mackenzie is currently embarking on a new maintenance contract and this will be tendered outside of the current Aoraki Roads partnership in which staff provided input to and review through to completion. This decision was made by Mackenzie to ensure a step change from the current maintenance approach only to a furthered partnership into the future to aid in the delivery on transportation services. The reason for the change is to move the Mackenzie District forward into a more sustainable approach, gain smarts, resource assistance in delivery and data collection/analysis space, additional assistance in asset management and technical assistance space which is not currently provisioned for appropriately.

To ensure activities are providing the best efficiencies possible, work has generally clustered in such a way that works are carried out in localised areas. The existing maintenance contract encouraged an informal joint approach between Principal and Contractor through open conversation (within a typical maintenance contract model) there have been numerous changes in personnel through the contract to solve roading issues as they eventuate. The existing contract has been delivered appropriately as specified within the contract but limited other outcomes or initiatives offered. The focus into the future is a step change toward a more pre-emptive or innovative approach and has typically been focused on how works have been completed in the past. To date the Principal has offered up a lot of

the thinking, initiative and aiding in driving of the contract with the contract assisting the delivery while trying to achieve the lowest whole of life cost for the network that is best for the asset.

Historic practice is to apply a combination of “reactive” condition driven and network lifecycle depreciation techniques to determine the work necessary to maintain the network within pre-determined financial constraints. Most of the routine maintenance is reactive, so budgets have been based on historical expenditure to date maintaining the network in perpetuity. With a growth study for the district complete, spatial planning works almost complete and Council committed to a sustainable infrastructure strategy; it is clear the current approach toward road maintenance will not address nor achieve required levels of service into the future. Increases in costs for some asset groups trying to maintain in perpetuity and the network deteriorating with increases in traffic use are not likely to be sustainable into the future with pressures around natural resources and availability i.e., gravel., timely improvements, a new contract and network approach to some work areas/ categories are required to deliver a fit for purpose network into the future improving outcomes at the lowest whole of life cost. Also, this is crucial to the delivery on Councils strategic outcomes in the future due to continuing increased asset quantity and/ or levels of service requirements. See Lifecycle Management Section 7 for further detail.

2.12.5 Renewal / Replacement Plan

This plan recommends renewal works in most asset groups; however, the significant renewal expenditure requirements are in the following areas:

- **Sealed road resurfacing** – A full review of the Mackenzie District seal histories using an average reseal life of 18 years and 5 years for 1st coats was completed in 2015. Part of this process involved creating a Forward Works Programme in RAMM to assist in the long-term activity management planning of the network. This needs further enhancement and update to allow for a change in strategy. The existing back log of resurfacing (i.e., where the existing seal age is older than the agreed default seal lives) has been caught up on given the significant amount of unsubsidised local share invested by Council and with the favourable tendered rates achieved through our combined resurfacing contract. There are still some old seals present in the network these should be dealt with in the short term. This allows us to approximately flat line our maintenance costs into the future given our current network condition, funding, and traffic volumes.

To avoid the likelihood of a bow wave forming in our forward works programme again from year 8 we have increased the budget by an extra \$100,000 to allow for the growth in our sealed network due to subdivision development and seal extension projects. The average life of the seals on the Secondary Collector is 15.30 years, with Access roads at 19.53 years and Access Low Volume are 17.45 average. There are, however, several seals much older than that, up to 34 years old. As the district develops with increased subdivision, more sealed roads are constructed and vested with Council there is the potential to create a backlog of older seals due to funding constraints. The other impact is the ever-increasing cost of bitumen against a fixed allocation from Waka Kotahi (NZTA).

Actual: In order to resolve the issues identified above, Council will budget between \$500,000 and \$530,000 for the first 7 years then increasing to \$630,000p.a. for the following years (all figures are in today's dollars) to keep pavement in a reasonable waterproof condition. This will maintain the asset with an average seal lifecycle of 18 years for the foreseeable future. This budget did not change significantly as a result of budgetary constraints.

- **Sealed Pavement Rehabilitation** – Normally, the average pavement renewal required is based on the assumed life of 75 - 100 years. However, current funding levels dictate Council renew their pavements at a rate of approximately 800m of rural network per annum, based on a sealed network of 213.37km, current co-investment levels from Waka Kotahi allows for a replacement lifecycle of approximately 257 years. This is an unsustainable position going forward, especially when Council must allow for the rehabilitation of areas that have suffered significant frost heave. Whilst these areas of weak pavement are identified and there is a significant investment on drainage improvements in these known areas, the nature of the Mackenzie District's harsh winters, means that this approach is not always successful within current budgets. The nature of frost heave can be from a minor pavement failure that will self-heal to a complete breakup of the road surface, exposing unsuitable subgrades which result in the regular access route being partially or completely impassable to all traffic. However, there have been significant changes in land use and intensification of farming practises over the last 11 years with water rights for irrigation becoming available. This has resulted in increased HCV's on a network which has not been designed for such loadings. Pavements are showing signs of increasing decay in terms of pavement deterioration due to the additional traffic. The level of funding will need increasing as the asset becomes fully consumed or failure becomes more prevalent, and maintenance is no longer the most whole of life cost solution going forward. This is also dependent on the classification of the road network whether this higher cost treatment is most appropriate, or a low-cost treatment will achieve a similar life cycle.

Actual: In order to resolve the issues identified above, Council has budgeted between \$130,000 and \$210,000 p.a. for the rehabilitation of sealed roads within the district. This budget did not change significantly as a result of budgetary constraints.

- **Unsealed road metalling** – The road user perception of unsealed roads is that they are of inferior quality to sealed roads due to issues with carriageway width, roughness, dust, mud, corrugations, potholes, soft areas, and increased vehicle operating costs. These issues are being continually assessed and inspected by the maintenance contractor and Council personnel with regular routine schedule grading maintenance being undertaken, programmed or renewal planned to keep the roads within the agreed and appropriate LoS. Majority of the time these roads are most economic to maintain as an unsealed road compared to seal. However, some of our high-country roads have or are tipping this balance and rural seal extension programmes are required to address these roads. We try to reduce these effects as much as possible first by balancing interventions through grading programmes based around ONRC/ ONF classifications, maintenance costs, signage, material selection, etc. Climate change and adaption to changing seasons is a constant challenge. With limited regular rainfall over longer periods, this is requiring a lot more "out of the box" thinking, various grading attachments and variance in wear due to traffic volumes.

Issues where continuous fault occurs may require further intervention or treatment through traction seal, other specific source treatment or through material property selection. There are also several roads that would benefit from rural seal extension or improvement from a safety perspective specifically where unsealed roads meet sealed roads or the intersection of unsealed road adjoining. A number of these roads intersect the State Highway as well as our higher volume rural roads and do not currently have sufficient seal backs in place to ensure adequate distance to decelerate. The roads that are reaching or are at the tipping point for seal extension are Lilybank

Road, Braemar Road, Hayman Road and Haldon Road. Each of these are in priority order. Some sections on these roads would benefit from intervention sooner rather than later.

The Council recognises that some unsealed road users may never be satisfied until “their” road is sealed but acknowledges that this is not always viable given the length of the unsealed network, seasonal/ varying use and cost involved. Council has policy around properties bordering unsealed roads in relation to dust nuisance sealing to mitigate these effects and have had for some time (2004). Waka Kotahi (NZTA) General Circular 16/04 have a general circular around dust to determine if cases are eligible for funding or not. Therefore, maintenance is aimed at maintaining the asset to an acceptable LoS for the lowest whole of life cost. However, on some route’s significant fluctuations in traffic volume affect both condition and the ability to maintain acceptable LoS economically. The higher priority roads typically receive the most traffic therefore attracting a greater portion of the re-metaling budget typically applied as wearing courses due historic performance.

The Roundhill Ski area on Lilybank Road has seen increased Ski traffic of up to 600vpd on a road designed to take its normal loading of 80 vpd to the high-country stations and Department of Conservation (DoC) walkways which are increasing in popularity with tourism. There was an expectation that the impacts of Covid 19 would lead to a significant reduction in tourism but there has been an influx of domestic tourism to the district which has meant the ski field has seen a number of record-breaking days during the 2020 season. This activity increases loading impacts the pavement at the worst possible time of the year. With access to DoC blocks increasing in popularity all year round also causes its own challenges with typically mid-summer and mid-winter being the worst times of the year for the roading network in the extreme dry when fines blow away and mid-winter when the pavements soften especially given the nature of these vehicles predominantly being setup for off road and four-wheel drive. Going forward it is uneconomic to maintain Lilybank Road as an unsealed road therefore we have planned to begin a seal extension project from the end of the existing sealed sections to form a seal road eventually from the beginning of Lilybank Road to the ski field.

- **Wearing course (Unsealed gravel renewal)** application is budgeted on an annual basis based on good historic records, and regular gravel loss surveys taken from 24 sites across the network. The results indicate that a treatment spread at 100mm is achieving the best whole of life cost given historic maintenance spreads were not achieving the life required laid at 40mm. Unsealed roads are prioritised yearly from Priority 1 to 3. Priority 1 condition is very poor and needs a full depth, recycle or stabilisation treatment to be able to continue to function as a road safely trafficable at 70km/h. Priority 3 is in poor condition showing corrugations and bony patches and evidence of topsoil showing through. Programmes over recent years have been very reactive, and it has been identified that further funding will enable completion of Priority 1 and intervention on Priority 2 roads and begin a gravel replacement programme to counteract gravel loss/migration.

Best Practice: As noted above, Best Practice would dictate a rural seal extension programme for Lilybank Road, Braemar Road, Hayman Road and Haldon Road which would ultimately reduce the cost of unsealed road metalling overtime offsetting maintenance with renewals. However, budget constraints limit Council’s ability to proceed with this work given the upfront costs. Therefore works have been spread over multiple years. This is further explained under ‘Seal Extensions’ below

Actual: The Council will continue to budget between \$700,000 and \$822,000 p.a. for unsealed road metalling works across the district. However, a significant portion of this budget will need to be invested into the high risk high volume roads to maintain LoS (i.e. Lilybank, Braemar, Hayman

and Haldon) as the seal extension programme for these roads has been pushed out beyond this LTP period. There is a risk that the maintenance and renewal costs for these roads continue to increase, especially if no seal extensions are undertaken in this LTP period.

- **Bridges** - Council's Bridge Replacement Strategy lists the bridges which are to be replaced over the next 10 years.

Best Practice: The table below identifies seven bridges will reach their end of remaining useful life in this period, however, only three have been identified for replacement with another bridge, two potentially to be handed over to the adjacent landowner, and another three replaced with a box culvert or concrete ford. This would come to a total replacement cost of \$3.25 million.

Actual: Council has decided to take a prudent approach with regards to its bridge replacement strategy. Of the bridges listed in the table 24 most only serve a single owner or have alternative access by an adjacent ford. These low access, low volume bridges are therefore not an immediate priority for Council and will not be replaced.

Council has also commenced a process to determine which bridges can potentially be divested back to the owner or alternatively which bridges can be replaced with a ford, or culvert. At this stage Goodman's Bridge fits into this category. Otama Road and Mowbray Road could also be replaced with a box culvert, which current funding can facilitate, if necessary.

Furthermore, Council will continue to undertake regular inspections to ensure the bridges are safe to use and still fit for purpose.

Council will still have budget within this LTP period for both maintenance and renewals activities for bridges. The council will seek to maintain the safe and appropriate level of service by maintaining and replacing structural components when necessary (e.g. running boards, wheel guards, side rails, etc.). It also allows for the clearance of gravel and debris build-up under the bridge to reinstate the design flow carrying capacity. Approximately \$200K per year is budgeted for renewal and maintenance activities for bridges (and structure components of bridges) over the next 10 years.

- **Footpaths and cycleways** – have been funded since the 2018- 21 LTP given the Government direction on mode shift, carbon neutrality, safety and wellbeing for the community. Council is looking to upgrade and install a number of footpaths within the district to encourage this uptake and reduce the number of vehicle trips to provide an improved level of service. Given the absence of public transport and the significant cost of establishment, it is unlikely this will occur for some time given the remoteness and isolation from each other. Autonomous short distance shuttle may be feasible once technology has evolved further and on international tourism returning but until then, is not likely. Over the previous LTP, period Council has been in a holding pattern due to the announcement of the roll out of ultra-fast broadband (UFB) project across the district, beginning in Twizel. Twizel is now complete with tidy up remaining and the other two main townships (Lake Takapo/ Tekapo and Fairlie) are programmed for rollout during this LTP cycle.

Best Practice: Council would ideally like to start the waterproofing of all the footpaths affected by the UFB rollout in Twizel beginning in 2021/22 and spreading the costs out over a 10 year timeframe. This minimises the risk of having a bow wave later on and allows for a more sustainable construction model. This is likely to worsen with the rollout of the UFB in Tekapo and Fairlie which is occurring now and into year 1 of this LTP period.

In terms of cycle paths, the Alps 2 Ocean cycle trail will require \$950,000 in year 1 and another \$200,000 in years 3 and 7 to off road a significant portion of this trail. This would be the safest approach.

Actual: Unfortunately, Council have had to reduce the amount of works undertaken on footpaths due to budgetary constraints. Waterproofing of footpath surfacing will not be undertaken significantly until 2024/25.

Financial constraints have reduced the Alps 2 Ocean budget to \$465,000, to be spent in year 1. This will mean a lesser portion of the cycle trail will be able to go off-road (assuming Waka Kotahi co-funding otherwise this length will be reduced further). This increases our safety risks and may require further interventions to be undertaken with increases in traffic volumes, addition activities, and/ or land use change.

- **Traffic Services Renewal:** Other renewal type works include sign replacement and streetlights replacement, which are allowed for within the renewal programme.

Actual: The Council has budgeted between \$88,000 and \$90,000 p.a. for this LTP period in order to maintain signs and streetlights in the district. This budget has not changed significantly due to budgetary constraints.

- **Environmental Renewal:** There is currently a need to replace the existing stormwater treatment system and facilities to meet modern standards. This would mean the replacement and upgrade of current infrastructure with stormwater treatment solutions. This would remove heavy metals / contaminants from road runoff prior to discharge.

Best Practice: The council originally budgeted \$50,000 p.a. to begin this type of work with focus on the most sensitive areas first (e.g. stormwater discharges toward Lake Tekapo).

Actual: Unfortunately, financial constraints means that Council are only able to budget \$24,500 in the first three years of this LTP. There is a risk that this will create a bow wave later on, particularly with the increase in focus on water quality standards.

- **Car Parking Renewal:** The Council identified a need to renew and resurface a number of car parks across the district, primarily in the main urban centres. This is to accommodate the increase in traffic volumes and improve the level of service.

Best Practice: Initially the Council budgeted between \$200,000 and \$300,000 p.a. to accommodate this renewal works. This would improve customer satisfaction and provide improved facilities to businesses.

Actual: Financial constraints has pushed this work out so that only \$200,000 p.a. will be available by 2024/25. This increases the risk of customer dissatisfaction and may cause further deterioration of the assets.

2.12.6 Asset Development Plans

This plan recommends capital improvements to the existing transport infrastructure. Projects were identified through the Transportation Strategy and consultation process. The concepts and development preparation has been completed to date. However, the projects which were to be in Twizel and Fairlie were put on hold due to the Te Manahuna Ki Uta study (Destination Mackenzie Study), growth strategy, the urban design & spatial planning process and District Plan review. These are all the foundational building blocks to guide the strategy and direction for the Mackenzie District into the future.

For this reason, council have focused on completing projects that only received positive feedback during consultation and isolated projects which did not affect future plans. Since Covid 19, there has been a rethink around project prioritisation. The focus has shifted from tourism prioritised projects; to more wide ranging district projects. These typically feature further down the prioritisation list and historic improvement expenditure were not likely to get funding for some time. This has also allowed further funds to complete safety projects which will improve the district and minimise risk. The tourism focused works have not been forgotten completely and still feature within the priority with some having been included in the LTP. Studies are now underway and progressing well with some nearing completion creates further certainty. The reason for inclusion is to prepare for the return of tourism and address some of the major projects which will cause significant disruption while it is quieter. The works included are as follows:

- **Low Cost Low Risk** improvements projects may now be budgeted up to an expenditure amounting to \$2,000,000 per project (up from \$1,000,000) in line with Waka Kotahi (NZTA) funding rules. Projects that fall above this amount or are part of a staged process that will or potentially exceed this amount are to be specified as a project.

Best Practice: The Council identified a comprehensive Low Cost Low Risk Programme of works which increased spending from \$300,000 p.a. to between \$1,500,000 and \$1,765,000 p.a. (2021-24 approved programme). Due to almost a complete downturn in international tourism as a result of the Covid 19 pandemic and the uncertainty of when or if this market would return; Council flipped their programme to a more district focused programme focusing on safety improvements, mode shift, seal extension and tourism. This was to focus on moving the network into the future transitioning from a rural network to a formed sustainable network built to addressing networks issue and deliver on strategic documents and visions. These projects were programmed but typically featured further down the list below tourism pressure improvements. The Best Practice programme therefore included minor safety works, seal extension, seal widening, footpath formation/construction, traffic services upgrade, road and access improvements around main centres, alignment improvements, bridges and other minor improvements works.

Actual: Financial constraints has reduced the amount of Low Cost Low Risk projects so that in year 1 Council will spent \$1,053,000 . In years 2 and 3, Council have budgeted less than \$450,000 per year, increasing to ~\$850,000 p.a. in 2024/25 and increasing again in 2027/28 to ~\$1,220,000 p.a. This step-up approach prioritises safety improvements in the short term (predominately site benching) and only starts to invest in seal extension, seal widening, footpath formation/construction, traction seals, road and access improvements around main centres and alignment improvements until 2024/25. There is a risk that this updated programme will create further bow waves in the future.

- **Urban Seal Extensions** – The Council has several prioritised sites for urban seal extension to reduce life cycle costs and provide improved level of service for users and communities. These are based on strategic importance and local knowledge.

Best Practice: Council initially budgeted \$160,000 per annum to deal with dust and maintenance issues in the Eversley Reserve, Kimbell and Tekapo Beauchamp Road. Typically, this type of activity is only undertaken if Waka Kotahi (NZTA) financial assistance is available. However, it was considered Best Practice to fund this activity (despite the lack of financial assistance) to respond to increasing community pressure and to reduce the increasing costs of maintenance & renewal and improve safety on these urban unsealed roads. This is considered to be more sustainable, especially considering the uncertainty around acquiring the necessary materials (i.e. gravel).

Actual: Due to budgetary constraints, Council have requested financial assistance from Waka Kotahi (NZTA) to assist in the urban seal extensions along Eversley Reserve, Kimbell and Tekapo Beauchamp Road. This activity has now been absorbed into the Low Cost Low Risk activities and has also reduced to between \$30,000 and \$60,000 p.a. and will not commence until Year 4. This does mean that Council will no longer fund 100% of urban seal extensions at this time. But also reduces the length of seal extension which can be undertaken within this LTP period. This increases the risk of a bow wave later on and also may cause further deterioration and customer dissatisfaction which have been discussed as part of the process.

- **Rural Seal Extensions** - Allowance has also been made for rural seal extensions (as discussed in the unsealed section above) which now exceed appropriate traffic volumes for an unsealed road.

Best Practice: A Best Practice approach would include an allowance for scoping and planning for year 1 (at \$12,000) and then from Year 2 onward a budget of \$300,000 p.a. would be allocated to the end of this LTP period and possible continue past this. This work could be completed in stages, with the ultimate goal being the completing improvements (i.e. sealing) of all high risk roads where required overtime. Lilybank Road, Braemar Road, Hayman Road and Haldon Road would be prioritised (in that order). It should be noted that Council can override this decision and utilise funding elsewhere if the need arises.

Actual: At this stage, Council is unable to undertake any seal extension projects due to budgetary constraints. A \$12,000 expenditure remains in Year 1, to prepare a business case/scoping study for future possible works. However, the need for these seal extensions still exists and is critical for mitigating/ offsetting the increasing maintenance and renewal costs into the future. This work has been pushed out to 2031.

2.12.7 Asset Disposal Plan

Council currently has within its asset register 20 bridges that service only one ratepayer. Further discussions and policy/legal decisions need to be made regarding future ownership and replacement of these bridges during Y1 of this LTP period.

At this stage, the Council has no specific plans or programme for disposal of components of the roading asset. This may come out of outcomes of policy and legal decisions once formalised by Council Asset disposal is dealt with on a case-by-case basis.

2.13 ASSET MANAGEMENT PRACTICES

Council employs a Group Manager-Operations, Engineering Manager, a Roading Manager, a Consent Engineer, an Engineering Officer and an Assets Administrator who are responsible for assistance in the management of the road asset. The year one allowance has been made for a Data/ Asset Management Officer and a Network Inspector to assist in the transportation space. The data/ asset management role is to work with the roading manager and aid in compiling, accuracy checking, loading, analysing, displaying and manipulating data while also assisting in the asset management and strategic plan preparation and development. The network Inspector Role is primarily to work with the Roading Manager and wider team to aid in the delivery of the maintenance contract works across the transport system, monitor maintenance works, undertake regular network inspection, collect data, aid in the upskilling and knowledge transfer to staff, aid in the establishment of long term sustainable forward works programmes across all activities and deal with the increased demand of the district given the growing number of subdivision and vested assets coming online with the amount of growth in the district. This will provide essential resource and ensure consistency and succession planning for the organisation into the future and aid in delivery.

Management planning is generally actioned in-house based on the knowledge of the Engineering Manager/ Roading Manager assisted by such planning tools such as the RAMM software tools, condition modelling using graphs and excel spread sheets.

Council has previously had in place a Multi-Party Funding Agreement (MPFA) with Timaru District Council to provide professional services to assist with the management of the road network. This provided the ability to buffer workloads, provide expertise that we may not have available and helps with consistency of asset management practices across both Councils. With increase in work programmes requirements and workloads for both councils, this has become more difficult to achieve the staff sharing of resource agreement. For this reason, we are needing to bring some service delivery back in house highlighting resourcing issues in our team as well as in the sector, to aid in the delivery with outside help also having minimal capacity. The Road Efficiency Group (REG) focus around data and the better business case process in conjunction with Waka Kotahi is requiring significantly more work than previously to meet requirements and deliver on reporting requirement given the drive to improve these elements.

Occasionally elements of the management of the network may also be negotiated with consultancy services. For specialised works or where a specific area of expertise is required a consultant will typically be employed to aid or carry out the specific works i.e., structure inspection.

Physical works are managed in accordance with the procedures documented in the flowcharts shown in Appendix IV. Routine maintenance has historically been undertaken through a competitively tendered contract (common specification for Ashburton, Mackenzie, Timaru and Waimate District Councils) of normally 3-to-5-year duration. The contract is due for retender Ashburton went out alone to the market last year with revision two of the original contract document due to issues with delivery on the ground and several other commercial reasons. Timaru and Waimate are currently out to the market with a consistently written revision 3 of the original contract and adopting some of Ashburton's document amendments (with Mackenzie inputting and contributing throughout the development

process). This has been released to the market to be tendered as two separate contracts using a similar contract specification.

Mackenzie required a 17a Review to be completed so pulled out of this contract late in the piece as we were not able to meet the timeframes of our other partners to allow sufficient time for this to be completed. As part of this process Mackenzie District Council have chosen to step back as part of this process and ensure a fit for purpose contract is in place to deliver outcomes sought into the future. Given the organisational change and the change in councils strategic approach to a sustainable infrastructure strategy it was deemed this was the most appropriate time for a step change away from a traditional maintenance contract. Council is committed to adopting a new procurement process. This will include:

- a request of interest (ROI) process
- an initial selection process for suitability
- short list and request for further information
- detail and submission
- review response and appoint an appropriate contracting party
- begin partnership and negotiate terms and conditions and an appropriate contract model and form to deliver appropriate outcomes.

We envisage this will take the existing works to date the next step forward to be revision 4 in the Aoraki Collaboration.

Other physical works contracts are provisioned such as resurfacing (joint two-year resurfacing contract with Mackenzie, Timaru and Waimate District Councils). The retendering process for Contract has changed significantly. Larger pavement rehabilitation (>1000m in length) and bridge renewals are let as competitively priced contracts generally on a year-by-year needs basis.

Council accounts for revenue and expenditure on an accrual basis. All works are identified through a job cost ledger with an appropriate breakdown level to be able to monitor and report on revenues and expenditure to Waka Kotahi (NZTA) and Audit NZ requirements. All claims and dispatches are reported and claimed in the Finance application in RAMM. All external reports are prepared in compliance with generally accepted Accounting Principles.

2.13.1 Collaboration

Mackenzie District Council is working in collaboration with other boundary Councils. The Mid-South Canterbury Roding Collaboration (ARC) comprising the Councils of Ashburton, Mackenzie, Timaru and Waimate Districts.

On the 28 October 2014, the first Memorandum of Understanding (MoU) was signed between Ashburton, Mackenzie, Timaru and Waimate District Councils. This was to actively seek to collaborate and co-operate with each other to improve effectiveness and efficiency with which they achieve the identified objectives and desired outcomes for specific aspects of roading asset management and network operations. The roading networks are the local roads within the four (4) Districts and due to the differing natures of the parties and their respective networks, the level of participation by each party varies across the numerous asset management and network operations.

The Councils will improve management and operations of their road networks by working together. In doing this the objectives of the collaboration are:

- Continually improve the performance of their asset management processes, the outcomes and consistency of service delivery in respect of their respective road networks.
- Improve investment decision-making, while recognising and accepting appropriate risk.
- Attract, develop, and retain good internal human resources and capability.
- Enhance governance through shared policy and strategy.
- Provide a sustainable market for affordable specialist resources.
- Become “smarter buyers” and recognised as leaders with best practice in asset management and road network operations.
- Enhance customer satisfaction.
- Formulate Programmes of work that will enhance the delivery of local services.
- Further embed safety in the cultures of the respective organisations.

Currently, as part of the collaboration, the following contracts have been successfully awarded:

- Road Network Operations and Maintenance Contract
- Joint procurement and documentation
- Road Resurfacing Contract

With the Collaboration work that is happening between the different Councils, Mackenzie District Council has been given the opportunity to look at other contract modes, work done by REG Procurement subgroup, REG Case Study, and obtaining constructive feedback from contractors involved in the collaboration work.

The next step in the process to put a performance standard with a metric to deliver measurable deliverables and outcomes sought to further enhance and build on where we have come from to where we are now heading into the future. This requires further higher level direction in terms of governance to make significant inroads and deliver on more integrated plans and strategies into the future. This will require equal buy in for all parties to work toward a common goal to realise success.

2.13.2 Asset Management Processes

Council uses the LTP process to identify community concerns and issues which are incorporated into levels of service that are expressed by performance measures written into the professional services and physical works contracts. The satisfactory execution of these performance measures results in levels of service compliance that ensures the Council’s outcomes are achieved and the community vision of a district they wish to live in is accomplished.

Well documented standards and processes exist for an on-going inspection programme of pavements, surfacing and bridges (see appendix VI).

Maintenance and renewal costs are recorded against activities that relate to Waka Kotahi (NZTA) work categories in the general ledger.

The Council has a formal risk management process, policy and framework for the organisation. A specific risk register for transportation is included as part of this AMP in section 8.

2.13.3 Asset Management Systems/ Traffic Counts

The Road Asset Maintenance Management (RAMM) database now rebranded as Think Project is used as the asset inventory management system and is the depository for all the available asset data, including streetlights. The assets are recorded in RAMM but are managed offline and routine updates uploaded into the database. Street lighting is maintained in RAMM through our MPFA with Timaru District Council. The Council is likely to take this on in future given changes of staff and availability of resource. Mackenzie now has a new contract with NETcon to supply services.

A regular counting programme is in place to monitor traffic volumes on the network. Traffic counts are completed primarily on roads that are targeted for improvement or are showing signs of accelerated failure. We also undertake general counting operations to assess the overall network and changes in traffic volumes

Accident data is recorded from police reports to the CAS database by NZTA. Council obtains crash information, and other reports as required by direct request to our Road Safety Co-ordinated or NZTA.

Other systems operated by the Council are:

- ArcGIS Geographic Information System
- NCS Corporate financial management system
- Electronic document management system
- Hardcopy document filing systems
- Hardcopy plan filing systems

2.14 PLAN IMPROVEMENT AND MONITORING

This AMP has previously been reviewed and had updates incorporated into it including improvements to move towards “Core+” (Intermediate) level Asset Management. Council is committed to continual improvement as outlined in Section 10. A key objective is to dovetail the activity management planning process with the other key planning processes particularly the 30-year sustainable infrastructure strategy and the Community Long Term Plan (LTP).

The review and improvement of this AMP requires resource and budget in order to complete the selected improvement tasks. Review and audit both internally and externally of the document outlines the items for improvement, relative urgency, resource, priority, budget and the authority sought to give approval to complete each item.

2.15 KEY FACTORS ASSUMED IN DEVELOPING THIS ACTIVITY MANAGEMENT PLAN

There are a number of key factors assumed in the development of this AMP as outlined below.

2.15.1 Asset Data

The level of confidence in our data has remained relatively static since the last iteration of this AMP completed in 2018. Data has been updated, but the focus has been on removing historic errors to improve data quality going forward. Council has carried out a significant auditing and validation programme on its RAMM data, completed by OPUS Consultants Ltd (now WSP). All previous assets

excel spreadsheets and modelling practises have been integrated with this validated data. Subsequent to this as part of the Road Efficiency Group (REG) group there has been a report released rating all Local Authorities RAMM Data sets. There are still areas that require Council attention in the RAMM databases:

- Traffic count data could be more complete and representative of the wider network
- Missing remaining useful life data makes it difficult to determine renewal profiles based on the age of the asset given some are unknown given they are historic assets and that an assumption would need to be made otherwise.
- More complete records of asset attributes would assist in the monitoring and assessing of assets.

Council undertake regular inspections and conditions assessment on its assets to determine whether the asset is in need of replacing (see section 6.2.2 of the Transportation AMP for details on how condition assessments and inspections are undertaken on roading assets). More complete and accurate data would help streamline and forecast for future renewals and capital works.

Table 17 gives the assessed data confidence quality of the Council RAMM and spread sheet data tables as described in the 2019 Roding Asset “Mackenzie District Infrastructure Revaluation” report.

Deleted:

2.15.2 Financial Forecasts

Waka Kotahi’s (NZTA) 10-year National Land Transport Programme (NLTP) for Mackenzie District is based on targeted maintenance with slight increases across some areas where there is greater need or a gap in Level of service of the existing and increased roading infrastructure (via. development). Renewals have increased slightly more in a few specific areas due to resource availability around gravel supply. A changing climate and the increased wear and tear on the roads (due to increasing traffic) has meant a need for improved drainage. This requires either culvert replacement or side and back drain cleaning to limit the effects of wet weather events. Additionally, the roll out of UFB across the district delayed the footpath maintenance programme meaning there is now a need to undertake an increased level of maintenance. We are now able to begin works again to waterproof footpaths now that the Twizel portion of the project is complete. This needs to begin in year 1 as it will be a staged process and as the whole of the Twizel installation was completed using open trenching. Paired with an escalation across renewal programmes. Over the next 10-year period there has allowance for cost increases due to inflation.

The forecast total for the Mackenzie District Transport Programme for 2021/22 for operations, maintenance and renewals totals \$4.417M (inclusive of all administration costs and professional service fees).

- 35% of this is to be spent on maintenance and operation
- 54% to be spent on renewals.
- 11% to be spent on improving the level of service

This is focused on capital improvements for the district, resourcing the option appropriately, increases in procuring gavel and addresses the network needs, which deals with deferred maintenance, due to restricted funding for a number of years. The reason for the increase is the move away from maintaining in perpetuity to being focused of a sustainable infrastructure strategy. These changes stem from a change in council strategic view and direction, organisational review/ change process,

growth projection study and strategic and urban planning/ spatial planning works. This is not an increased level of service.

The \$300,000 approved in the 2018/21 LTP based on community consultation, for WC 341. As part of the NLTP \$400,000 – 1,050,000 was approved by Waka Kotahi NZTA. For the 2021/24 NLTP preparation process budgets were requested with significant increase to address a number of network issues and level of service focused on safety, mode shift, rural network, urban townships and tourism. Also, some of this spend is to limit maintenance expenditure into the future by removing and addressing problem areas. The budget has moved from \$300,000 p.a. to between \$443,000 and 1,246,000 p.a.¹ to allow for Low Cost Low Risk projects to address network issues and deliver on safety priorities in the short term and then focusing on mode shift, transportation strategy works, spatial planning transportation outcomes, address level of service issues and urban seal extension. Into the future we are forecasting this to remain Reduced funding to existing levels maintenance, renewals and improvements will mean one project or several small projects will be delivered.

Funding at LTP and NLTP request levels will maintain and work on improving the network addressing network needs, addressing maintenance issues, and building on and improving current levels of service in the maintenance and renewal space towards a sustainable infrastructure strategy. Allowance has also been made for a new maintenance contract award for year one with targeted increases to address specific network issues. With improvements being made to aid and improve safety, reduce maintenance into the future, improve opportunity and facilities to enable mode shift, raise levels of service, while delivering on planning outcomes consulted with the community. Further increase in primarily improvement spend means that network improvement project can be accelerated further meaning the same amount of improvement can be completed in a shorter timeframe therefore improving safety interventions, levels of service, mode shift, seal extension, etc in a shorter timeframe. Maintenance cost and renewals would reduce in the interim providing network issues are the focus and are address i.e., unsealed roads, drainage, etc. Over time maintenance costs would vary and go up again for instance surfacing maintenance and renewal cost presuming that further seal extension is undertaken.

Funding for the management and maintenance of the road network is provided from the District roading rate and co-investment received from Waka Kotahi (NZTA). Funding for improvements is provided from Waka Kotahi (NZTA) co-investment and the targeted roading rates.

As of 1 July 2019 the total optimised replacement cost of the Roding Infrastructure was assessed to be \$166,902,154. The total optimised depreciated replacement cost was assessed to be \$116,561,399. The annual depreciation or decline in service potential has been determined to be \$2,304,260 per annum.

A check of the annual renewal expenditure against the Annual Depreciation (AD) for each asset component gives an indication whether the renewal expenditure is appropriate for the age and condition of the network. For asset components nearing the end of their expected lives a figure greater than the depreciated costs would be expected to be spent. For situations where the asset component is new or only partially through the expected life the budgeted expenditure would be expected to be less than the AD with the balance banked so as funding will be available when required. Table 4 shows the 2021/22 forecast renewal expenditure compared to the Annual Depreciation.

Table 4: Comparison between Forecast Expenditure and Annual Depreciation

¹ These are uninflated values

Asset Type	2021/22 Renewals Forecast	2024/25 Renewals Forecast	Annual Depreciation
Pavement (Unsealed road metalling, seal road resurfacing, pavement rehabilitation)	\$1,444,000	\$1,562,000	\$1,338,031
Footpaths	\$32,000	\$210,000	\$144,520
Structures	\$51,000	\$68,000	\$404,153
Drainage/ SWC	\$99,800	\$110,000	\$243,074
Traffic Services/ Lighting	\$88,980	\$90,000	\$174,482

From the comparison shown in [Table 4](#), expenditure is probably appropriate for most assets in relation to the Annual Depreciation. However, under investment is indicated for Structures and Drainage assets. Staff have been targeting the areas of greatest need in the network, which include replacement of unsealed road gravel, resurfacing and/or replacement of sealed pavements. Higher focus for 2021/24 has also been given to drainage traffic service, footpaths etc. especially with seasonal variances and extremes in weather events at both ends of the scale with further climate change effects predicted into the future. Being historically a rural network there is also several safety issues to address. Development adds to these pressures especially in rural residential and/ or peri urban areas on fringes of existing townships forming a disconnect and then subsequently infilling overtime.

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Key factors assumed in the financial forecasts are as follows:

- Waka Kotahi (NZTA) will continue to provide financial support to Council for the road network.
- The Council will support and continue to fund the level of service currently set out in this AMP and consulted on in the 2012-22 LTP.
- The dollar values shown in this Plan are December 2020 dollars.
- Renewal costs are best available estimates, based on current network needs, some especially very long-term estimates (greater than five years), are rough order of cost estimates that need to be further researched and refined.
- The effects of known very likely or future developments are included.
- Assumptions made on Total Useful Lives and Residual Useful Lives of the assets in relation to the asset valuation.
- The asset data is reliable and fit for the purpose for developing the long-term financial forecasts.
- Waka Kotahi's (NZTA'S) Funding Assistance Rate (FAR) now at base co-investment rate of 51% for the of the LTP period will remain at this level or increase.
- There has been increases in the Network and asset management field to allow for increases in resource to aid in the delivery of the transportation network given the ever increasing data analysis, continuous improvement, reporting costs, document preparation, collaboration, data collection/ testing, as a direct ONRC to ONF transition.

- It is thought that sufficient allowance has been made for potential change in level of service for the next 3-year funding block and resultant co-investment as a direct result of implementing One Network Framework implementation and transition.

2.16 FINANCIAL FORECAST

2.16.1 Proposed Future Capital Works Programme (inflated)

ROADING (\$ thousands)	Primary Type	LTP Budget Yr 1 2021/22	LTP Budget Yr 2 2022/23	LTP Budget Yr 3 2023/24	LTP Budget Yr 4 2024/25	LTP Budget Yr 5 2025/26	LTP Budget Yr 6 2026/27	LTP Budget Yr 7 2027/28	LTP Budget Yr 8 2028/29	LTP Budget Yr 9 2029/30	LTP Budget Yr 10 2030/31
Roading Professional Services											
Plant and Equipment	Renewal	20	12	13	3	13	3	3	4	4	4
District Rooding											
Rural Seal Extensions	LOS	12	0	0	0	0	0	0	0	0	0
Unsealed Road Metalling	Renewal	700	722	743	898	924	951	979	1,007	1,036	1,066
Sealed Road Resurfacing	Renewal	500	516	531	579	596	613	631	772	794	817
Drainage Renewal	Renewal	90	93	96	120	124	127	131	135	139	143
Sealed Road Pavement Rehabilitation	Renewal	130	134	138	229	236	243	250	257	265	272
Structures Component replacements bridges	Renewal	30	31	32	74	64	79	81	70	86	88
Structures Component replacements cattle stops	Renewal	0	0	0	0	18	0	0	20	0	0
Bridge & Structures Renewals	Renewal	52	54	55	58	78	61	63	85	67	69
Environmental Renewals	Renewal	25	25	26	0	0	0	0	0	0	0
Cycle Path Renewal	Renewal	466	0	0	0	0	0	0	0	0	0
Footpath Renewal	Renewal	210	217	223	229	236	243	250	257	265	272
Streetlight LED Upgrade	LOS	727	12	13	13	13	14	14	15	15	16
Low Cost Low Risk Improvements	LOS	1,053	464	462	948	947	976	1,484	1,509	1,523	1,610
Car Parking Renewal	LOS	0	0	0	219	225	231	238	245	252	259
Urban Seals	LOS	0	0	0	0	0	0	0	0	0	0
Walking & Cycling Projects	LOS	0	0	0	82	84	87	89	92	95	97
Traffic Services Renewal	Renewal	88	91	93	98	101	104	107	110	113	117

ROADING (\$ thousands)	Primary Type	LTP Budget Yr 1 2021/22	LTP Budget Yr 2 2022/23	LTP Budget Yr 3 2023/24	LTP Budget Yr 4 2024/25	LTP Budget Yr 5 2025/26	LTP Budget Yr 6 2026/27	LTP Budget Yr 7 2027/28	LTP Budget Yr 8 2028/29	LTP Budget Yr 9 2029/30	LTP Budget Yr 10 2030/31
Total Roding Capital Expenditure		4,102	2,370	2,425	3,552	3,659	3,733	4,321	4,576	4,653	4,831

2.16.2 Annual Net Cost – Funding Impact Statement (inflated)

Roading Supply	Annual Plan 2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/20 30	2030/31
	<i>(thousands)</i>										
General rates, uniform annual general charges, rates penalties	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	1021	1104	1413	1718	2452	2917	3282	3592	4014	4103	4109
Subsidies and grants for operating purposes	953	943	970	998	1009	1036	1065	1094	1130	1155	1187
Fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal charges and overheads recovered	0	0	0	0	0	0	0	0	0	0	0
Local authorities fuel tax, fines, infringement fees, and other receipts	0	95	98	101	103	106	109	112	116	119	122
Total Operating Funding (A)	1974	2142	2481	2817	3564	4059	4456	4798	5260	5377	5418
Applications of Operating Funding											
Payments to staff and suppliers	1723	1853	1896	1958	2405	2493	2578	2592	2687	2780	2796
Finance costs	0	8	25	35	52	67	75	95	99	99	99
Internal charges and overheads applied	22	35	36	36	54	55	56	57	58	60	61
Other operating funding applications	0	0	0	0	0	0	0	0	0	0	0
Total applications of operating funding (B)	1745	1896	1957	2029	2511	2615	2709	2744	2844	2939	2956
Surplus (deficit) of operating funding (A-B)	229	246	524	788	1053	1444	1747	2054	2416	2438	2462
Sources of capital funding											
Subsidies and grants for capital expenditure	1530	1826	1188	1211	1685	1728	1762	2052	2175	2211	2291
Development and financial contributions	0	0	0	0	0	0	0	0	0	0	0
increase (decrease) in debt	0	1128	657	426	815	486	225	215	-14	4	77

Gross proceeds from sale of assets	0	0	0	0	0	0	0	0	0	0	0
Lump sum contributions	0	0	0	0	0	0	0	0	0	0	0
Other dedicated capital funding	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding (C)	1530	2954	1845	1637	2500	2214	1987	2267	2161	2215	2368
Capital expenditure											
- to meet additional demand	0	0	0	0	0	0	0	0	0	0	0
- to improve the level of service	1445	1792	476	475	1262	1269	1308	1825	1860	1885	1982
- to replace existing assets	1759	2310	1893	1950	2290	2390	2425	2495	2716	2768	2848
Increase (decrease) in reserves	-1445	-902	0	0	1	-1	1	1	1	0	0
Increase (decrease) of investments	0	0	0	0	0	0	0	0	0	0	0
Total applications of capital funding (D)	1759	3200	2369	2425	3553	3658	3734	4321	4577	4653	4830
Surplus (deficit) of capital funding (C-D)	-229	-246	-524	-788	-1053	-1444	-1747	-2054	-2416	-2438	-2462
Funding Balance ((A-B)+(C-D))	0	0	0	0	0	0	0	0	0	0	0

3 INTRODUCTION

This section sets out the purpose of this AMP and shows the plan framework.

3.1 PURPOSE OF THIS PLAN

The purpose of this AMP is to outline and summarise in a coordinated manner the Council's long-term asset management approach for the provision, intergenerational and sustainable management of the transportation system throughout the District. This may also be considered the overall objective of Asset Management.

This AMP is intended to be read in conjunction with the Long-Term Plan (LTP) programme business case and fulfils requirements of the Local Government Act 2002 (LGA), - Schedule 10.

Activity Management Planning is a management tool that provides the link between Council's strategic direction, strategic planning and managerial areas of Council's business and community's desired outcomes.

The need for AMPs for Council's major infrastructure and other major assets is an implied requirement of the LGA and the Long-Term Plan (LTP). Such AMPs define agreed levels of service, and the expenditure required to maintain these agreed service levels for the period of the plan.

This AMP is also to serve as the overall document for outlining the overall transport system, explaining why decisions are made and serves as part of the business case for Waka Kotahi (NZTA) as part of the better business case approach. The AMP also incorporate the One Network Road Classification which is to transition to the One Network Framework over the 2021/24 LTP period and associated measures.

Levels of service are the definitions of service quality resulting from operation of the particular asset against which the assets service performance may be measured. Levels of Service are one of the key outputs from the strategic planning process and typically comprise the following elements.

- Quantity
- Quality
- Cost
- Amenity
- Safety/ Risk
- Timescales
- Performance Measures
- Sustainability

3.2 RELATIONSHIP WITH OTHER PLANNING DOCUMENTS

The Activity Management Planning process analyses the impact of the Levels of Service on the business and should be structured to be compatible with other key planning mechanisms and documents, including:

LTP: Council's LTP sets out the broad strategic direction for the period of the plan, defining the District Vision, Outcomes, Strategic Objectives, Projects and Tasks and the Financial Framework that will be required. The outcomes are directly related to Governance, Community Well-Being, Environment Protection, Sustainability, Economic Development, and Organisation Performance.

District Plan:

Section 73 of the Resource Management Act requires the Council to always have a District Plan for its District.

The District Plan specifies objectives, policies and methods, in relation to resource management issues in the District, to achieve the integrated and sustainable management of the District's resources. To achieve the objectives and policies of the Plan, rules are included which prohibit, regulate or allow activities.

The Council has adopted the principle of zoning. This technique recognises that different areas of the District will have different resources, character and levels of amenity and that the community will seek different environmental results for these areas. The zones provide opportunities for future development in keeping with the character and amenity sought for these different areas. Any activity must comply with the rules applicable to the zone in which it is situated, as well as general district rules covering a range of matters such as subdivision, heritage values and transportation.

The operative district plan (2004) is significantly out of date for the change in the district over this time period. Council is currently in the process of reviewing this which should be completed by the end of the 2021/24 LTP period. Council engaged with local Rūnanga early through Aoraki Environmental Consulting (AEC) in the process and are engaged as key partners/ stakeholders with council and have been to date and will continue to be part of this process with a relationship being built. Several enabling studies, consultation, workshops and conversations have been undertaken to inform this process, some of these include a growth projection study, spatial planning/ urban design study. Aoraki Environmental Consulting (AEC), Rationale and Boffa Miskel have been involved in leading and guiding the process to date with assistance from staff and input from the community and council representatives. Te Manahuna Ki Uta (Destination Mackenzie study) focused around 30 -50 years with the outlook of 100 year continues to be progress and this will be incorporated and inform this process as well once complete

30 Year Infrastructure Strategy:

The LGA requires that a local authority must prepare and adopt, as part of its LTP, an Infrastructure Strategy for a period of at least 30 consecutive financial years.

The task of building, operating and maintaining infrastructure assets in an affordable manner is becoming increasingly difficult in view of:

- Demographic changes
- Environmental impacts
- Development/ growth
- New technologies
- Climate Change Effects
- Continually changing legislative environment (Central & Regional Government)
- Infrastructure resilience/sustainability
- Ageing of infrastructure
- Availability of natural resource i.e. gravel
- Carbon Neutral targets
- Road efficiency group REG requirements continuing to grow
- Impact of Pandemic and natural events
- Static funding levels
- Reduction in co funding

- Level of service
- Increase vehicle dimensions and weights
- Traffic volumes
- Land intensification

Council has considered these impacts and developed a strategy to guide decision-making for the next 30 years.

Annual Plan and Budget:

The works identified in this AMP will form the basis on which future annual plans are prepared.

Procurement Strategy:

This is required by the Land Transport Management Act and signals Council's intentions for procurement of subsidised land transport activities.

Contracts:

The levels of service, strategies and information requirements contained in AMP's are translated into contract specifications and reporting requirements.

Bylaws, standards and policies:

These tools for asset creation and subsequent management are needed to support Asset Management (AM) tactics.

Other Transportation Related Plans:

These include:

- MDC Transportation Strategy
- Walking and Cycling Strategies
- Regional Policy Statements
- Regional Land Transport Strategy
- Regional Passenger Transport Plan
- Government Policy Statement (Land Transport)
- New Zealand Transport Strategy
- New Zealand Walking and Cycling Strategy; Getting there on foot, by cycle.

Figure 12 illustrates the relationships between this LTAMP and other Council plans.

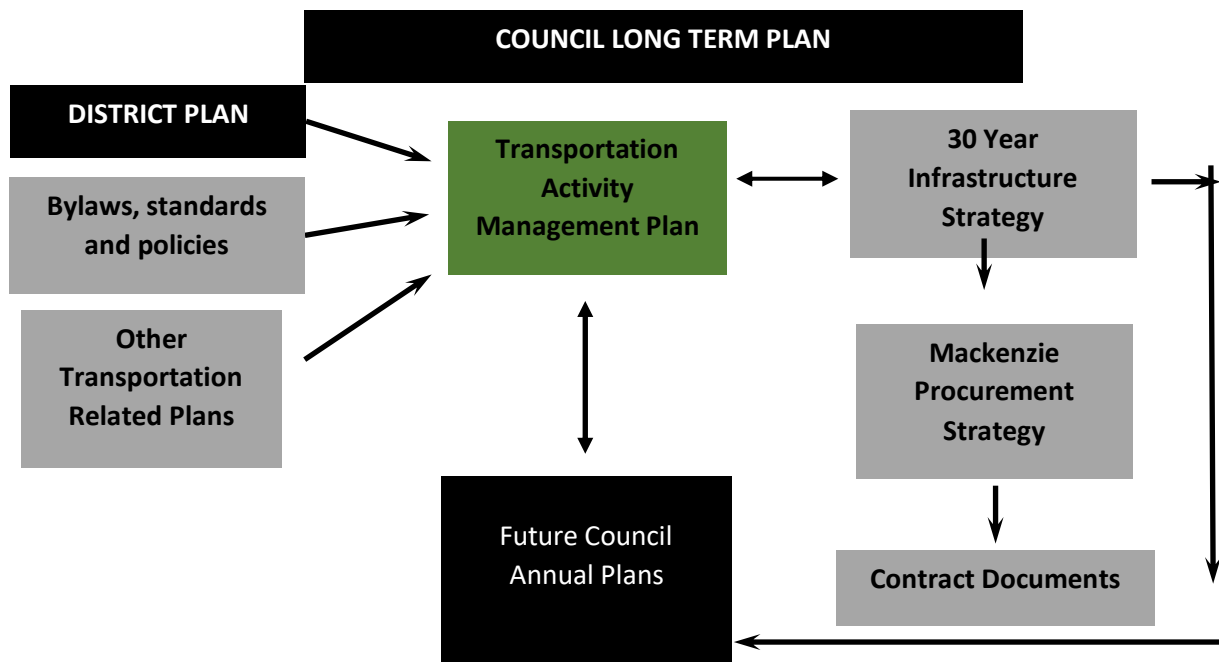


Figure 8 Strategic alignment of Transport AMP

3.3 ASSETS INCLUDED IN THIS PLAN

3.3.1 Location

Figure 9 shows the location of the district within the Canterbury Region. The Mackenzie District is bounded in the north and east by the Timaru and Waimate Districts, in the south by the Waitaki District and to the West by the Southern Alps/ Westland District boundary. There are two wards: Pukaki which in effect takes in the Mackenzie Basin and Opuha being the remaining area to the east of a line following the upper reaches of the Hakataramea River through Burkes Pass to Mt Musgrove in the Two Thumb Range.

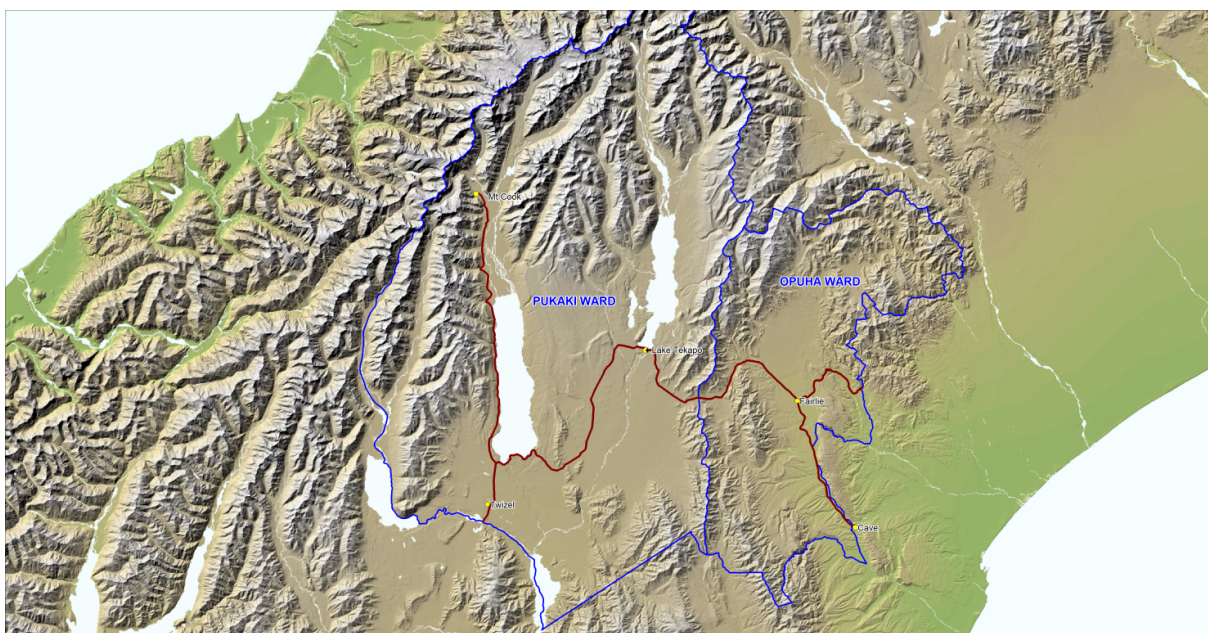


Figure 9: Map of the Mackenzie District

- State Highways 8, 79 & 80 are the responsibility of the Waka Kotahi (NZTA) which form the backbone of the local district roading network. With Mackenzie district roads feeding/hanging off the 'backbone'. The Mackenzie road network consists of "Secondary Collector" roads that lead from the State Highways into the remote areas of the District, form routes through the District or are the main through roads in the urban settlements. "Access & Low Volume Access" roads generally extend from these "Secondary Collector" roads to serve the remaining urban and rural areas and provide linkages.
- The condition of the roads is continually changing due to tourism, land intensification, climatic conditions, topography and traffic changes.
- As some inter district boundaries follow rivers, there are 7 boundary bridges. That have joint ownership. Four of these with Waimate (Cannington, Pareora Gorge (Martins), Cliffs & Gorge) and three with Timaru (Raincliff, Rockwood & Orari Gorge (Andrew Stream))

3.3.2 The Asset

The transport asset includes all Council owned road reserve, roads, streets, bridges, footpaths and related infrastructure within the District as shown in Figure 9.

Table 5: Transportation assets included in this plan

Asset Description	Sub-Asset Description	Quantity	Quantity (Updated 31/08/2020)
Land		1,395Ha	
Roads	All roads	732.19km	
	Urban - Sealed	50.07km	1,486,074m ²
	Urban - Unsealed	5.12km	2,357,730m ²
	Rural - Sealed	163.3km	
	Rural - Unsealed	513.65km	
Footpaths		59km	163,743m ²
Drainage	Culverts	18.07km	18,040m
	Catch Pits	309	309h
	Side Drains	16.1km	16,102m
	Soak Pits	40	61
	Earth Surface Water Channel	739.97	632,269m
	Kerb and Channel	63.8km	

Asset Description	Sub-Asset Description	Quantity	Quantity (Updated 31/08/2020)
Bridges	Bridges - Timber	7	All bridges 8,377m2
	Bridges – Other (Including 7 large Box Culverts)	88	
	Cattle stops	58	56
	Concrete Fords	20	45
Signage	Signs	3342	5,984 each
	Posts	1145	
Lighting	Lanterns (include brackets)	791	1,008 each
	Columns	696	
Features (gates, Intersections, Monuments, stockpile sites) 164			

Unformed/paper roads are not included except in the land area.

3.4 KEY STAKEHOLDERS AND CUSTOMERS

3.4.1 Key Stakeholders

The Council as the ultimate owner/guardian of the assets and the Crown (through Ministry of Transport financial assistance) wish to ensure that their investment as the majority shareholder is secure, and that the operational capability of the network is ensured. The Crown entity established to manage Transportation activities is the Waka Kotahi (NZTA). Other key stakeholders of the roading network include:

- Regional council
- Owners and operators of inter-connecting or co-located networks, including Waka Kotahi (NZTA) state highways
- Significant representative user-groups such as Road Transport Association (RTA)

3.4.2 Funding Partners

Funding is provided by several parties and in particular the following are significant contributors:

- Waka Kotahi (NZTA)– The District Transportation Programme is financially assisted by Waka Kotahi in accordance with operational requirements set out in Waka Kotahi (NZTA) Programme and Funding Manual.
- Ratepayers – Rates provide funding for non-subsidised activities and the Councils “local share” of subsidised works.

- Both Waka Kotahi (NZTA) and Council are partners in delivering Transportation Activities to the community.
- Recently Central Government has set up the “Tourism Infrastructure Fund” to assist Council to support the development of public infrastructure that is used by visitors.
- The ‘Provincial Growth Funding’ and ‘NZ Up Fund’ which are contestable funds made available for large infrastructure projects.

3.4.3 Customer Groups

Council’s customer’s fall into three different groups: associated service providers, users and the wider community. These are shown in the figure below and further detailed in the following table.

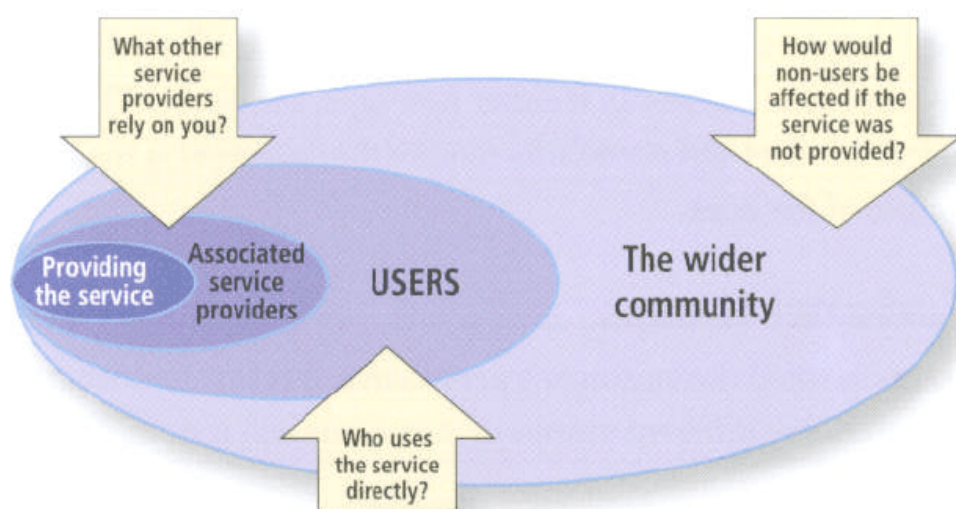


Figure 10: Customer Groups (Ref IIMM Figure 2.1.6)

Table 6: Council’s Roading Customer Groups

Customer Group	Description	Customers
Associated Service Providers	These are other service providers who rely on the transportation network	<ul style="list-style-type: none"> • Contractors • Utilities service providers – use the road corridor to access their assets • Transport operators • Emergency Services
Users	Those who directly use the service	<ul style="list-style-type: none"> • Private drivers • Commercial road users • Drivers of public and

Customer Group	Description	Customers
		other transport services (e.g., tourist buses) <ul style="list-style-type: none"> • Pedestrians and cyclists
The Wider Community	Non-users that are affected if the service is not provided	<ul style="list-style-type: none"> • Citizens • Tourists • Residents who live beside the roads • Local businesses – requiring access

3.4.4 Other Parties

Other parties with an interest in Council's AMP include Council employees, consultants and contractors who manage and work on the asset. Our partners and co-funders Waka Kotahi (NZTA) and intern the Ministry of transport, Regional Council and other Government Agencies i.e., Audit NZ also may take an interest.

3.5 ORGANISATION STRUCTURE

Mackenzie District Council's organisation structure is shown in the figure below. This AMP covers activities included under Essential Services, led by the Council's Engineering Manager and Roading Manager.

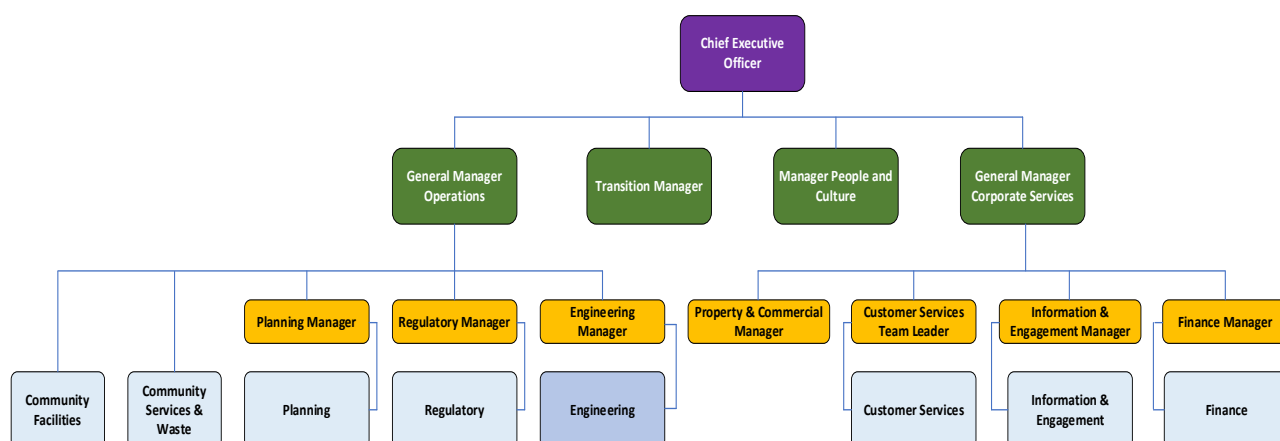


Figure 11: Council Organisation Structure - as at July 2020

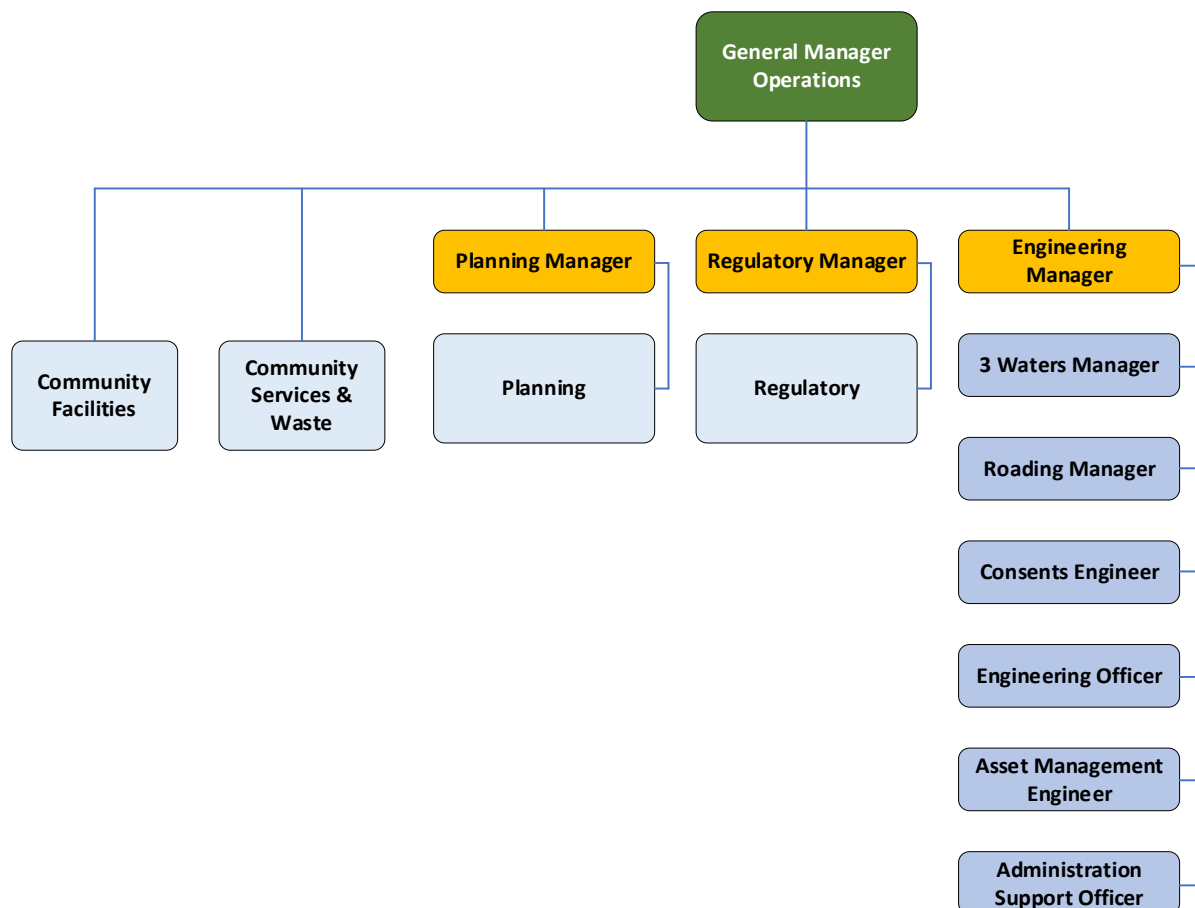


Figure 12: Essential Services Group Structure

Council has an Engineering Manager, Rooding Manager and an Engineering Officer responsible for the maintenance management of the transportation network. Occasionally some elements of the work are tendered to consultancy services to manage (e.g., Major Projects, Specialist skills, etc.). The Rooding Manager, Engineering Officer and the Maintenance Contractors regularly inspect, monitor and keep oversight of the network. Any work identified is directly tasked to the incumbent maintenance contractor or, if it is beyond the scope of the maintenance contract, tendered using Competitive Pricing Procedure guidelines in line with Councils endorsed procurement plan for Land Transport which is also endorsed by Waka Kotahi (NZTA). This may or may not need the involvement of consultants depending on the nature or extent of the work.

-Council has previously had in place a Multi-Party Funding Agreement (MPFA) with Timaru District Council to provide professional services to assist with the management of the road network. This provided the ability to buffer workloads, provide expertise that we may not have available and helps with consistency of asset management practices across both Councils. With increase in work programmes requirements and workloads for both Councils this has become more difficult to achieve this staff sharing of resource agreement. For this reason, we are needing to bring some service delivery back in house highlighting resourcing issues in our team as well as in the sector, to aid in the delivery with outside help also having minimal capacity. We have therefore made allowance for extra resource in both Data/Asset Management and Network Management to manage the additional workload into the future.

Council accounts for revenue and expenditure on an accrual basis. All work under the Works Programme is identified through a job cost ledger with a significant level of breakdown using analysis

codes. The costs are summarised into the general ledger where operational/maintenance costs are identified separately to capital/renewal items.

The majority of the work (physical works and professional services) carried out as part of the total management of all Roading Asset functions is actioned under either physical works or consultancy contracts.

All contract works are claimed monthly against each of the contract item numbers by the physical works and professional services contractors/ consultants. Council and/or consultants confirm the payment value for all physical works and the Council confirms the payment of any professional services. The accounts job number and account codes are included on the payment certificate. These certificates are forwarded to Council for payment. The types of work that this system relates to are maintenance, renewals and capital expenditure.

There are a range of reports prepared in order to comply with the requirements of Council, and the Auditors. All external reports are prepared in compliance with Generally Accepted Accounting Principles (GAAP).

3.6 GOALS AND OBJECTIVES OF ASSET OWNERSHIP

3.6.1 Purpose of Ownership

Council provides a safe, efficient, convenient, and comfortable roading network to ensure appropriate property access and freedom of travel for all road uses including pedestrians and cyclists. The provision of a roading corridor also accommodates the infrastructure of utility service providers throughout the District. The Council's overriding aim for transportation is:

To ensure all transportation assets are managed sustainably to provide the desired level of service in the most cost effective and achievable manner for existing and future customers.

3.6.2 Review of Activities and Funding

The Long Term Plan (LTP) identifies planned activities, defines the rationale for justifying these activities, and identifies the appropriate funding source.

3.6.3 Legal Authority for Council Action

The Local Government Act 2002 gives local authorities the full capacity, and full rights, powers and privileges, to carry on, undertake any activity or business, do any act, enter any transaction wholly or principally for the benefit of its district.

Along with these wide powers comes the requirement to identify all reasonably practicable options before deciding, to assess the benefits and costs of each option against the likely economic, environmental, social and cultural impacts.

Local authorities are also required to consult widely, effectively and appropriately with the community to determine the communities' wishes and to seek feedback on all potentially significant activities – not only when a particular course of action is proposed, but at the various stages of the decision-making process.

A significant aspect of this consultation process is the development of the LTP, which forms the long-term (not less than ten years) direction for all Council's activities.

3.7 LINKS TO ORGANISATION VISION, MISSION, GOALS AND OBJECTIVES

3.7.1 Vision

OUR STRATEGIC VISION

Using our guiding values as a solid foundation whilst looking through the lens of our vision and mission statements, Mackenzie District Council along with the community, will work together to discover our southern cross stars, our community outcomes. We remain focussed on our community outcomes as our goal for our district and everything we do.

OUR COMMUNITY OUTCOMES

A TREASURED ENVIRONMENT

- We recognise that our outstanding environment plays a vital role in sustaining our district.
- We manage our environment and natural resources sustainably to ensure they can be enjoyed now and by future generations.
- We have sustainable, efficient and well-planned infrastructure, services and community facilities.

RESILIENT, SUCCESSFUL COMMUNITIES

- Our communities have access to facilities and networks which enable people to enjoy positive, healthy lifestyles.
- Our communities are engaged, connected and are given the opportunity to influence local outcomes and decisions.
- Our communities have a 'sense of place' that makes people proud to live here.
- Our communities are resilient and provide for inter-generational wellbeing through networks that care for all ages.

STRONG AND INNOVATIVE ECONOMY

- We value the role that our District's environmental, social and cultural assets play in supporting economic development.
- We are a welcoming, enabling and business friendly district that encourages creative local economic development.
- We recognise and manage the effects of economic growth and actively support our communities and environment while striving for prosperity.

EMBRACE HERITAGE AND DIVERSITY

- We embrace our partnership with ngā rūnanga and support mana whenua traditions and relationships with their ancestral lands, waterways, wāhi tapu and other taonga.
- We are proud of and celebrate the heritage and diversity of our District and our people.
- We respect each other and what we contribute to the District through our traditions and culture.
- Our communities are given the opportunity to celebrate and explore their heritage, identity and creativity.

GUIDING VALUES

- Be fair to everyone
- Strive for a better future
- Dare to be different
- Act with respect and trust
- Protect our peace and serenity

VISION To empower our communities and treasure our environment
MISSION Strengthening our communities
GOALS To achieve our vision and mission

Council's outcomes and objectives for the road network are stated in the LTP 2021-2031.

These outcomes and objectives have been translated into various targets for maintenance and renewals to be achieved in each financial year. The outcomes are reported in each Annual Report.

The principal goal is to provide an effective, efficient, accountable and sustainable range of services that meet the actual needs of the residents. The road network provides access to each residence in the District and allows the safe and efficient movement of all types of traffic.

The over-riding management strategy is that the roading infrastructure as it presently exists will be maintained to deliver at least the current Levels of Service in perpetuity providing funding allows.

Council has a range of performance measures that set targets for achievement in the Transport Activity and these are detailed in Table 7.

Table 7: Performance Measures

What you can expect from us	What we will measure	Latest result (2019/20)	Targets:			
			2021/22	2022/23	2023/24	By 2030/31
Council provides safe, smooth, quality sealed roads in order to reduce travel times and vehicle wear.	The average quality of ride on a sealed local road network, measured by smooth travel exposure. *	98.0% for rural and 94.0% for urban roads.	90% for rural and 75% for urban roads.	90% for rural and 75% for urban roads.	90% for rural and 75% for urban roads.	90% for rural and 75% for urban roads.
	The percentage of the sealed local road network that is resurfaced. *	5.84%	≥4%	≥4%	≥4%	≥4%
	The percentage of the unsealed road network renewed using wearing course and stabilisation techniques	5.70%	≥2%	≥2%	≥2%	≥2%
	The percentage of road users are satisfied with the roading network.	78.50%	≥85%	≥85%	≥85%	≥85%
Council provides a safe and efficient roading network	The change from the previous year in number of fatalities and serious crashes on the local road network, expressed as a number.	-2	Change from each previous financial year= 0.(Equates to a total target of ≤2 fatality and serious injury crashes)	Change from each previous financial year= 0.(Equates to a total target of ≤2 fatality and serious injury crashes)	Change from each previous financial year= 0.(Equates to a total target of ≤2 fatality and serious injury crashes)	Change from each previous financial year= 0.(Equates to a total target of ≤2 fatality and serious injury crashes)
	The number of death and serious injuries recorded for the financial year on local roads under control of the Mackenzie District Council.	N/A (wasn't recorded)	<1 (In line with the road to zero vision)	<1 (In line with the road to zero vision)	<1 (In line with the road to zero vision)	<1 (In line with the road to zero vision)
	The number of reported crashes on local roads under control of the Mackenzie District Council.	N/A (wasn't recorded)	≤10	≤10	≤10	≤10
	The percentage of customer service requests relating to roads and footpaths to which	86%	≥75% of service requests relating to roads and footpaths will	≥75% of service requests relating to roads and footpaths will	≥75% of service requests relating to roads and footpaths will	≥75% of service requests relating to roads and footpaths will

What you can expect from us	What we will measure	Latest result (2019/20)	Targets:			
			2021/22	2022/23	2023/24	By 2030/31
			be responded to within 10 working days.	be responded to within 10 working days.	be responded to within 10 working days.	be responded to within 10 working days.
Footpaths are maintained in good condition and are fit for purpose	The percentage of footpaths that fall within the level of service or service standard for the condition of footpaths that is set out in the LTP. *	95%	<p>≥75% of the total length of footpaths are at or above the 'average condition rating'.</p> <p>Condition rating will be undertaken at not less than 5 years frequency.</p>	<p>≥75% of the total length of footpaths are at or above the 'average condition rating'.</p> <p>Condition rating will be undertaken at not less than 5 years frequency.</p>	<p>≥75% of the total length of footpaths are at or above the 'average condition rating'.</p> <p>Condition rating will be undertaken at not less than 5 years frequency.</p>	<p>≥75% of the total length of footpaths are at or above the 'average condition rating'.</p> <p>Condition rating will be undertaken at not less than 5 years frequency.</p>

3.8 ASSET MANAGEMENT DRIVERS

The business drivers, which define the need, priority and scope for improved asset management (AM) practices within Council may be summarised as follows:

3.8.1 Customer Service

Customers require that agreed levels of service be delivered reliably, efficiently and economically. The use of AM techniques provides the following benefits in satisfying these demands:

- Focuses on identifying and satisfying customer requirements
- Provides a basis for customer consultation when determining levels of service preferences by identifying the range and cost of service level and service delivery options
- Enhances customer confidence that funding is being allocated in an equitable and cost-effective manner; that assets are being well managed and improves understanding of service level options and requirements.

3.8.2 Financial Responsibility

“The Local Government Act section 101A Financial Strategy”:

- (1) *A local authority must, as part of its long-term plan, prepare and adopt a financial strategy for all of the consecutive financial years covered by the long-term plan.*
- (2) *The purpose of the financial strategy is to—*
 - (a) *facilitate prudent financial management by the local authority by providing a guide for the local authority to consider proposals for funding and expenditure against; and*
 - (b) *provide a context for consultation on the local authority's proposals for funding and expenditure by making transparent the overall effects of those proposals on the local authority's services, rates, debt, and investments.*
- (3) *The financial strategy must—*
 - (a) *include a statement of the factors that are expected to have a significant impact on the local authority during the consecutive financial years covered by the strategy, including—*
 - (i) *the expected changes in population and the use of land in the district or region, and the capital and operating costs of providing for those changes; and*
 - (ii) *the expected capital expenditure on network infrastructure, flood protection, and flood control works that is required to maintain existing levels of service currently provided by the local authority; and*
 - (iii) *other significant factors affecting the local authority's ability to maintain existing levels of service and to meet additional demands for services; and*
 - (b) *include a statement of the local authorities—*
 - (i) *quantified limits on rates, rate increases, and borrowing; and*
 - (ii) *assessment of its ability to provide and maintain existing levels of service and to meet additional demands for services within those limits; and*
 - (c) *specify the local authority's policy on the giving of securities for its borrowing; and*
 - (d) *specify the local authority's objectives for holding & managing financial investments, equity securities and its quantified targets for returns on those investments & equity securities.*

The implementation of the optimised work programmes and resulting long-term cash flow projections contained in AMPs will aid compliance with these requirements.

AMPs (supported by appropriate processes, systems and data) should provide clear justification for forward works programmes (and associated funding programmes) and provide the ability to even out peak funding demands and account for changes in asset service potential.

3.8.3 Environmental Responsibility

Activity Management Planning demonstrates how Council is addressing sustainable management of its physical resources while enhancing the protection of the environment as required under the provisions of the Resource Management Act (RMA).

3.8.4 Safety

AM planning addresses Council's safety obligations through:

- Road safety strategy (managed currently through Timaru DC shared resource with Waimate DC)
- Education, Engineering and Enforcement to deliver on the road to zero strategy
- Adoption of appropriate design standards for the creation of new assets
- Development of risk management practices
- Monitoring and reacting to road safety issues

3.8.5 Economic Efficiency

The techniques incorporated into this AMP support economic efficiency by:

- Providing a basis for monitoring asset performance and utilisation
- Enabling asset managers to anticipate, plan and prioritise asset maintenance and renewal expenditure
- Identifying under-funding of asset maintenance and renewal
- Identifying opportunities to build resilience into the network and the infrastructure that supports it.
- Extending the life of an asset by optimising maintenance programmes and demand management

3.8.6 Achieve Strategic Goals

Council has a strategic intent to "achieve sustainable development" and other goals relating to growth, building communities, protecting the environment, supporting the economy and providing quality customer service. This activity plan for transportation has been developed to implement this intent.

3.9 PLAN FRAMEWORK

This AMP is structured around the current asset inventories, the existing levels of service and consequential financial management plan for at least the next ten years. It includes Maintenance

requirements, Renewals, and Capital improvements in terms of Waka Kotahi (NZTA) and Council requirements.

This AMP generally follows the format recommended in the National Asset Management Steering Groups (NAMS) Infrastructure Asset Management Manual to a “Core” level. Figure 13 shows the framework of this AMP.

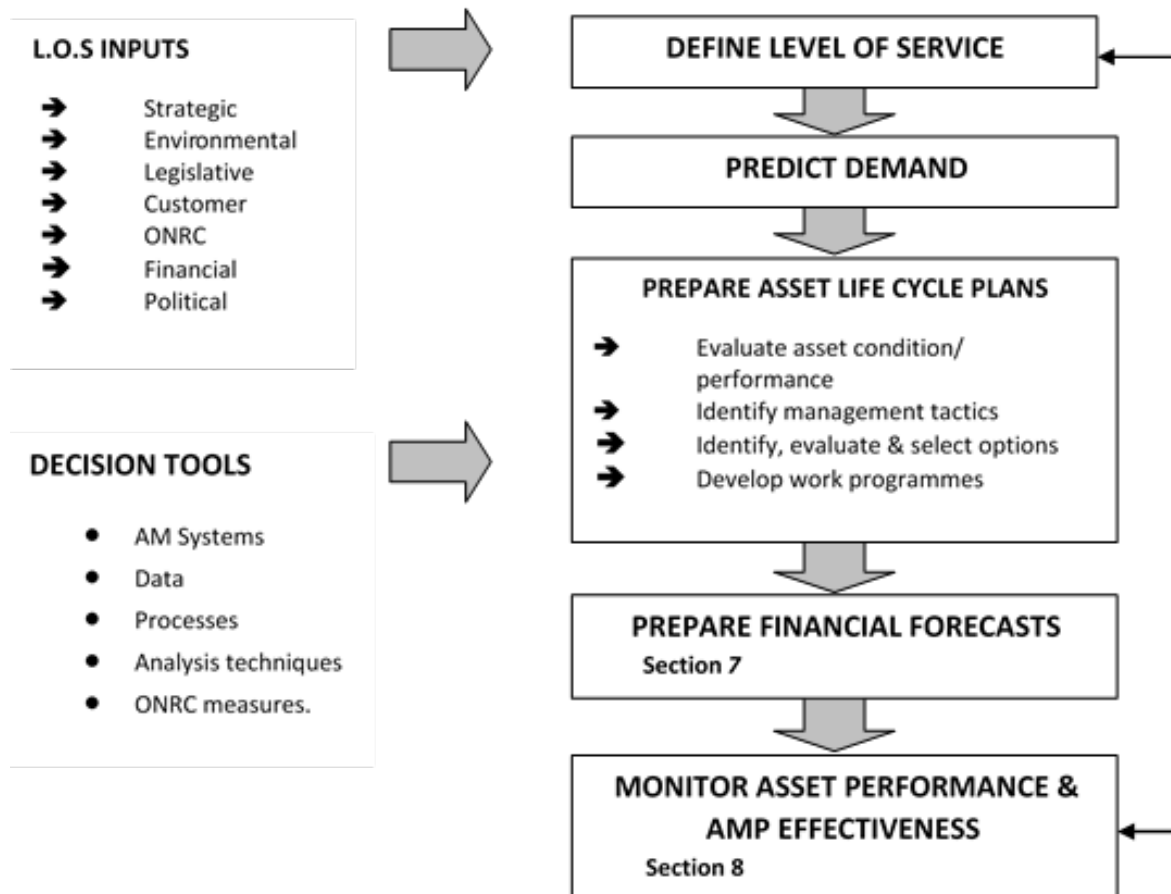


Figure 13: Transportation AMP Framework

This AMP is focused on moving away from the status quo of being maintained in perpetuity to a more sustainable infrastructure model into the future given growth predictions. This will result in a higher level of improvements to transition away from a primarily rural basic unsealed and urban network to a more fit for purpose safety orientated built network. The focus for the district is around achieving cost effectiveness while addressing network, alignment & safety, high use unsealed road transition, modal shift, climate change effect issues, etc. to ensure an appropriate Level of service and sustainable infrastructure for Mackenzie District transportation network into the future.

3.10 APPROPRIATE LEVEL OF ASSET MANAGEMENT

The International Infrastructure Management Manual (IIMM) provides a summary of the different degree asset management complexity: Aware, Basic, Core, Intermediate and Advanced. The degree of complexity differs according to an organisation’s corporate needs. The level of complexity of Asset Management is dependent on the following:

- The costs and benefits to the organisation

- Legislative and other mandated requirements
- The size, condition and complexity of the assets
- The risks associated with failures
- The skills and resources available to the organisation
- Customer expectations

A core AMP will meet minimum legislative and organisational requirements for financial planning and reporting. It provides basic technical management outputs such as statements of current levels of service, forward replacement programmes and associated financial projections and is appropriate for the needs of the network.

Council considers the required sophistication of their plan in the short to medium term need not progress beyond a “Core+” planning level, as the cost at this time to move to an advanced plan would provide little significant benefit to Council or its’ customers

- The size, complexity and use of the assets is consistent with a rural sparsely populated district
- The risks associated with failure are low

The current AMP generally meets “Core” requirements as outlined in the IIMM 2011. By implementing improvement planning Council can assess the asset management performance and identify gaps to drive improvement actions.

4 DESCRIPTION OF TRANSPORTATION ASSET

4.1 DESCRIPTION OF ACTIVITY

The Mackenzie District Council owns and is responsible for the day-to-day operation, maintenance, renewal and improvement of the District's local roading network excluding State Highways No 8, 79 and 80 which are owned by the Crown and managed by the Waka Kotahi (New Zealand Transport Agency). The Council also provides other assets such as carparks, footpaths and streetlights. State Highways 8, 79 and 80 are an important part of the overall roading network serving as the backbone within the District in which the local roads feed off. The Council works with Waka Kotahi (New Zealand Transport Agency), Road Efficiency Group (REG) and the Regional Transport Committee to meet its obligations regarding roading and to be consistent with the Regional Land Transport Strategy.

The purpose of road assets is to provide a sustainable, safe, convenient, comfortable and cost-effective road network for the free movement of people, goods and vehicles throughout the Mackenzie District.

The transportation asset is made up of the following components, which are described in more detail in the sections below.

- Land
- Road pavements - sealed and unsealed
- Bridges, fords and other structures
- Drainage
- Traffic services
- Footpaths
- Street lighting

4.1.1 Maintenance Road Groups

The Mackenzie District roading consists of a network of "Secondary Collector", "Access" and "Low Volume Access" roads as classified under ONRC leading from the State Highways to many remote localities and providing convenient access in and around the three main urban centres of Twizel, Lake Takapō/ Tekapo and Fairlie (Mt Cook Village is administered by the Department of Conservation). It also incorporates settlements of Kimbell, Burkes Pass and Albury. The network is predominantly rural (93%), unsealed (71%) and with light average daily traffic volumes (typically less than 1000 vehicles per day)

The Council has adopted the ONRC classification system which is primarily based on movement and looks to transition the network to the ONF once available based on movement and place traffic volumes and the use of the roads as shown in Figure 14.

The One Network Road Classification (ONRC)

The ONRC is the framework that is used to categorises roads throughout the country. This is the first time in the history of New Zealand that consistent specifications will apply to all public roads from Cape Reinga to the Bluff, depending on what purpose they serve.

The ONRC considers the needs of all road users, be they motorists, cyclists or pedestrians. It will give road users more consistency and certainty about what standard and services to expect on the national

road network, including the most appropriate safety features. It will also help New Zealand to plan, invest in, maintain and operate the road network in a more strategic, consistent and affordable way throughout the country.

The below illustrations outline ONRC the road classification hierarchy and describes how the classifications are determined. The Mackenzie District is made up of 29% secondary collector, 9% access, 60% low volume roads. These hierarchies have been recorded in RAMM.

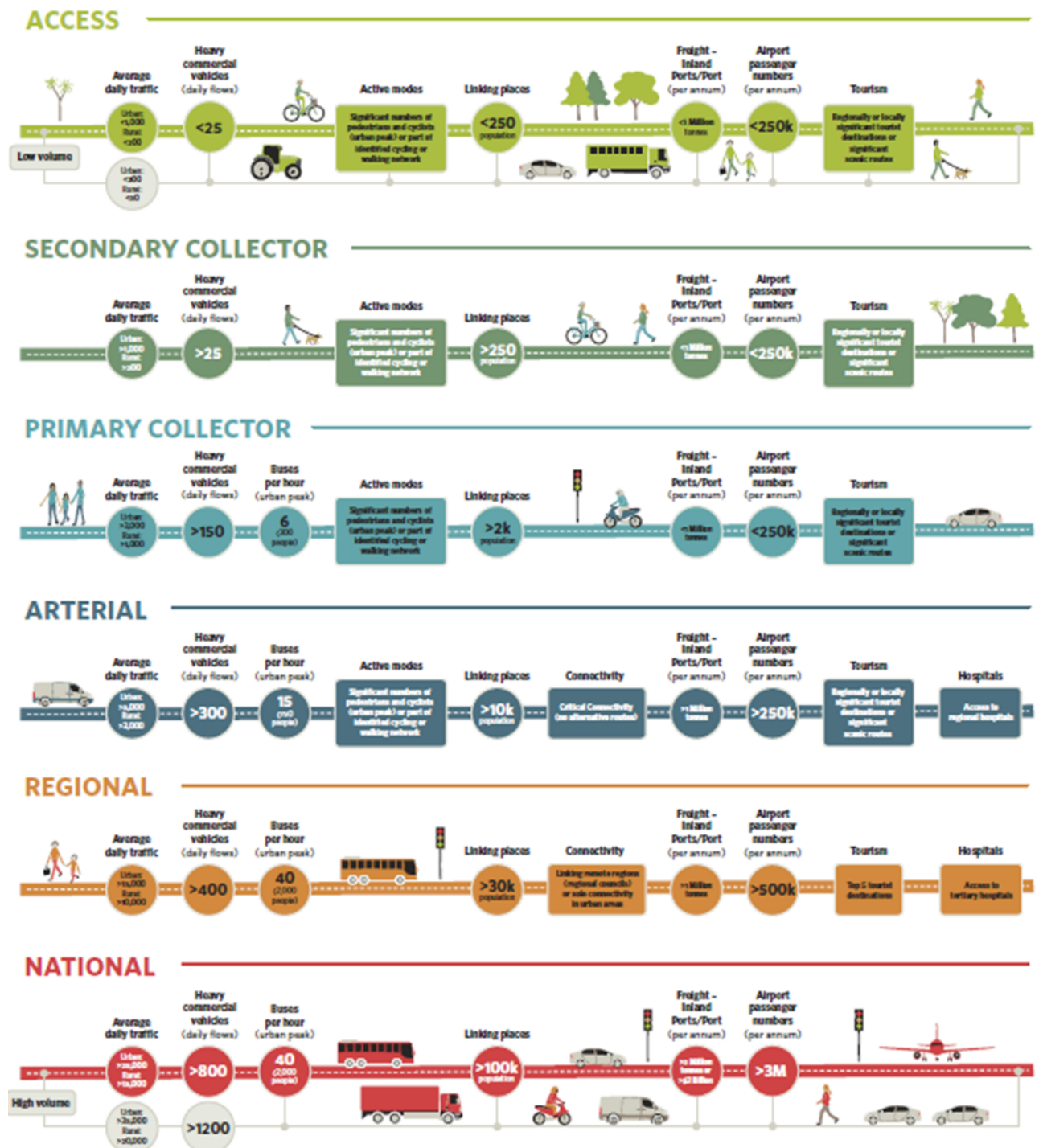


Figure 14: ONRC System

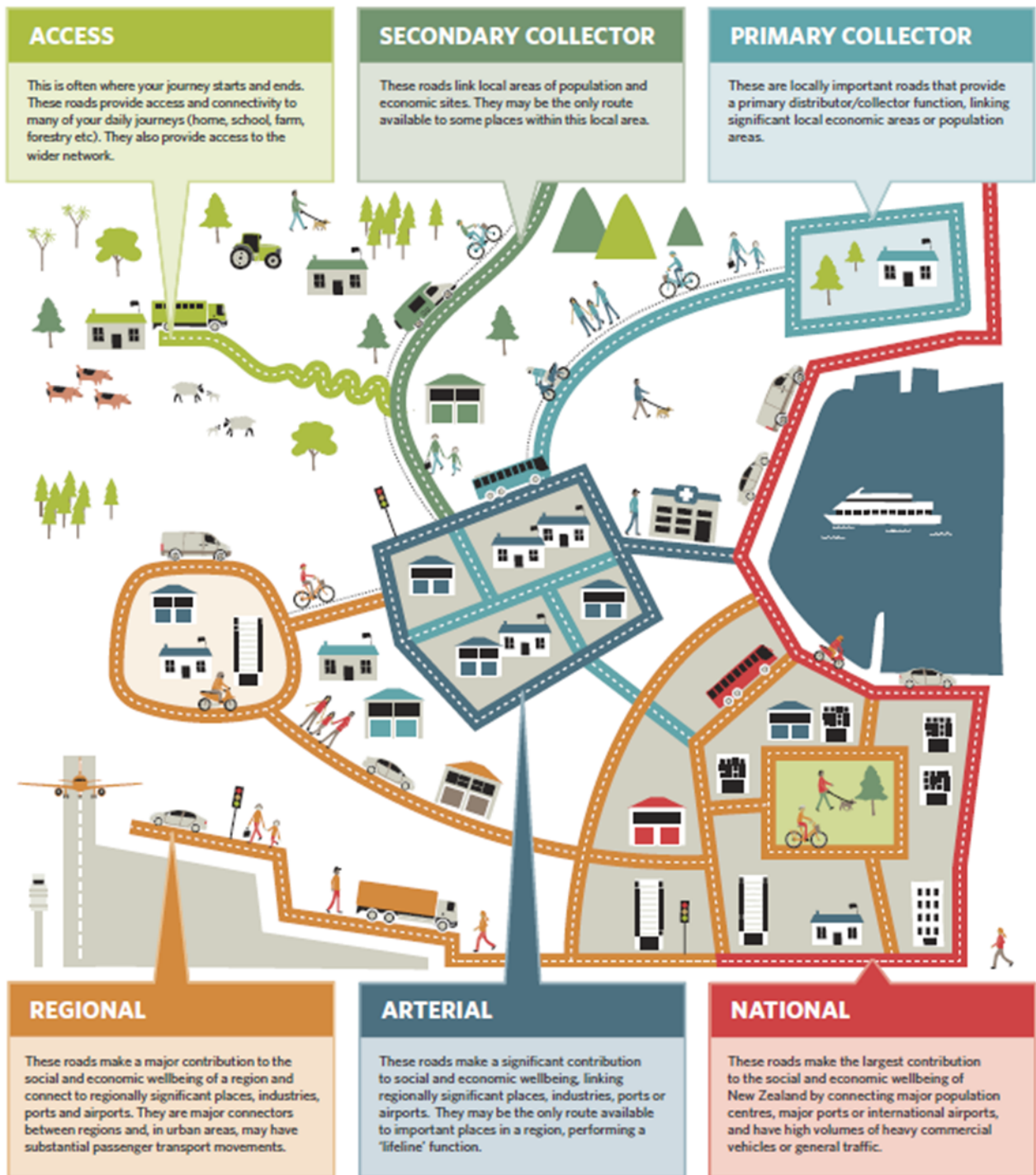


Figure 15: ONRC Network Make Up

The ONRC is to transfer to the ONF over the life of this plan.

4.2 ROAD PAVEMENTS

Mackenzie District Council owns, operates and maintains a total of 732.18km of road pavements. There are 213.4km of sealed road total, 50.07km of the sealed network being urban roads (i.e., where the legal speed limit is 70kph or less) and 163.3km of the roads being sealed rural roads.

There are 518.77km of unsealed roads within the network and only 5.12km of these in the urban area. The unsealed roads, which are spread throughout the district and are generally lower volume roads (as classified under ONRC) that provide access from individual properties to Secondary Collector roads and the State Highway Network. They generally have lower speed values than sealed roads, with the aim of providing a suitable surface for the public to travel comfortably at 70 km/hr. on straight sections. On some of our longer high country rural roads this is not always the case with some travelling at greater speeds on the unsealed surfaces causing increased risk, safety issues, wear and damage. On the highest use unsealed roads rural seal extension needs to be explored for funding.

The amount of each type of road based on road hierarchy groups is detailed in [Table 8](#).

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Table 8: Sealed and unsealed pavement qualities

Class	Rural AADT	Urban AADT	HCV Daily	Additional Criteria
Secondary Collector	200-1000	1000-3000	25-150	<ul style="list-style-type: none"> Buses per hour (urban peak) Pedestrian/cyclist numbers Linking populations Critical connectivity Ports / Inland Ports (tonnage) Airport Passengers (per annum) Tourism (significant destinations) Hospitals (tertiary or regional)
Access	< 200	<1000	<25	
Low Volume	<50	<200	<25	

4.3 BRIDGES

Council manages a total of 95 bridges with a combined length of 1993m including 7 large culverts (considered bridges as they have a waterway area over 3.4m²). The types of bridges include:

- 86 single lane bridges (90% by length)
- 7 timber bridges (7% by length)
- 14 speed and weight restricted bridges
- 20 fords with improved access, 44 Fords in total.

4.4 DRAINAGE

Mackenzie District Council owns, operates and maintains drainage assets associated with the road pavements. The quantities of each type of drainage asset are detailed in [Table 9](#).

Deleted:

Table 9: Drainage asset qualities

Drainage Type	Quantity
Kerb and channel concrete	17.4km

Drainage Type	Quantity
Dished Channel Concrete	0.8km
Mountable Kerb and Channel	2km
Mountable Kerb Concrete	0.2 km
Kerb only Concrete	3.3km
Dished Channel Sealed	39km
Kerb and Dished Channel Concrete	1.1km
Total	63.8km
Surface Water Channel (Deep)	378km
Surface Water Channel (Shallow)	361km
Total	739km
Culverts < 300mm dia.	1.6km
300 - 599mm dia.	2.2km
600 - 1,199mm dia.	13.7km
1,200 - 1,799 mm dia.	0.5km
> 1,800 mm dia.	0.05km
Total	18km
Catch pits	309
Soak pits	40
Side Drains	16.1km

4.5 TRAFFIC SERVICES

Council manages 3,342 signs, 289 culvert markers, 36km of road marking, 1183 road marking symbols.

Within RAMM there is an inventory for these traffic services asset components:

- Signs
- Culvert markers
- Railings

Most road markings are recorded in RAMM, these are continually changing with changes in use, the requirement for additional information from the previous rural nature of the network and maintenance issues that are created from marking i.e., edgebreak. Edge Marker Posts (EMPs) remain unrecorded in the RAMM database currently. Some of this data is reported in RAMM contractor now finance as part of the monthly claim process.

4.6 FOOTPATHS

There are 62km of permanent footpath on the transportation network. These are principally designed for and used by pedestrians. The majority (36.7km) of the footpath is within the Twizel Township Urban area. A smaller amount (16.4km) is in Fairlie area and a further (9.2km) in Takapō/ Tekapo area. Footpaths on State Highways are included in this asset as they are the maintenance responsibility of the Council currently. These numbers are increasing as part of vesting assets with Council from development.

A summary from the current spread sheet inventory of formed footpath is included in [Table 10](#).

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Table 10: Footpath assets

Footpath Type	Length (m)	Area (m ²)
Asphalt concrete	12,900	26,500
Asphalt concrete / Grass	1,929	3,490
Asphalt concrete / Gravel	715	1,155
Chip Seal	39,986	123,950
Chip Seal / Grass	512	707
Chip Seal / Gravel	75	90
Cobbles	63	130
Gravel	175	423
Concrete	5900	8800
Total	62,255	159,803

4.7 STREET LIGHTING

Council administers the maintenance and power consumption of streetlights throughout the district including those on the state highways owned by NZTA, whose direct costs are recovered from NZTA. Street lighting asset details (excluding Waka Kotahi (NZTA) owned assets) are summarised in [Table 11](#). The data contained within this table is correct as of November 2018, however Council has applied for funding and begun replacement all these lights with LED equivalent at 2200K, taking advantage of the 85% subsidy currently available for this project.

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Table 11: Street Light Assets

Lights		Poles		Bulbs	
Type	Number	Material	Number	Type	Number
850mm Bollard	135	Steel		Led 17 Watt	135
Windsor Heritage Bollard	224	Steel	224	35-Watt Low Pressure Sodium	224

Lights		Poles		Bulbs	
Mackenzie Park Style	49	Steel	49	100-Watt Low Pressure Sodium	49
Riddle Street Style	7	Steel	7	LPS	7
Market Square Style	22	Fibreglass	22	26 Watt Florescent	22
Tekapo Springs Style	19	Unknown (Alpine Owned)	19	2 x 30 Watt Low Pressure Sodium	19
Florescent	42	Unknown (Alpine Owned)	42		42
GL 500	453	Unknown (Alpine Owned)	453	36-Watt Low Pressure Sodium	453
GL 520	155	Unknown (Alpine Owned)	155	LED 3000k	155
GL 600	69	Unknown (Alpine Owned)	69	55-Watt Low Pressure Sodium	39
GL 700	34	Unknown (Alpine Owned)	34	2 x 55-Watt Low Pressure Sodium	34
Flood Light	11		11	400-Watt Mercury Vapor	11
Custom Bollards	12	Wood	12		12
Unknown	19		19		19
Total	1251		839		1251

4.8 ENVIRONMENTAL ISSUES

4.8.1 Dust Nuisance

With its large proportion and length of unsealed roads, dust can be a significant nuisance, to dwellings situated near roads, to following/passing vehicles and adjacent land uses. The Council does not use dust suppression agents, as these are costly, short lived and require reapplication. Council has introduced silty/clay bound wearing course for unsealed roads, which has helped to mitigated dust to some extent. Council has been undertaking trials with locally sourced pit weathered rock materials (“rotten rock”) over the past 4 – 5 years, this is showing significant dust suppression qualities and reduction in routine maintenance cost. This material has progressed to being used as a wearing course as close proximity sources allow or there are dust nuisance or maintenance issues. It is not intended to roll this out to entire road lengths, but trials/ blends are still continuing, and performance of the various source materials are monitored as well as trialling and monitoring of new sources.

The Council has a current policy for sealing past houses where a house was built or relocated after 2002. Council has placed a dust nuisance warning on LIM and PIM reports since that date and is considered due diligence to warn of possible dust problems. As such the applicant will be required to fully fund the Council approved dust nuisance project. For properties that were built or relocated prior

2002 Council and landowner are carry out a cost sharing exercise going 50/50 share with the Council's contribution capped at \$10,000 at a maximum length of 200m for any one request. This would likely be unsubsidised unless it meets Waka Kotahi (NZTA) Guidance Note (Dust Circular 16/04) where subsidy maybe available depending on if it meets the set-out criteria. On-going maintenance is carried out by the Council. These isolated seals that we currently have are expensive to maintain and resurface and we try to minimise these as much as possible trying other forms of treatment in the interim.

4.8.2 Physical Works Impacts

Roading maintenance activities generally do not have major adverse environmental effects. The control of dust and water pollution at work sites is carried out under the contractors' quality and environmental management plans. Work in riverbeds requires resource consent from Environment Canterbury. The only long-term impact on the environment is the creation of borrow pits for the extraction of aggregate for unsealed road maintenance. Both the Council and contractors take care in how these are managed and are rehabilitated after use. We will try to limit the extend and number of borrow pits in future as they can cause reasonable road safety hazards at certain times of the year and once all the material has been harvested leaves a large hole.

4.8.3 Gravel Availability

Mackenzie has primarily sourced their gravel from the rivers around the district over time to manage gravel build ups, manage the waterways and reduce the risks of flooding in the most cost effective manner for the ratepayers and the community. Predominantly most of these extraction works have occurred close to Council infrastructure assets or roadways. Sourcing from rivers has allowed for close sourcing of materials and resource for road construction, maintenance gravel, gravel renewal, etc with limited cartage. Recently we have been advised as a result of riverbed surveys that we are unable to source gravel for the majority of rivers in the district any longer. This is made harder by ownership changes, changes in rules & legislation, environmental controls, consenting cost, protection areas, etc. Due to this issue and the likelihood of increased cartage there is almost certain increase of cost increasing significantly into the future. Retendering of Councils Road Maintenance contract also raises uncertainty around the cost of delivery which we have heard is in the order of 35% or greater from some suppliers due to consenting costs etc. This results in the whole of life cost of treatments and optioneering into the future needing to be reconsidered district wide to ensure transported related infrastructure remains cost effective into the future and cost do not just continue to increase. This is dependent on securing of alterative gravel resources, in what locations these resources can be secured, gravel provisioning as part of the district plan, gravel consents, suitability of material, etc. It is also dependant on whether Environment Canterbury will allow gravel extraction consent from rivers beds into the future if so when and with what level of certainty that can be assured.

4.8.4 Global Consent

Council is looking to apply for a global consent incorporating river works, structure maintenance, renewal, installation, waterway maintenance, cleaning, culvert renewal & installation, ford maintenance, etc. under a standard set of consent conditions for each activity. This is to cover all activities that occur as part of road maintenance in watercourse or waterways into the future across the district. Council wants to work with all affected parties/ stakeholders to ensure an appropriate consent can be achieved to allow maintenance works to take place within a standard set of controls.

4.9 CLIMATE CHANGE IMPACTS

Climate change is a critical consideration in the Council's long-term planning. This Council uses guidance from the New Zealand government, based upon the best available climate science, to support the planning.

Mackenzie District Council is in the process of developing a Climate Change Response Policy for the whole of Council. The policy acknowledges the role of Council and the outcomes sought by the community. Key inputs into this policy and its implementation are the National Climate Risk Assessment for New Zealand (Ministry for the Environment, 2020) and the Climate Change Projections for the Canterbury Region (NIWA, 2020). The Ministry for the Environment information on <https://www.mfe.govt.nz/climate-change/likely-impacts-of-climate-change/how-could-climate-change-affect-my-region/Canterbury> provides a summary of projected climate changes over the period 2031-2050 and 2081-2100, compared with 1986-2005 and the key impacts this is likely to have.

Table 12 Climate Change effects on infrastructure

Climate Change	Impact on environment	Impact on roading infrastructure
Temperature	<p>Compared to 1995, temperatures are likely to be 0.7°C to 1.0°C warmer by 2040 and 0.7°C to 3.0°C warmer by 2090.</p> <p>By 2090, Canterbury is projected to have from 6 to 35 extra days per year where maximum temperatures exceed 25°C and the number of frosts could decrease by around 13 to 38 per year.</p>	<p>A reduction of frosts per year will likely have a positive effect on the council's roading, with fewer incidents and damage related to frost heave.</p> <p>Extreme heat can also mean roads fail more quickly from buckling, cracking creating potholes. However, it is unlikely temperatures will reach this high.</p>
Rainfall	<p>By 2090, winter rainfall is projected to decrease by up to 12 per cent in Christchurch and up to 10 per cent in Hanmer but increase by 6 to 28 per cent in Tekapo.</p> <p>According to the latest projections, the frequency of extreme rainy days in the Canterbury region is not projected to significantly change as a result of climate change.</p>	<p>Whilst projections indicate that extreme rainfall will not increase significantly, the recent flooding events indicate that the impacts from these events can be significant. Currently estimates indicate that between \$1 and \$3 million will be required for the restoration of roads across the Mackenzie District (see section 10 for further details).</p> <p>It is therefore critical that the council have emergency funding available for these events, and to ensure the roads are kept at a relatively high level of service.</p>
Snowfall	<p>The Canterbury region will likely experience significant decreases in seasonal snow. By 2090 the number of snow days is projected to decrease by up to 30 days per year. The duration of snow cover is also likely to decrease, particularly at lower elevations.</p> <p>Less winter snowfall and an earlier spring melt may cause marked changes in the annual cycle of river flow in the regions. Places that currently receive snow are likely to see increasing rainfall as snowlines rise to higher elevations due to rising temperatures. So for rivers where the winter precipitation currently falls mainly as snow and is stored until the snowmelt season, there is the possibility of larger winter floods.</p>	<p>As indicated above, flooding events will have an impact on both roading and water infrastructure.</p> <p>Again council will need to be sure its infrastructure is maintained to an appropriate level of service. Additional engineering resilience's will to be implemented as these events increase.</p>

Wind	The frequency of extremely windy days in Canterbury by 2090 is likely to increase by between 2 and 10 per cent. Changes in wind direction may lead to an increase in the frequency of westerly winds over the South Island, particularly in winter and spring.	Extreme wind events and increase in wind speeds, could increase the damages to infrastructure. Fallen trees, signs, etc. will mean council will need to ensure its emergency response funding is adequate to quickly and efficiently repair damages
Water Shortages	Higher temperatures, less rainfall and greater evapotranspiration are likely to cause increasing pressure on water resources, particularly in North Canterbury. Droughts are likely to become more frequent and more extreme.	Less rainfall can increase the dust nuisance from the unsealed roading network in the district.
Fire risks	Strong winds, combined with high temperatures, low humidity and seasonal drought may result in an increased fire risk in some areas. The length of the fire season is expected to increase.	Fire resilience's within existing and new infrastructure will need to be prioritised as fire risks become more prevalent.

4.10 FUTURE WORKS

The current age and remaining life of all assets are reviewed regularly, as more accurate information and knowledge becomes available. As the confidence in this data grows the accuracy of the life cycle management requirements improves significantly.

4.11 CRITICAL ASSETS

Critically is based on ONRC and redundancy. Much of the network is a 'fishbone pattern' running off the State Highway and is very important to users. Traffic volumes can be used as a proxy for criticality, but this ignores the level of access. For example some roading assets act as lifelines for people (evacuation routes) and as corridors for reaching critical infrastructure and utilities. These additional factors are considered when council are assessing criticality.

Formal asset criticality assessments are yet to be undertaken. These have been identified as an action item in the Activity Management Plan. Once complete these assessments will be used to guide operations and renewal planning.

The table below outlines a high level methodology the council currently use to identify, assess and renew critical and non-critical assets.

Table 13 Critical assets assessment approach

Criticality Category	Condition Assessments	Renewal
<u>Critical Assets</u> Critical assets include; main feeder roads, secondary connectors, roads servicing critical utilities, Bridges/ all structures servicing more than one landowner, Culverts	The council currently undertake <ul style="list-style-type: none"> - Roughness and rating of sealed road network - Random pavement testing samples and collection across the network - Footpath ratings - Continual condition rating of unsealed 	At the moment, Council have been maintaining its assets in perpetuity due to budgetary constraints. The Council optimize their assets with innovating and exploring new maintenance techniques to reduce future maintenance costs, extending their design life and undertake inspections to prevent any critical failures.

<p>>400mm diameter, roads with only one access point, failures which impact access (i.e. there are no alternative route or it's an interconnecting route), footpaths (when the failure destroys all other available and safe walkways)</p>	<p>network (assessing potholes, scours etc.)</p> <ul style="list-style-type: none"> - Three yearly bridge inspections (Annual inspection for at risk structures or as required) 	<p>This approach is expected to change moving forward. Renewals will in future be aligned with their design life, assuming budgetary constraints allow for it.</p>
<p><u>Non-Critical Assets</u></p> <p>Non-critical assets include; roadside furniture, bridges accessing one property, fords which can be crossed even when a failure occurs, roads servicing one land owner, roads which have alternative access, smaller culverts <400 mm diameter</p>	<p>Non-critical assets are assessed slightly differently:</p> <ul style="list-style-type: none"> - Bridges are inspected default as a 3 yearly programme where a third are inspected each year. - Any structure which has changed from the previous inspection is put on annual cycle of inspections until fixed - Timber and/or posted structure are inspected annually - Road classification will determine the frequency of inspection - All other non-critical assets are inspected over a greater time period than critical assets. For overall network condition assessments, they are typically inspected as per the above for efficiency 	<p>Design lives for non-critical assets are typically extended further by seeking alternative methods of treatment and/ or risk profiling if there is a LoS drop or access is disturbed (e.g. gravel materials and two coat seals).</p>

Whilst there is no formal criticality assessment, the Council are able to physically inspect their roads on a regular basis. This is due to the fact that the network is relatively small with easy access. Roadway assets are also all above ground and visible, making it easier to assess their condition.

5 LEVELS OF SERVICES

5.1 DEFINING THE LEVEL OF SERVICE

Activity management planning requires a clear understanding of customer needs and preferences and the minimum obligations that must be met. A key objective of this activity management plan (AMP) is to match the level of service provided by the asset with the expectations of the customers given legislative, financial, technical and safety constraints. Service standards, set to meet this objective, provide the basis for the life cycle management strategies and work programmes identified in Section 9.

The service standards defined in this section will be used:

- To ensure legal and legislative requirements are met
- To inform customers of the type and level of service offered
- As a focus for the asset management strategies developed to deliver the required level of service
- As a measure of the effectiveness of this Plan
- To identify costs and benefits of the services offered
- To enable customers to assess the suitability, affordability and equity of the services offered

The Council levels of service for Transportation reflect current industry standards and are based on:

- Customer Research and Expectations: Information gained from the community on their expectations of quality and price of services
- Strategic and Corporate Goals: Provide guidelines for the scope of current and future services offered, the manner of service delivery and define specific levels of service which the Council wishes to achieve
- Legislative Requirements: Environmental standards, regulations and acts that impact on the way assets are managed (i.e., resource consents, building regulations, health and safety legislation, Local Government Act)
- Demands on the Roding Network: Service demands that are placed on the network by the mix of road users and how this demand varies across the District.

5.2 CUSTOMER RESEARCH AND EXPECTATIONS

The Council utilises the following methods to determine and measure customer expectations:

- Public meetings
- Consultation via the Annual Plan and LTP process
- Feedback from customers and elected representatives
- Publicity
- Engagement and communication through day to day activity
- Council currently undertake Customer Surveys annually.

Road users want full time availability of safe, smooth roads and adjacent landowners/occupiers want to minimise the impact these roads have on them and their properties but retain maximum benefit from the access and convenience that the roads provide.

Customer expectations are one of the key considerations used to determine the acceptable target levels of service prescribed for the Council Road Network. The Council classifies road users as customers in the context of service provision although not all road users are ratepayers. The community is to be the all encompassing group of people that make up our district including ratepayer, habitants, visitor, tourist, workers, etc.

The community's expectations can be summarised as being:

- Roads address the needs of network continuity
- Roads serve demands for access consistent with the needs of the time
- Roads can be traversed at a level of safety, comfort and speed appropriate with their usual use
- Roads are constructed and maintained to avoid unjustified or avoidable expenditure
- Minimal interruption to use of roads

In order to achieve the above community expectations there are five specific strategies that the Council will implement:

- The maintenance of roads to provide appropriate ride quality for each road, based on the road's usual purpose and number of vehicles using the road
- The Council will maintain a road network where preferred routes are supported, where practicable, by sufficient alternative routes to minimise the impact of disruptions such as planned maintenance, storm/weather damage, accidents and other occasional hazards
- The Council will meet and coordinate operations with other Councils, agencies and the private sector (e.g., NZTA, Police, South Canterbury Road Safety Co-ordinating Committee) to improve road safety.
- The Council will employ preventative maintenance and monitoring systems to protect the District's roads, bridges, culverts and supplementary roading infrastructure to reduce avoidable damage, disruption and cost
- Roads will be maintained and improved in keeping with the demands of residential users, commerce, business and agriculture, where the level of use justifies the cost to ratepayers and there is no other suitable alternative

Council has now been using the MagiQ service request system for a number of years. This system seems to work well for Council and provides easy access to historic records as well as to follow up on complaints and ensure performance measures are being met. This information provides a good measure of levels of service and identifies trends in issues/complaints received.

5.3 STRATEGIC AND CORPORATE GOALS

The road network must be operated to meet Council policy, objectives and various Waka Kotahi (NZTA) requirements where financial subsidies are involved. Council's goals and the community's expectations are stated in the LTP which provides the framework for the operation and development of the roading infrastructural assets.

5.3.1 Organisation Mission, Goals and Objectives

The Council's mission statement is: "STRENGTHENING OUR COMMUNITIES". The aspects of the overall mission that relate to the roading activity are:

SERVICE

We are a service organisation. Providing efficient and cost-effective services is our prime responsibility.

SUSTAINABILITY

We are committed to the sustainable management of all the resources and infrastructure of the district.

5.3.2 Roading Activity Goal and Principal Objectives

As outlined in Council's Community Plan (LTP) Council, the transportation asset contribution to achieving Council's governance goal and the community outcomes identified in Section 2 is through the Transportation Activity Goal:

To ensure all transportation assets are managed to provide the desired level of service and safety in the most cost effective and achievable manner for existing and future customers.

The specific Objectives of the transportation activity are as follows:

- To develop an AMP for transportation
- To contract cost-effective service delivery
- To ensure all roads are adequately maintained
- To identify and prioritise key areas for safety improvements and progressively correct these
- To develop and implement a planned programme of seal extension
- To meet established footpath standards and continue to implement them over time
- To be proactive in ensuring adequate funds are provided to maintain and develop the District's roading network for the best whole of life cost

5.4 LEGISLATIVE REQUIREMENTS

Legislative requirements set the framework for the minimum standards of service that Council as the Road Controlling Authority must meet. The key legislation relating to the Council's responsibility to manage the Transportation asset is:

- Local Government Act 2002 (including amendments)
- Local Government Act 1974
- Land Transport Management Act
- Resource Management Act 1991
- Building Act 2004 and 2005 Amendment
- Health & Safety Act at Work Act 2015
- Civil Defence Emergency Management Act 2002
- Traffic Regulations Act 1976

- Public Works Act 1981
- Land Transport Rule: Setting of Speed Limits 2003
- Land Transport Rule: Traffic Control Devices 2004

The **Local Government Act 2002** gives local authorities the full capacity, and full rights, powers and privileges, to carry on or undertake any activity or business, do any act, or enter any transaction wholly or principally for the benefit of its district.

Along with these wide sweeping powers comes the requirement to identify practicable options before deciding, and to assess the benefits and costs of each option against the likely economic, environmental, social and cultural impacts.

Local authorities are also required to consult widely, effectively and appropriately with the community to determine the communities' wishes and to seek feedback on all potentially significant activities – not only when a particular course of action is proposed, but at the various stages of the decision-making process.

The Council has determined that it will consult its communities where practical, reasonable and within the resources available to it. A significant aspect of this consultation process is the development of the LTP, which forms the long-term (not less than ten years) direction for all Council's activities.

The remaining sections in the **Local Government Act 1974**, in respect to roads, give local authorities the authority to construct, upgrade, and repair all roads with such materials and in such manner as the Council thinks fit. It also gives Council the power to name roads, set road gradients, charge betterment for any road improvement and the right to lay pipes under the roadway.

It also gives Council the power to "stop or close" a road.

The **Land Transport Management Act (LTMA)** requires Council to prepare a three-year land transport programme (which is reviewed annually and fully redeveloped at the completion of the three-year period) through a special consultative procedure, unless the local authority includes the matters that are required to be in such a programme in its LTP or Annual Plan and provide details of those matters in a form acceptable to Waka Kotahi (NZTA).

When preparing its land transport programme Council must consider how road maintenance:

- Assists economic development
- Assists safety and personal security
- Improves access and mobility
- Protects and promotes public health
- Ensures environmental sustainability

Levels of service provided, and maintenance practices used should be in line with the objectives of the New Zealand Transport Strategy and the requirements of the Land Transport Management Act 2003.

The **Resource Management Act 1991** requires Council to:

- Sustain the potential of natural and physical resources to meet the reasonably foreseeable needs of current and future generations
- Comply with the District and Regional Plans
- Avoid, remedy or mitigate any adverse effect on the environment and structures (e.g., adverse effect of surface run-off from roads)

The **Building Act 2004** requires Council to:

- Ensure all buildings and facilities constructed comply with the Act
- Produce Project Information Memoranda (PIM's) which supply all available information relating to an individual property. For the roading network the relevant information may include details of access restrictions, approvals, leases, plans, relevant records, notices, etc.

The **Health and Safety at Work Act 2015 (HSWA)** was enacted on 4 April 2016. Working Safer is aimed at reducing New Zealand's workplace injury and death toll by 25 per cent by 2020.

The HSWA:

- Reinforces proportionality – what a business needs to do depends on its level of risk and what it can control
- Shifts from hazard spotting to managing critical risks – actions that reduce workplace harm rather than trivial hazards
- Introduces the “reasonably practicable” concept – focusing attention on what is reasonable for a business to do
- Changes the focus from the physical workplace to the conduct of work – what the business actually does and if so, what it can control
- Supports more effective worker engagement and participation – promoting flexibility to suit business size and need.

A guiding principle of the HSWA is that workers and other persons should be given the highest level of protection against harm to their health, safety, and welfare from work risks as is reasonably practicable. The HSWA shifts the focus from monitoring and recording health and safety incidents to proactively identifying and managing risks so everyone is safe and healthy.

The HSWA identifies four duty holders:

persons conducting a business or undertaking (PCBUs) – these may be individuals or organisations	Have the primary responsibility for the health and safety of their workers and any other workers they influence or direct. They are also responsible for the health and safety of people at risk from the work of their business
officers	(company directors, partners, board members, chief executives) must do due diligence to make sure the business understands and is meeting its health and safety responsibilities
workers	Must take reasonable care for their own health and safety and that their actions don't adversely affect the health and safety of others. They must also follow any reasonable health and safety instruction given to them by the business and cooperate with any reasonable business policy or procedure relating to health and safety in the workplace.

other persons at workplaces	Who come into the workplace, such as visitors or customers, also have some health and safety duties to ensure that their actions don't adversely affect the health and safety of others
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Civil Defence Emergency Management Act 2002

Under the CDEM Act 2002 there is an expectation that Council's services will function at the best possible level and extent during and after an emergency, including no change from normal operation. Council has established planning and operational relationships with regional CDEM groups to deliver emergency management within Mackenzie District boundaries.

The ***Traffic Regulations Act 1976*** requires Council to:

- Comply with the rules for pedestrian crossings, traffic islands, road markings etc.
- Plan activities such that the network complies with driving rules

The ***Public Works Act 1981*** requires Council to:

- Set requirements for the acquisition of land by local authorities for roading works
- Sets requirements for stopping of roads and removal of trees on adjacent land

Land Transport Rule: Setting of Speed Limits 2003 and its amendments requires Council to:

- Establish Speed Limits By-Law
- Establish speed limits of 50km/hr. in urban traffic areas and 100km/hr. on rural roads and motorways
- Authorise the setting of speed limits other than 50km/hr. on urban roads and less than 100km/hr. on rural roads, and to set temporary speed limits associated with work on or near the road and for special events

Land Transport Rule: Traffic Control Devices 2004 and its amendments requires Council to:

- Authorise and install traffic control devices in accordance with the rule
- Ensure safe practice in the design and installation of traffic control devices and how they are used for traffic management

Legislation (e.g., Resource Management Act) requires Council to consult with the Tangata Whenua and consider the principles of the Treaty of Waitangi in the management of road infrastructural assets.

5.5 CURRENT AND TARGET LEVELS OF SERVICE

Council's community outcomes and their contributions to the roading activity are included in [Table 14](#). Council's key levels of service and performance measures as defined in the 2021-2031 LTP are summarised in [Table 15](#). These show how levels of service contribute to the community outcomes and provides a technical measure that enables Council to monitor current levels of service against target levels of service.

The ONRC was designed to standardise the performance of our roads throughout New Zealand, aiming to address historical inconsistencies, and promote economic growth. ONRC has affected the way we

maintain and manage maintenance levels on our transportation network. Under ONRC the financial impact has appeared to be minimal. ONRC is primarily focused on movement. The emphasis on delivery and maintenance going forward under the ONRC was on putting forward a strong business case supported by robust data and evidence. This is under the better business case approach, conditional on other districts bids and funding given the available funds continue to decrease from central government. Over the life of this plan the ONRC is to transition to the ONF which incorporates movement and place value.

Table 14: Community Outcomes and how the Roding Activity Contributes

Community Outcome	How the Roding Activity Contributes
<i>Treasured Environment</i>	By providing suitable vehicular and pedestrian access to areas while minimises the effect on the natural environment.
<i>Strong and Innovative Economy</i>	By providing a safe and efficient highway/roading network for the transport of people and goods. Which is easy to understand, follow is inclusive and is to an appropriate Level of service and amenity.
<i>Resilient and Successful Communities</i>	By providing safe transportation facilities which connect local communities, make people proud to live in the district, providing for intergenerational wellbeing, allowing people to have positive and healthy lifestyles and cater for all ages and abilities.
<i>Embrace Heritage and Diversity</i>	A district which displays and tells the stories of our rich trail cultural history. Signage that brings together both languages (Maori and English as one and that places are named correctly. Identify significant trails and pathways of the district. Manage a protect the water and environment and health and life blood of our rivers for future generations.

Table 15: Key Levels of Service and Performance Measures

What you can expect from us	What we will measure	Latest result (2019/20)	Targets:			
			2021/22	2022/23	2023/24	By 2030/31
Council provides safe, smooth, quality sealed roads in order to reduce travel times and vehicle wear.	The average quality of ride on a sealed local road network, measured by smooth travel exposure. *	98.0% for rural and 94.0% for urban roads.	90% for rural and 75% for urban roads.	90% for rural and 75% for urban roads.	90% for rural and 75% for urban roads.	90% for rural and 75% for urban roads.
	The percentage of the sealed local road network that is resurfaced. *	5.84%	≥4%	≥4%	≥4%	≥4%
	The percentage of the unsealed road network renewed using wearing course and stabilisation techniques	5.70%	≥2%	≥2%	≥2%	≥2%
	The percentage of road users are satisfied with the roading network.	78.50%	≥85%	≥85%	≥85%	≥85%
Council provides a safe and efficient roading network	The change from the previous year in number of fatalities and serious crashes on the local road network, expressed as a number.	-2	Change from each previous financial year= 0.(Equates to a total target of ≤2 fatality and serious injury crashes)	Change from each previous financial year= 0.(Equates to a total target of ≤2 fatality and serious injury crashes)	Change from each previous financial year= 0.(Equates to a total target of ≤2 fatality and serious injury crashes)	Change from each previous financial year= 0.(Equates to a total target of ≤2 fatality and serious injury crashes)
	The number of death and serious injuries recorded for the financial year on local roads under control of the Mackenzie District Council.	N/A (wasn't recorded)	<1 (In line with the road to zero vision)	<1 (In line with the road to zero vision)	<1 (In line with the road to zero vision)	<1 (In line with the road to zero vision)
	The number of reported crashes on local roads under control of the Mackenzie District Council.	N/A (wasn't recorded)	≤10	≤10	≤10	≤10
	The percentage of customer service requests relating to roads and footpaths to which	86%	≥75% of service requests relating to roads and footpaths will be responded to within 10 working days.	≥75% of service requests relating to roads and footpaths will be responded to within 10 working days.	≥75% of service requests relating to roads and footpaths will be responded to within 10 working days.	≥75% of service requests relating to roads and footpaths will be responded to within 10 working days.
Footpaths are maintained in good condition and are fit for purpose	The percentage of footpaths that fall within the level of service or service standard for the condition of footpaths that is set out in the LTP. *	95%	≥75% of the total length of footpaths are at or above the 'average condition rating'. Condition	≥75% of the total length of footpaths are at or above the 'average condition rating'. Condition	≥75% of the total length of footpaths are at or above the 'average condition rating'. Condition	≥75% of the total length of footpaths are at or above the 'average condition rating'. Condition

What you can expect from us	What we will measure	Latest result (2019/20)	Targets:			
			2021/22	2022/23	2023/24	By 2030/31
			rating will be undertaken at not less than 5 years frequency.	rating will be undertaken at not less than 5 years frequency.	rating will be undertaken at not less than 5 years frequency.	rating will be undertaken at not less than 5 years frequency.

*NAASRA counts - National Association of Australian State Road Authorities counts are generated utilising a laser profilometer fitted to a vehicle travelling at speed on the Districts sealed roads, which records the road profile and converts the results into a roughness count/kilometre. The higher the roughness count/kilometre, the rougher the road surface which may lead to reconstruction of the surface.

Currently in Mackenzie this is completed using response- type roughness measuring equipment to determine the movement from live rear axle in comparison to the body of the test vehicle.

Further to the levels of service in [Table 15](#), there are requirements that form part of the maintenance contract specifications. These are detailed in the following sections.

Deleted:

5.5.1 Road Efficiency Group and the One Network Road Classification

In 2011 The Minister of Transport established the Road Efficiency Task Force to examine what changes would be needed in the future funding and provision of roading. As a result, the Road Efficiency Group (REG) which included local government and Waka Kotahi (NZTA), was set up to initiate a change management process. REG's purpose statement is "To Enable Efficient and Effective Transport Systems through Smart Investment"

This includes:

- The One Network Road Classification System
- The Business Case Approach
- Improvements to procurement practices
- Encouraging greater collaboration.

Mackenzie District Council has been and will continue to be actively involved in each of these initiatives.

The ONRC was developed in 2013/14 and refinement of levels of service continued through into 2018/19.

The ONRC is a classification system, divides New Zealand's roads into six categories based on how busy they are, whether they connect to important destinations, or are the only route available. The classifications include:

- National
- Arterial
- Regional
- Primary collector
- Secondary collector
- Access
- Access (Low Volume) was also added later

The Mackenzie roading network is characterised by many roads that feed/ 'hang' off the state highway network, and few through routes. Twenty nine percent of the network roads are secondary collectors, 9% access, and the majority (60%) are low volume (See Figure 14 for classification descriptions and Figure 16 for the districts roading make-up).

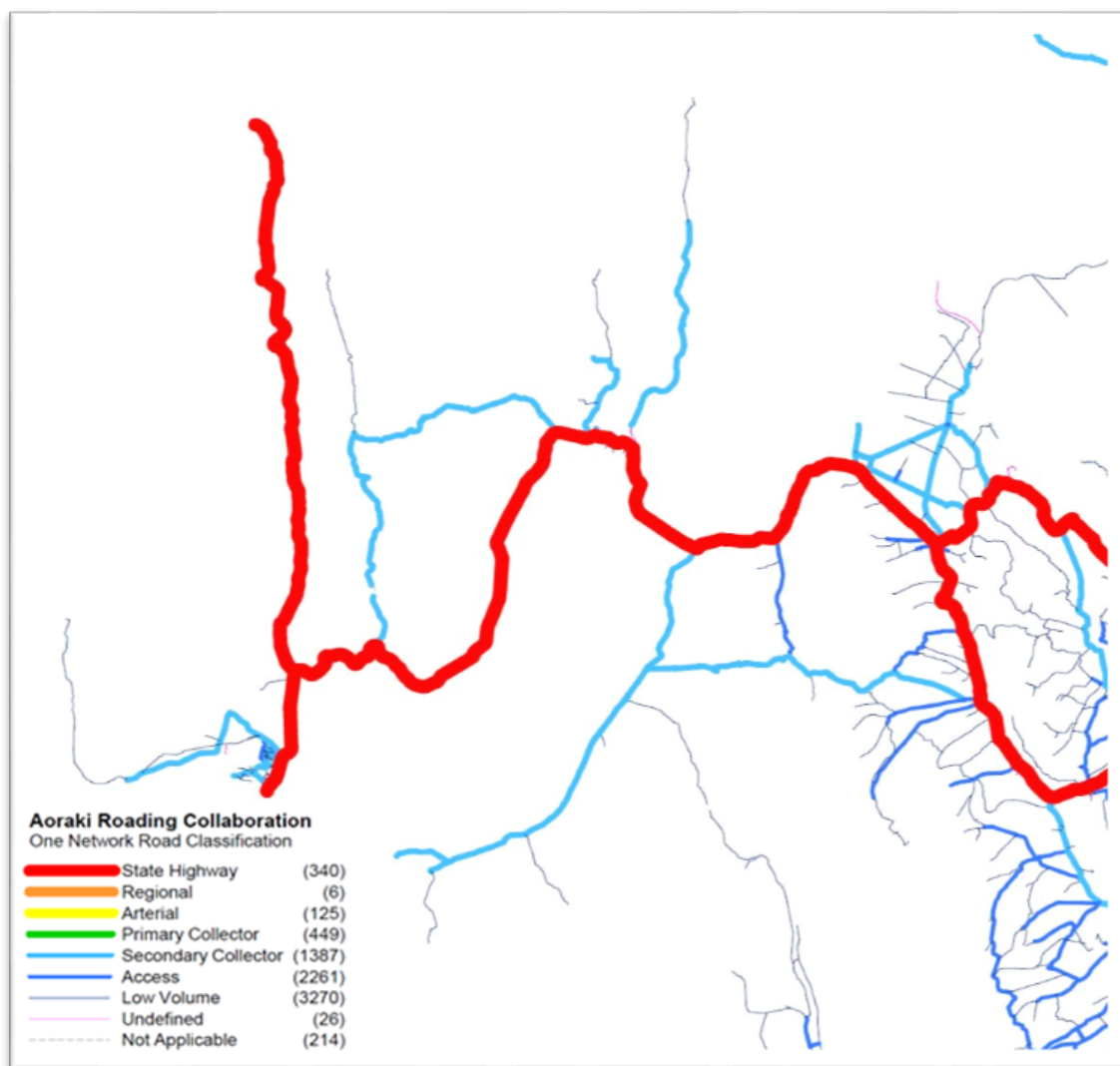


Figure 16 Aoraki Roding Collaboration

The ONRC is a customer-centric model, with Customer Outcome measures including:

- Safety
- Resilience
- Amenity
- Accessibility
- Travel time reliability

Levels of service can be measured and compared nationally to identify where investment is needed to deliver a 'fit for purpose' roading network. Data is collected for these measures and used to drive prioritised investment in the issues and areas it is needed most. Safety and resilience are two of the key issues for the Mackenzie network, with many visitors travelling on the network paired with challenging climatic conditions & inexperienced.

The Business Case Approach involves a different approach to network management and demonstration of the investment needed. The Roding Activity section of the LTP discussed this further.

Mackenzie has embraced new procurement and collaboration opportunities. The Aoraki Road Collaboration comprises Ashburton, Mackenzie, Timaru and Waimate District Councils. A common approach has been taken to asset management and maintenance contracts previously, with greater staff and resource sharing. Mackenzie is committed to being part of the collaboration providing it adds and achieves value for the district. As a smaller authority this helps Mackenzie access a larger capability pool of resource. Procurement is undertaken for resurfacing together to seek efficiencies and better value for money.

The combined contract performed reasonably well over the last 5- 6 year term but given changes in the district both Ashburton and Mackenzie have pulled away to complete separate contracts to the joint with Timaru and Waimate. These are effectively all revisions of the original document. Ashburton completed the first revision and have gone to the market and awarded already, Timaru & Waimate (with Mackenzie DC input) second and Mackenzie the third revision. Timaru and Waimate have similar specifications but have released two separate contracts to the market.

Mackenzie decision to pull away from the combined contract was to enable delivery of a section 17A review which did not fit within the timeframes of the other councils, having already completed theirs. Mackenzie wants to ensure a fit for purpose contract into the future given organisational change and transferring to a sustainable infrastructure strategy. We are therefore planning to change the contract from just a traditional maintenance contract with a step change in approach with more assistance in the asset management and data collection space built around a partnership.

Mackenzie is proposing an Request of Interest (ROI) process and completing a the tender process on market feedback rather than preparing and putting a document to the market for tender in relative isolation. Axell Consultants are aiding in the process. Instead of the previous methodologies we plan to undertake multiple engagement and interactive sessions with interested suppliers to provide understanding, seek input gain feedback, clarify, explain. Council then proposes to put together request for tender (RFT) and schedule, let to the market to the interested suppliers, run through a procurement process, assess the submissions an select a preferred tenderer and co-design a partnership and appropriate model, specification and contract document.

It believed is each of these new initiatives will benefit the Mackenzie District in the long-term provision of roading services; Council is able to demonstrate and articulate the issues clearly, in an open transparent process and work with its contractors and neighbours to deliver value for money results.

5.5.2 Safety Levels of Service

Council is focused on reducing the number and cost of crashes on the District's roads toward delivering on the road to zero strategy. This is proposed by maintaining the Operational Safety Measures as included in [Table 16](#), and by providing the Traffic Services Levels of Service as detailed in the [Table 16](#). Traffic services are devices used for the safe and orderly control and warning of vehicles and people on public roads. The function of these devices is to:

- Regulate
- Warn
- Guide, and
- Inform road users

Table 16: Operational and Safety Measures

Safety Response Times	Secondary Collection	Access	Access Low Volumes
Potholes	5 days	10 days	10 days
Digouts /stabilisations	28 days	28 days	28 days
Surface Openings and Minor Surface Levelling	28 days	28 days	28 days
Surface Defects Sealed	5 days	10 days	10 days
Adjust Service Covers Urban			
Edgebreak	20 days	28 days	28 days
Weed and grass removal	7 days	3 weeks	3 weeks
Unsealed Shoulder Maintenance Rural	5 days	10 days	10 days
Localised Widening Rural	20 days	N/A	N/A
Minor Sealing	comply	comply	comply
Unsealed Road Potholes	5 days	7 days	7 days
Grading	5 days	7 days	7 days
Unsealed Road Pavement Metalling	5 days	7 days	7 days
Structures Maintenance Urban	1 day	7 days	7 days
Structures Maintenance Rural	1 day	7 days	7 days
Traffic Services - Non-regulatory signs	As Programmed	As Programmed	As Programmed
Traffic Services - Regulatory signs Urban	1 day	2 days	2 days
Traffic Services - Regulatory signs Rural	1 day	2 days	2 days
Edge Marker Posts	3 weeks	3 weeks	3 weeks
Roadmarking	1 day	5 days	5 days
Raised Pavement Markers	As Programmed	As Programmed	As Programmed
Drainage Maintenance Urban	5 day	10 days	10 days
Drainage Maintenance Rural	5 days	10 days	10 days
Surface detritus Rural	1 day	1 day	1 day
Surface detritus Urban	1 day	1 day	1 day
Surface detritus Urban CBD	1 day	1 day	1 day
Vegetation Control- Mowing and Spraying Urban	7 days	10 days	10 days
Vegetation Control- Mowing and Spraying Rural	7 days	10 days	10 days

Safety Response Times	Secondary Collection	Access	Access Low Volumes
Potholes	5 days	10 days	10 days
Footpaths, Walkways and Cycleways Maintenance Urban	1 days	7 days	7 days
Footpaths, Walkways and Cycleways Maintenance Rural	1 days	7 days	7 days
Granular Overlay	5 days	7 days	7 days
Incident Response - Winter Maintenance Urban	4 hours	4 hours	4 hours
Incident Response - Winter Maintenance Rural	24 hours	24 hours	24 hours
Unscheduled Works - Urgent Work	As programmed	As programmed	As programmed
Unscheduled Works - Emergency Work	Immediate	Immediate	Immediate

5.5.3 Asset Preservation Measures

Council is committed to maintaining and improving the network where current levels of service may not be being met. Analysis of the network condition over time provides an indication of asset behaviour and performance achievement.

5.6 GAP ANALYSIS

5.6.1 Levels of Service Development with Users and Stakeholders

The current level of service being provided has been established through Council's LTP process. Meaning there is approval with the current regime.

Options to further examine this issue in the future could include:

- Monitoring and interpreting customer feedback through customer feedback and complaints. This information can be analysed for any trends or common factors related to current service levels (e.g., number of complaints received from identified road sections can be compared to current conditions)
- Review agreed (with Stakeholders) Levels of Service on other local authority road networks as a means of bench marking these on another network. There may be opportunities to consider some reduction in service levels where any reduction would result in savings or enable some reallocation of expenditure between activities. This is already completed dependant on the risk when nearing the end of the financial year.
- Engage customers in a formal process. Council is currently undertaking an independent customer survey annually and are using a web based portal 'Let's Talk' to engage and consult on matters.

- Engagement with key stakeholders. These include the Regional Council, Waka Kotahi (NZTA), transport operator groups, Automobile Association and others. Good input information to these engagements will produce valuable feedback.

5.6.2 Levels of Service Definition

The current LoS are documented as a combination of:

- LTP LoS documentation based on real or perceived customer feedback
- Contract processes which describe some elements of the quality of service provided, mainly travelling surfaces and intervention levels

This can be improved by:

- Augmentation of existing information e.g., clearer relationships between alternative service levels for roughness, street lighting etc. and their associated costs.
- Utilisation of a level of service model defining quality, quantity, location, and timeframe. This would be based on the IIMM and define the transport service in terms of Accessibility, Health and Safety, Quality, Reliability and Responsiveness, Sustainability, Functionality.

These would form the basis for a consultative process as outlined above.

5.6.3 Performance Measures

Currently performance is measured as per contractual requirements and changes in indicators such as road roughness. This gives a good indication of the performance of the Transportation Activity and with our collaboration partners using the same specification, there is a great opportunity to benchmark each other.

Mandatory Performance Measures

Council has suite of performance measures agreed with the community and reported on annually by the Annual Reports. This performance is measured as per contractual requirements and changes in indicators such as increased flooding or maintenance. However Central Government introduced a suite of mandatory performance measures covering Transportation, Three Waters and Flood Control that came into force on 1 July 2014.

These mandatory performance measures have been adopted by Council and were included in the 2015-25 Long Term Plan and will continue to be used for the 2021- 31 Long term plan period. Two other measures will be used/ considered at this stage around road safety as a measure to monitor and raise awareness on the delivery of road to zero.

Performance measure 1 (road safety)

The change from the previous financial year in the number of fatalities and serious injury crashes on the local road network, expressed as a number.

Suggested Council Measure

“The number of death and serious injuries recorded for the financial year on local roads under control of the Mackenzie District Council.”

Suggested Council Measure

“The number of reported crashes on local roads under control of the Mackenzie District Council.”

Performance measure 2 (road condition)

The average quality of ride on a sealed local road network, measured by smooth travel exposure.

Performance measure 3 (road maintenance)

The percentage of the sealed local road network that is resurfaced.

Performance measure 4 (footpaths)

The percentage of footpaths within a territorial authority district that fall within the level of service or service standard for the condition of footpaths that is set out in the territorial authority's relevant document (such as its annual plan, AMP, AMP, annual works program or long-term plan).

Suggested Council Measure

"75% of the total length of footpaths are at or above the "average" condition rating" Condition rating to be undertaken no less than a 5-year frequency."

Performance measure 5 (response to service requests)

The percentage of customer service requests relating to roads and footpaths to which the territorial authority responds within the time frame specified in the long-term plan. (This response time to be determined)

Suggested Council Measure

"75% of service requests relating to roads and footpaths, to which the territorial authority responds within 10 working days"

5.6.4 Affordability and Willingness to Pay

Hand in hand with the current LoS vs. Desired LoS is the issue of cost. This needs to be addressed at two levels:

- Cost for different Levels of Service options within the Transportation Activity
- Cost of the Transportation activity within the total Council programme.

The first level can be addressed using the options outlined above where fully described and costed service level options are consulted with the community.

The second level needs to be addressed as an assessment of the relative contribution the Transportation Activity makes towards the achievements of Community Outcomes at the current level vs. greater or lesser levels of service.

With increased growth in Tourism pre Covid 19 and more of the free independent travellers there was and still is a need to consider a higher LoS. Especially given the historical rural nature and communities of the district where very little substantial improvements have occurred and where it was previously accepted to have gravel footpaths, unsealed roading, minimal traffic services, curvature alignments, impassable roads due to weather event for a couple of days, four-wheel drive access only roads/ fords, etc. There is an increased safety risk due to the free independent travellers or visitors to the district not being familiar with our roads and not keeping left or parking clear of the carriageway. These items are still relevant even with the reduction in international tourism as a lot more domestic tourist have taken their place. This could be considered worse in the transportation system space given domestic tourist and undertaking further exploration than international tourists, typically travel faster and maybe just as, or more inexperienced in less safe vehicles.

6 ASSET MANAGEMENT PRACTICES

6.1 INTRODUCTION

Council has a full time Roothing Manager, with assistance from the Engineering Manager and an Engineering Officer, who are responsible for the maintenance management of the road network. Overall responsibility lies with the Engineering Manager which is overseen by the General Manager of Operations. Occasionally design and management are negotiated to consultancy services. The Roothing Manager/ Engineering Officer and the Road Maintenance Contractors regularly inspect and monitor the network. Any work identified is directly tasked to the incumbent maintenance contractor or, if it is beyond the scope of the maintenance contract, tendered or negotiated using Waka Kotahi (NZTA) Competitive Pricing Procedure guidelines. This may or may not need the involvement of consultants depending on the nature or extent of the work.

Council accounts for revenue and expenditure on an accrual basis. All work under the Works Programme is identified through RAMM Finance (previously contractor) with a significant level of breakdown using analysis codes. The costs are summarised into the general ledger where operational/maintenance costs are identified separately to capital/renewal items. Specialist reports have been developed to match analysis code costs to the work categories required for Waka Kotahi (NZTA) reporting.

All contract works are claimed monthly or as receipts are received against each of the contract item numbers by the physical works and professional services contractors. Council and/or Consultants confirm the payment value for all physical works and the Council confirms the payment of any professional services. The accounts job number and account codes are included on the payment certificate. These certificates are forwarded to Council for payment. The types of work that this system relates to are maintenance, renewals and capital expenditure.

A variety of reports are prepared in order to comply with the requirements of Council, Waka Kotahi (NZTA) and Audit NZ. All external reports are prepared in compliance with Generally Accepted Accounting Principles (GAAP)

6.2 ASSET MANAGEMENT PROCESSES AND SYSTEMS

6.2.1 Processes

Levels of Service

The Council currently has a level of service that has been consulted on over several Long-Term Plan iterations. ONRC has been introduced and implemented as a national approach to classify roading networks around the country. There are seven road classifications under ONRC of which the lower three make up the Mackenzie District (secondary collector, access and access low volume. The aim of the ONRC is to be able to have a consistent standard of roading across the country when measured against the 27 performance measures. It is focused on vehicle movement and the customer's perception rather than just the technical aspect aiming at performance measures and targets encouraging a different thought process targeted toward the investment story. Instead of focusing on each of the individual measures, the performance measures should be considered as the entire package and also wider across network boundaries, regionally and nationally. This method enables comparative reporting between similar sized and functioning districts encouraging road controlling

authorities to assess, evaluate, challenge their asset management practices against their peers to achieve the best whole of life cost and continue to consistently improve their practices and efficiency. This has reinforced the level of service requirement for the various road classifications. The ONRC model is based on spending the money where required but weights the maintenance spend against the road classification. Therefore, the maintenance works shall be greater on the higher classification (secondary collector) roads rather than the lower classification (low volume access) roads. The ONRC over the life of this plan is to transition to the ONF which follows the same principals, but instead of being focused only on movement it also incorporates place allowing further considerations & outcomes to be assessed i.e., well beings.

Knowledge of Assets

The process of capturing as-built records for the on-going enhancement of asset registers is included as a requirement of the maintenance contracts. The information is supplied to Council via RAMM contractor now RAMM Finance and assets are updated accordingly. Projects undertaken outside the maintenance contracts have a requirement within their contract and/or resource consent requirements for the relevant information to be collected and forwarded to Council for them to update RAMM. There are minimal observed gaps in the securing of data for new road infrastructural assets (e.g., subdivisions). Consultant time will be utilised to address any gaps.

Accounting/Economics

Maintenance and renewal costs are recorded against broad activities in the general ledger. Valuations are currently based on straight line depreciation and assumed effective lives. On the completion of capital projects and the acceptance of vested assets associated with new subdivisions all the asset infrastructure data is passed to the financial department of Council for updating their systems to ensure the correct amount of depreciation is allocated. The value of those vested assets is provided by the developer from the tendered contract information for the project. If the developer is unable to provide the data, the value of the vested assets is developed using rates supplied during the three yearly valuation (undertaken by AECOM historically and CPI adjusted if required).

Condition and Performance Monitoring

Well documented standards and processes exist for an on-going inspection programme of pavements, surfacing, culverts, cattle stops and bridges. Other assets are inspected on an as required basis.

Processes for regularly monitoring the performance of pavements, (e.g., roughness, gravel loss, defects, crash statistics) surfacing, culverts and bridges are well documented and the information is used for identifying and prioritising upgrading and development of projects. The monitoring of other assets is informal and mostly reactive.

Risk Management

Although processes are in place for the monitoring of some critical assets (e.g., bridges), risk management is outlined and council has a corporate risk policy. The assessment and management of these risks is generally practised informally based on the knowledge of experienced staff.

Operations

Operational processes are documented in service delivery contracts or specified in Waka Kotahi (NZTA) standards and are subjected to regular review.

Maintenance

Competitively tendered contracts are entered into for major budget items that are not included as part of an existing contract or that don't meet the endorsed (Council & Waka Kotahi (NZTA)) procurement strategy for land transport.

Optimised Life Cycle Strategy

Systems are in place for optimising pavement and surfacing renewals using a combination of inspection, RAMM Treatment Selection algorithm (where appropriate) and assumed expected economic lives. Work optimisation for other assets is based on the judgement of experienced staff, and renewal projections are based on assumed economic lives.

Road Utilisation

Current traffic volumes are recorded within RAMM to monitor demand within the network. Mackenzie District Council own and manage our own traffic count surveys & equipment. A programme is tailored and managed in house to ensure quality data and results across the district are achieved.

Design, Project Management

Waka Kotahi (NZTA) project management procedures are used as a guide, and council have introduced and created an Inspection Test Plan (ITP) to address quality assurance specific procedures are formally documented for Council. We are also undertaking random site audits of construction works. Fit for purpose procedures are used during the project evaluation, design phase, contract management on all minimal expenditure low risk projects. Larger projects are designed and managed by external consultancy services typically. The supervision of assets constructed within sub-divisional development and are subsequently taken over by Council is considered to be adequate however, it requires periodic auditing by the Engineering Manager, Consents Engineer or delegated staff member during crucial construction phases. This will ensure a high-quality subdivision, with a low life cycle cost is vested with Council on completion.

Quality Assurance/ Continuous Improvement

Audit NZ audits performance measures reported in the annual plan annually and Waka Kotahi (NZTA) regularly audits financial transportation practices. Recommendations for improvements are generally adopted and implemented as resources permit. Recommendations by Audit and Waka Kotahi (NZTA) were in relation to traffic counts which we had previously identified as an issue and are working on remediating due to the need for accurate data in reporting to Waka Kotahi (NZTA). To date we have dropped all of the data verified what we could and then reinput back into the database.

6.2.2 Systems

Several data management systems are used to assist in the decision-making process for Transportation network issues. Some of these include but are not limited to RAMM, Asset Viewer (GIS), Laserfiche, etc

Road Assessment and Maintenance Management System (RAMM) (Think Project)

The RAMM system is the main information system used in the management of the road network. RAMM contains a schedule of all roads in the network and information on carriageway widths, surfacing types and ages, pavement composition, bridge data, footpaths, traffic volumes & loadings and road condition data along with streetlights.

The bridge assets are managed, under a professional services contract by DCL Consulting. They use our RAMM database to manage the asset and input, update and amend data as required.

The level of confidence in our data has remained relatively static since the last iteration of this AMP completed in 2018. Data has been updated, but the focus has been on removing historic errors to improve data quality going forward. Council has carried out a significant auditing and validation programme on its RAMM data, completed by OPUS Consultants Ltd (now WSP). All previous assets excel spreadsheets and modelling practises have been integrated with this validated data. Subsequent

to this as part of the Road Efficiency Group (REG) group there has been a report released rating all Local Authorities RAMM Data sets. There are still areas that require Council attention in the RAMM databases:

- Traffic count data could be more complete and representative of the wider network
- Missing remaining useful life data makes it difficult to determine renewal profiles based on the age of the asset
- More complete records of asset attributes would assist in the monitoring and assessing of assets.

Council undertake regular inspections and conditions assessment on its assets to determine whether the asset is in need of replacing (see below). More complete and accurate data would help streamline and forecast for future renewals and capital works.

The use of RAMM or an equivalent asset management system is mandatory to obtain financial assistance from Waka Kotahi (NZTA).

Table 17 gives the assessed data confidence quality of the Council RAMM database and spread sheet and spread sheet data tables as described in the 2016 Roding Asset "Mackenzie District Infrastructure Revaluation" report.

Deleted:

Table 17: Data Confidence Levels

Valuation Element	Pavement	Footpath	Structures	Drainage	SWC	Signs	Lights
Asset Registers or Databases	H	G	H	H	G	G	G
Attribute Details	G	G	G	H	A	H	G
Asset Categorisation	VH	H	VH	H	H	H	G
Optimisation Information	H	G	H	H	H	H	H
Useful Lives Information	A	G	A	A	A	A	H
Unit Rates	H	H	G	G	G	A	G

The table Data Confidence Levels are:

VH very high confidence H high confidence G good confidence
A average confidence P poor confidence

The Council recognise that there is significant improvement which can be made with regards to its data management for roading assets and has since contracted Geo-Solve to undertake pavement testing over various locations within the district. This will provide data to check pavement depths and ensure performance, deflection and strength.

Through the retendering of its Road Maintenance Contract in 2020/2021, Council has secured Waka Kotahi support to undertake a quality based procurement methodology as it looks to secure a maintenance delivery partner that brings not only physical network maintenance services, but also Asset management and Data capability. This, alongside Council seeking to employ a dedicated asset data manager in order to prioritise the improvement and confidence level of the roading data, will support significant improvement in data over the coming years.

RAMM - Condition Assessments

Data on road condition is collected through road roughness and condition rating surveys.

Roughness surveys measure the quality of ride experienced by motorists when travelling on the road are undertaken bi-annually. The measurements are obtained using a vehicle mounted response metre which records the vertical displacement or roughness of each 100 metres of traffic lane. These measurements are then converted to NAASRA and IRI counts which are the standard measure of road roughness and stored on the RAMM database.

Condition rating surveys involve a visual assessment of pavement surface condition and are undertaken bi-annually over the sealed network. They involve a detailed walkover and identification of defects on the carriageway over an approximate 20% sample each sealed road length. This has increased from 10% on the advice from other local authorities and Waka Kotahi (NZTA). The defects recorded include the number of potholes and the area or length of other defects such as rutting, shoving, flushing, scabbing, cracking, edge break. Drainage assets are typically not rated other than to state whether they are adequate, inadequate or non-existent.

Council have undertaken some GeoSolve pavement testing but haven't yet received the result as the data is still be analysed and compiled. Council haven't undertaken any high speed data capture to date on the network due to costs and limited amount of sealed surfacing currently. Small sections may be explored in future as part of a national programme or collaboration agreement. But we are unlikely to complete any until then.

RAMM -Treatment Selection Algorithm (TSA)

The RAMM system contains a treatment selection algorithm that utilises the condition data, roughness, traffic counts and other road inventory data to make recommendations as to preferred treatments on the network. The outputs from the treatment selection are utilised at a network level and also at an individual treatment section level. Council still finds the most proven way to assess the network is to undertake a full network inspection annually to assess condition and failure. As the TSA has its limits and given the amount of sealed road network both options are deemed cost effective data is then interrogated to justify treatment.

At a network level the treatment selection summary report identifies the length of the network recommended for resealing in the current and following year and also makes recommendations as to the length of the network requiring major treatments such as smoothing or strengthening. The treatment selection algorithm undertakes an economic analysis of the maintenance options for each treatment length to identify the most cost-effective treatment option. This is based on the on-going cost of maintenance, vehicle operating costs and the unit costs of the various maintenance and renewal treatments.

The treatment selection summary report can be a useful tool in assessing the effectiveness of the maintenance and renewal strategies being followed and is an indicator of the future maintenance needs of the network. The treatment selection output identifies sections of road with various faults and makes recommendations as to which specific road sections should undergo resealing or rehabilitation. These outputs are sometime considered or used where necessary or appropriate in the preparation of the annual resealing and rehabilitation programmes. However, Waka Kotahi (NZTA) does not necessarily meet the co-investment required to achieve these recommended programmes.

The treatment selection algorithm is run if appropriate after updating of the RAMM database is complete to reflect completed physical work and forecasts are adjusted to exclude sections of road where renewal works are programmed in the current year or underway.

Traffic Data Collection

A regular counting programme is in place to monitor traffic volumes on the network. Traffic counts are completed primarily on roads that are targeted for improvement or are showing signs of accelerated failure. Council owns their own counting equipment and undertakes the physical operations and data collection and transfer. Council owns 4x 'Metro' Counters (classifying counters), 3 x 'Pico' (classifying counters and a number of 'Trafx' counters some that count vehicles and others that count pedestrians and cyclists. These 'Trafx' counters only provide vehicle counts per time of the day they do not provide classification as they work off magnetic sensor. We have had some issues given seasonal variance and temperature affecting operation. Because of this we have reduced the use of these counters given inconsistencies in data. Over the past long term plan (LTP) period we have also taken up the advantage of using Timaru District Council's contractor to count several roads over the Christmas period over 3 week period. We have been monitoring the same sites over the last 3 years. Timaru have 10 counters and with our 4 we can undertake 14 counts a week resulting in 42 counts over this period.

Our 'Pico' counters have been used to collect a full year's data traffic data on some of our higher volume roads. We have had these in place on Lilybank Road, Braemar Road and Haldon Road. This is to better understand the use of our roads as well as to monitor seasonal variances as well as to provide evidence for seal extension. These replace three of the four permanent counts stations set up on Braemar, Lilybank, Haldon and Mount Nessing Roads historically We are now in a position to analysis this data and draw trends from the information collected for date. We are also counting roads that have no traffic count data or current counts to improve our data quality for and to keep ONRC classification up to date as well as preparation for the adoption of ONF.

Actual count data exists in RAMM since 2010 there were some errors in this data, due to this we dropped the data. Certified the data that we could then reloaded into the database. We still have issues with estimates due to Traffic Link not working correctly and being very difficult to setup. We await RAMM's new version of this prior to continuing with it any further. There are still gaps in our traffic count data due to errors in historic data input which we haven't been able to verify. We are currently working on these gaps, propose to address gaps by purchasing further counting equipment to undertake a greater number of counts per annum and to provide a better understanding along the lengths of network to predict and enable greater accuracy around estimates and to build an accurate model.

We are working on a programme to determine traffic throughout the network to get a better understanding of use via a targeted traffic count programme and to keep data current. Some of our estimates are still well out of context therefore we programme to complete multiple counts per road beginning with our high country rural roads, lower country rural roads then urban centres to provide better more realistic, reliable, up to date information based on actual count information. Also, to understand the use on roads used as collector and the feeders into these at intersections. The position of Engineering Technician was vacant during 2017 for some time and this created a gap a 6-month gap in our traffic counting programme. Covid 19 has also had an impact on the traffic counting programme. Between the various levels the permanent counters remained in place but the temporary counters that are shifted around the district were removed.

Bridge Data

Bridge data is currently held in Council's RAMM database such that the bridge valuation can be undertaken. Council has recently undertaken updating the RAMM database with DCL Consulting Dunedin who is tasked with the annual structural inspection of the bridge stock, to include all available asset data.

A bridge maintenance inspection of a third of the bridge stock is undertaken on a yearly cycle to identify and prioritise repairs. Bridge structures that require repairs or some of the high-risk weight limited structures are assessed annually. A full report of these inspections is provided to Council. Superficial inspections are undertaken by the maintenance contractor on a regular basis.

Pavement and Surfacing

All road sections are monitored by the maintenance contractors to determine routine maintenance needs and programming of work requirements. This ensures the road network is kept to the minimum levels of service required by their contract. Council staff also monitor the road network condition when undertaking their daily duties to ensure contractor compliance.

CAS Database

CAS is an online Waka Kotahi (NZTA) live database of official crash data and includes sophisticated spatial, analysis and reporting capability. Access to this data is available by direct enquiry to Waka Kotahi (NZTA) reports can also be generated by our South Canterbury Road Safety Coordinator.

Other systems operated by Council include the following:

- ARC Geographic Information System developed by ESRI
- NCS Corporate financial management system
- Hardcopy plan/filing systems

6.3 INFORMATION FLOW REQUIREMENTS AND PROCESSES

General maintenance work is continuous throughout the year and responds to the needs of the network. The data from the repairs carried out is entered into RAMM Finance (previously Contractor) daily with maintenance costs being updated monthly. Sign's data, culvert replacements and traffic count data are entered into the RAMM database as they become available.

New subdivisions in the District result in additions to the roading infrastructure. In the past there have been difficulties with developers not supplying the additional asset information. A process has been established to ensure that this data is recorded in RAMM, at the cost of the developer, and is available for on-going effective Road Asset management.

6.3.1 Programming of Works and Funding

Currently the network is funded to the level at which Waka Kotahi (NZTA) has deemed appropriate based on historical spending. As such there is some deferred maintenance, particularly in re-metalling, as discussed in considerable detail under the "Lifecycle Management" section. Extensive modelling has been undertaken to show that the level of funding approved previously is not meeting network demands this is also further pressured by the reduction in Financial Assistance Rate (FAR) the council has had historically. We also thought historic values were light compared to other similar district across the country. This shortfall in funding needs to be addressed and either met by Waka Kotahi (NZTA) or the ratepayer. But given the average rate payer is already contributing their fair share with seven people funding each kilometre of Mackenzie's local roads, compared to nationally sixty people fund each km with see this as a Waka Kotahi (NZTA)/central government matter.

Council to date have approved for LTP consultation a significant increase while also entering into debt for the first time ever even with a stimulus package given the impacts of the Covid 19 pandemic and receipt of no central government funding for shovel ready projects given increased thresholds. With

the greater number of tourism and visitors (slightly reduced due to Covid 19 but still evident with domestic tourism) and the primary benefit to New Zealand Inc. we strongly believe our district rate payers are contributing their fair share for the level of service provided and that Waka Kotahi need to reconsider the FAR rate for Mackenzie. Given the use deterioration, increases in level of service and facilities required and demanded by tourism pressures notwithstanding the ongoing maintenance in using the infrastructure in comparison to locals.

Even with growth in the towns the majority of this is the private visitor accommodation rather than an increase in local residents. Therefore, it would seem only fair that the Financial Assistance Rate (FAR) be increased for the Mackenzie to aid in the upkeep and improvement of essential infrastructure given the increasing use has been driven mainly by non-ratepayer. For example, our level of approved funding for pavement rehabilitation means that all sealed roads within the network must last 257 years before they are renewed.

Maintenance and renewals on the Roding network are prioritised on the following categories.

- Situation in the network
- Increasing signs of failure

Current traffic loadings and demand

Budgets are expended in the work category that is required at the right time to ensure the lowest lifecycle cost is realised. This practise of “just in time” and “sweating the asset” is unsustainable and considered poor asset management by any stretch of the imagination leaving the road network, in particular the sealed roads and unsealed roads, at risk of significant failure that will be expensive to rehabilitate when all they require is a waterproofing seal coat or wearing course or early intervention to remediate.

The budget figures defined in this AMP reflect network requirements based on current contract rates and agreed levels of service. Items that are likely to impact on this are.

- LoS Changes from ONRC
- Contract Rate Changes as a result of retendering
- Failure by Waka Kotahi (NZTA) to recognise the level of co-investment required

During the NLTP period there is an ability to reallocate funds between work categories depending on network requirements. This reallocation endeavours to provide the best final outcome for the long-term benefit of the network.

Low Cost Low Risk projects are carried out to improve the network where funding is not available through other means. Programmed bridge replacements are first call on this work category, which in some years eats entirely into this allocation and thus there is limited ability to complete other improvements in those years.

Bridge replacement/renewals are based on benefit cost analysis and funded under the “Low Cost Low Risk” improvements programme, where replacement is expected to be under \$2,000,000. All bridge projects are ranked on their merit, taking into account:

- Situation in the network
- Increasing signs of failure
- Current traffic loadings and demand

When a bridge reaches the end of its economic life, Council reviews the need for replacement and looks at the full range of options such as removal, replacement, alternative risk profile structures, wash over ford culverts, etc.

Validation

Each year when the annual programme is developed, unit rates are checked and amended to reflect the current seasons contract prices.

The RAMM database system is the main management tool used to ensure the annual works programme is providing the correct balance of maintenance and renewal work to keep the network operating at the appropriate levels of service. Condition and performance reports from RAMM are analysed and trends produced that provide measures of the appropriateness of the work practices.

Lifecycle costs are analysed at a projects design phase using criteria laid out by Waka Kotahi (NZTA). This assists in the selection and ranking of projects. Project design is standardised by use of the Austroads and NZ Supplement Pavement Design Manual, Road Geometric Design Manual (recognised nationally and internationally) and local knowledge.

6.3.2 Standards and Guidelines

The management of the road asset is constrained by the funding available to maintain the network as a viable entity. The requirements of Waka Kotahi (NZTA) which channels Government funding that provides a substantial portion of the roading funds available, are detailed in their “Programme and Funding Manual” and the “Project Evaluation Manual”.

Another key manual is the International Infrastructure Management Manual which provides guidelines on the structure and format for AMPs and practice.

7 FUTURE DEMAND

7.1 DEMAND DRIVERS

The significant future demands affecting roading in Mackenzie District to be considered are:

- Growth Trends – Trends in population growth or decline give a good indication of future growth and in turn demand on the network.
- Economic Changes – Changes in land use, farming intensification, forestry, business development, freight movements and tourism can all affect the demand on the roading asset.
- Vehicle Mix, weight and Use Changes – The available modes of transport, vehicle ownership, heavy vehicle trends and the increasing width of agricultural equipment using the road can all impact on future demand on the network.
- Improvements to Levels of Service - Continual demand for improvements in the levels of service. This can result from:
 - Advances in available technology
 - A greater understanding of customers' use, perceptions and expectations – using survey currently being completed.
 - A higher level of road safety consciousness/ change in strategy i.e., road to zero – Joint South Canterbury Road Safety Coordinator
 - Changing legislative requirements
 - ONRC
 - Growth of district and central government direction
 - Changing demographic
 - Climate Change
 - Availability of supplies/ resources
 - Development and interconnectivity
 - Carbon emissions deliverables/ outcomes

Table 18, indicates how these factors are expected to be reflected in changes in use of the roading network.

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Table 18: Transportation Demand Drivers

Transport Demand Drivers	Urban - Sealed	Urban - Unsealed	Rural – Sealed	Rural - Unsealed
Growth	Population changes. Surfacing requirements and suitability. Kerb and channelling/ separation of users.	Building development and growth. Town/ boundary expansion. Dust nuisance. Maintenance issues and traction sealing.	Widths and structure unsatisfactory. Alignments not suitable. Lack of information and traffic services. Safety.	Forestry maturing wall of wood. Army exercise in Balmoral training area. Farm intensification. Tourism opportunities and activities developing or intensifying.

Transport Demand Drivers	Urban - Sealed	Urban - Unsealed	Rural – Sealed	Rural - Unsealed
	<p>Walking and cycling facilities and appropriateness.</p> <p>Lighting.</p> <p>Parking.</p> <p>Manoeuvrability.</p> <p>Traffic calming speed.</p> <p>Accessibility to cross.</p>	<p>Safety and suitability of asset.</p> <p>Availability, amenity and accessibility.</p> <p>Interconnection. Active mode options and opportunities.</p> <p>Vehicle type. (only 5km)</p>	<p>Mode shift provisioning or awareness.</p> <p>Deterioration, consumption and suitability</p> <p>Amenity, visibility.</p> <p>Experience of users.</p> <p>Speed.</p>	<p>Advertising back country NZ as part of Covid 19 repose.</p> <p>Diversification of businesses and operations.</p> <p>Cycle trail connections & improvements.</p> <p>Wear, deterioration and consumption of asset.</p> <p>Maintenance increases to a point of no longer being cost effective to maintain as unsealed.</p> <p>Experience, vehicle type and knowledge of users.</p> <p>Speed.</p>
Economic	<p>Tourism, parking, walking and cycling.</p> <p>Wayfinding, traffic services, traffic calming, speed.</p> <p>Development/intensification</p>	<p>Walking and cycle trails.</p> <p>Accessibility& amenity.</p> <p>Cultural and heritage provisions.</p> <p>Business/ industry establishment.</p> <p>Development/ growth.</p> <p>Infilling of properties (only 5km)</p>	<p>Changes in land use & Tourism increased due to self-driving and increases in free independent travellers.</p>	<p>Changes in land use and commercial operations due to farm intensification (irrigation).</p> <p>Tourists driving on unsuitable roads.</p>
Vehicle Mix and Use	<p>Changes in vehicle ownership and numbers of vehicles.</p> <p>Increases SUV and 4x4 ownership.</p> <p>Mode shift provision for walking and</p>	<p>Growth in vehicle numbers on the roads.</p> <p>Speed of vehicles.</p> <p>Mixing of modes in the on space.</p> <p>Mode shift provision for</p>	<p>Increased heavy vehicle usage.</p> <p>Increases in weight.</p> <p>Increased size, dimension and weight of agricultural vehicles.</p>	<p>Increased heavy vehicle usage and heavier vehicles, HPMV, 50 Max.</p> <p>Increased size, dimension and weight of agricultural vehicles.</p> <p>Increased amounts in the number of light vehicles.</p>

Transport Demand Drivers	Urban - Sealed	Urban - Unsealed	Rural – Sealed	Rural - Unsealed
	cycling opportunities.	walking and cycling opportunities. (only 5km)		AWD vehicle provisions.
Improvements to Levels of service	<p>Improved safety.</p> <p>Increased parking, signage and walking and cycling requirements.</p> <p>Improved surfacing treatments on roads and pathways.</p> <p>Improved traffic services, traffic calming, markings, information and way finding.</p> <p>Improved amenity and accessibility for all.</p>	<p>Increased pressure to seal these 5km due to dust nuisance and safety</p> <p>Improved surfacing treatment limiting maintenance.</p> <p>Improved safety.</p> <p>Greater uptake of mode shift.</p> <p>Improved amenity and accessibility.</p>	<p>Adequate depth of pavement to allow for large vehicles, lane width perception, passing opportunities, Improved delineation and traffic services direction for road user.</p> <p>Wider roads to cater for all traffic and increased volumes limiting edge damage.</p> <p>Limited to no faults.</p> <p>Mode shift protection, availability & connectivity.</p>	<p>Changes of farm operations, more contractors coming in, deliveries, station owners/managers travelling to town centres daily for school etc.</p> <p>Increases in sealed surfacing to improve safety and reduce maintenance cost.</p> <p>Improved widths, traffic services and delineation.</p> <p>Increased opportunities.</p> <p>Improved amenity and accessibility.</p>

7.2 DEMAND FORECASTS

7.2.1 GROWTH TRENDS

Population Projections

Mackenzie's population growth is expected to follow the medium projection issued by Statistics NZ in December 2016. It is anticipated that over the next ten years (2018-28) Mackenzie District will have a growth in population of around 13%, from around 4,300 at present to 4,880. Like much of New Zealand, the proportion of people aged 65 years and older will grow within the district. It is anticipated that projected population growth will not impact significantly on the operation and maintenance of our roading activity.

Household Growth

It is projected that over the next ten years Mackenzie District will have:

- A growth in household numbers consistent with the population growth trajectory.

- Household numbers are projected to increase from 3872 in 2020 to 5089 in 2030 (=31 per cent) by 2028 (Statistics New Zealand) - the higher percentage increase in households relative to population increase in 2028 reflects a projected increased in single person households.
- With a greater number of older people living alone, a reflection of structural ageing, one-person households are projected to increase by 15 percent by 2028 (Natalie Jackson Demographics Ltd, Sept 2014).
- Future demand in the Mackenzie District will be increasingly driven by one-person households and couples without children, characteristic of population ageing.

Residential Development

Analysis of the future urban and rural residential subdivision over the next 3 years shows an average of 110 sections per year, long with associated infrastructure, to be vested in Tekapo and an average of 65 per year in Twizel.

During the 2015/17, 5km of sealed road and 4.8 km of unsealed road was vested in Council. Whilst developers have to construct this to Council's standard before vesting the ongoing maintenance costs have to be allowed for.

Initially it was assumed that the level of development experienced during 2015-17 would slow down to about a third but this has proved not to be the case. We have modified our projections to allow for this growth.

7.2.2 Economic Changes

Tourism

Mackenzie has experienced unprecedented growth in visitor numbers (both domestic and international) in recent years, as indicated by a range of data, including the Statistics New Zealand Commercial Accommodation Monitor, which for the year ended September 2016 compared with the year ended September 2015 reported:

- Guest nights rose 23.1 per cent to 705,316
- International guest nights rose 19.9 per cent to 489,769
- Domestic guest nights rose 31.1 per cent to 215,547
- The average length of stay rose from 1.32 nights to 1.33 nights
- The overall occupancy rate rose from 44.4 per cent to 50.2 per cent
- Accommodation capacity, excluding holiday parks, rose 3.1 per cent

International tourism numbers are expected to continue by 5.4 per cent per annum from 2016 until 2022. Based on this, there could be nearly 6 million tourists visiting New Zealand by 2028. Council is assuming average growth in international visitors to the district will be at least equivalent to or greater than the growth in international visitors forecast for NZ. Growth in domestic visitor numbers is also expected to occur at a similar rate.

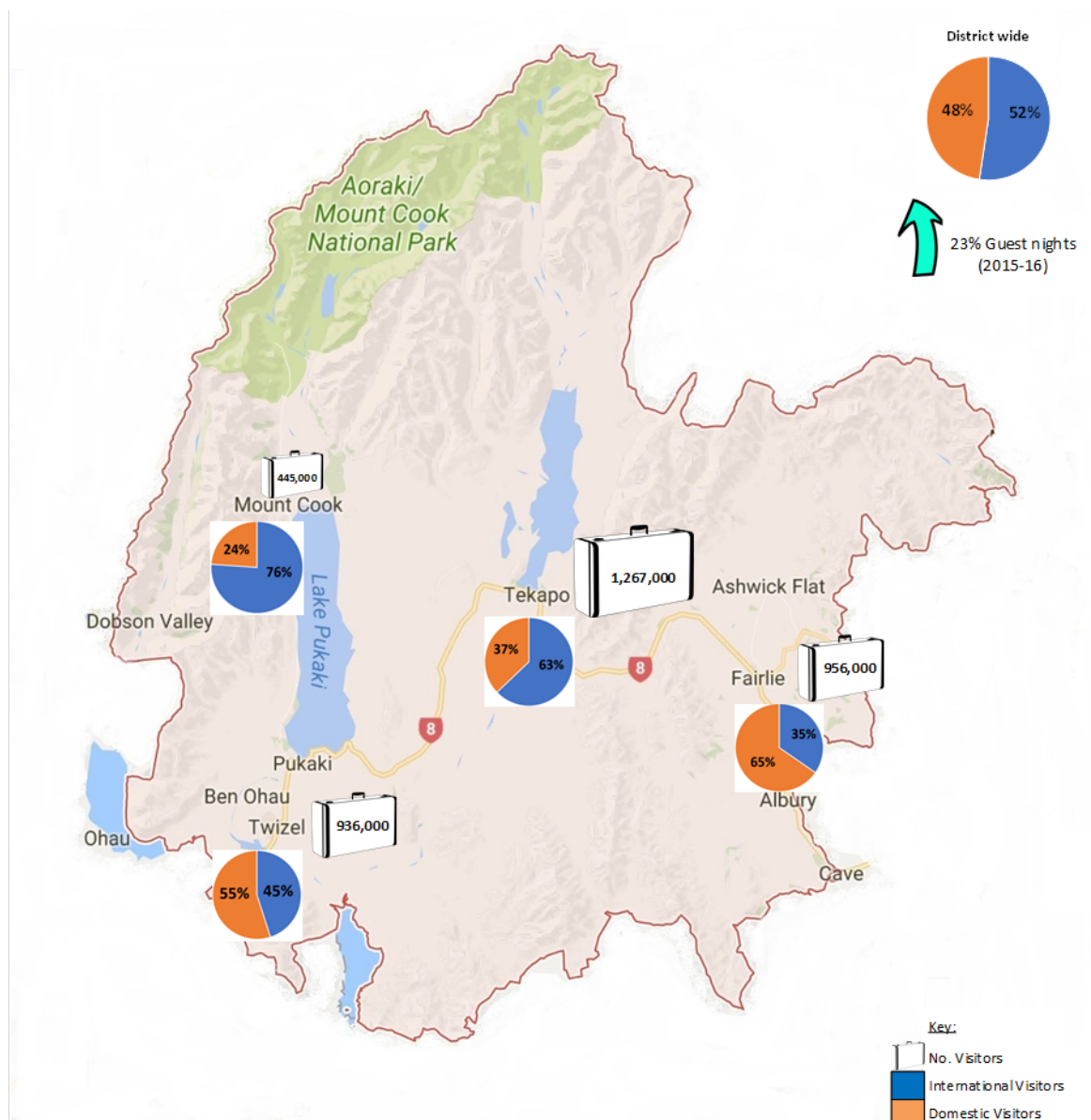


Figure 17 Mackenzie district visitor characteristics

Tourism makes up a large component of transportation demand within the district. The Mackenzie has experienced increasing numbers of free independent travellers, with fewer tourists opting for commercial tour groups. Where previously commercial tourism groups favoured the State Highway network, free independent travellers are increasingly using the local roading network. Covid 19 has affected and reduced this to some extent outside of the New Zealand holiday periods. This has been supplemented somewhat by domestic tourism but not to the same consistent intensity.

Many international tourists are accustomed to travelling on the right-hand side of the road. On unsealed roads there is no centreline to provide visible orientation, in addition, the majority of the unsealed roading network is operated at open road speed limits. This has reduced almost completely as a result of Covid 19. It is likely this will return but is unsure to what level at this stage and or when. It is important we improve our network and levels of service for the return to limit pressures on the network at a later date.

The influx of domestic holidaymakers into the district, particularly the Mackenzie Basin, has a significant impact on roading. On some unsealed roads summer traffic volumes double or treble, at a

time when the roads are extremely dry and particularly sensitive to wear. The route from State Highway 1 at Albury over the Mackenzie Pass to Lake Benmore down the Haldon Road is an example of this traffic loading.

The following provides an overview of specific areas of demand on roading activities resulting from tourism growth:

- The Church of the Good Shepherd: vehicle and pedestrian pressure on Pioneer Drive and surrounding walkways.
- Dark Sky Reserve: within the Takapō/ Tekapo township and surrounding rural landscapes.
- Mt John: increasing pressure on Godley Peaks Rd for day and night visitors.
- Lake Alexandrina: pressure on sealed and unsealed roading on Godley Peaks, Lake Alexandrina and Lake Alexandrina South Roads as camping, fishing and recreational areas.
- Haldon Camp: high summer traffic volumes on Haldon Road a typically with strong north west winds results in a significant loss of fines.
- Ski Fields: open the traffic on the feeder roads can increase by 1200%. An example of the effect of increased tourism traffic on the Mackenzie network is the Roundhill Ski area on Lilybank Road. The Ski traffic of up to 600vpd on a road designed to take its normal loading of 80 vpd to farms. This increased loading impacts the pavement at the worst possible time of the year. Whilst this road is classified as a secondary collector under the ONRC, it is actually a predominantly unsealed road that operates at 100km/hr so increased traffic results in accelerated wear through loss of fines. This road attracts a disproportionate amount of costs to maintain it at a safe level of service for the customer compared to what is collected from the properties it serves.
- Braemar/ Hayman roads with the numbers of free independent travellers both pre and post Covid 19, motorcycle tours becoming more popular, alternate route to the alps to ocean and several accommodation suppliers and tourist activities these roads are receiving a lot greater use for the scenic outlooks etc. The mixing of different modes is the major safety risk followed by vehicle vs vehicle crash occurring. This resulted in a triple fatality. Numerous tourists are using Braemar and Hayman roads as an alternate route to State Highway 8 for these reasons. There are, though increased risks of conflicts with heavy traffic through farming, military training exercises, logging harvests, development, aggregate cartage, etc. especially given the curvature alignment, lack of visibility, width of road, vegetation, historic rural nature, etc. For these reason council recommends a seal extension for this route which can also serve as permanent detour to SH8 in future given the current lack of provision for any incidents that occur through this highway section compared to the alternative.
- Alps2Ocean cycle trail: increased demands on Mt Cook Station Road and Hayman Road. Safety concerns arising from user conflicts on Mt Cook Station Road will be mitigated by the off-roading of the trail on Mount Cook Station Road to be completed in Years 1 of the LTP. This may lead on to the first section of Hayman Road as well depending on costs
- Te Araroa Trail: general traffic increases on sealed and unsealed roads within the district. With modes mixing on Lilybank Road if not picked up as it forms part of the trail.

Changes in Land Use, Practices and Resource Use

Development is likely to have some impact on Council's roading activities

Key developments within the rural area of the district, as affecting our roading network are identified below:

- **Tenure Review:** there are a number of High-Country Stations involved in tenure review. Historically this process has resulting in part of the reviewed station being passed into the public estate and becoming open for public access. This has resulting in increasing expectation from the Department of Conservation and other road users for improved access to areas of public land. However, there is no additional funding from either Waka Kotahi (NZTA) or Department of Conservation (DoC) to date for these improvements. Council staff continue to work with DoC in an attempt to minimise this risk and come to some appropriate arrangements.
- **Meridian Energy shoreline protection:** erosion of the Lake Pukaki shoreline continues, risking the erosion of Hayman and Mt Cook Station Roads. There is an existing agreement with Meridian Energy whereby they are responsible for that erosion and will undertake work to rectify and minimise erosion at their cost. It is anticipated that this work will continue to be undertaken by Meridian Energy over the term of the LTP.
- **Rural Land Change:** changes to land use and intensification within the district include dairy conversions; increasing primary produce as a result of irrigation, and Mt Cook Station 50yr forestry programme. Land use conversions can impact the road network in terms of increased heavy vehicle volumes. Diversification of historic farming practices to tours, venues, accommodation, tourism activities, farm stays, hunting guiding, etc. In some areas this is becoming a primary source of income.
- **Te Manahuna Aoraki** is a Department of Conservation project focused on delivering a pest free fenced area in the Mackenzie basin. This focused on a vision of a mainland island in which native species inhabit. This could draw some significant interest into the district to go and explore and enjoy these areas. We aren't yet fully clear what the final outcomes for this will look like, but it is envisioned it could become similar to the national park at Aoraki Mount Cook.

7.2.3 Vehicle Mix and Use Changes

Traffic Counts

Mackenzie District Council has been actively completing traffic counts over the last 10 years. Traffic counts are completed primarily on roads that are targeted for improvement or are showing signs of accelerated failure. The count data in RAMM is based on actual count data for roads surveyed and then estimated for other similar roads within the network that have not been counted that year considering the number of households using the road and the nature of the adjoining land-use.

It is difficult to draw conclusions from this data as different lengths of road have been counted each year. Average Annual Daily Traffic (AADT) for each road type is shown in [Table 19](#).

Table 19: Average ADT

Road Group	1		2		3	
	Length (km)	ADT	Length (km)	ADT	Length (km)	ADT
Rural	75.5	180	584.0	45		

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Road Group	1		2		3	
	Length (km)	ADT	Length (km)	ADT	Length (km)	ADT
Urban	4.4	919	9.1	227	36.7	48

Council is reviewing their traffic counting programme and have developed a strategy for Traffic Counting that allows for regular annual traffic counts to be completed on all of council roads, particularly highly trafficked roads. This will allow historic comparisons and from these predictions on future growth. It will also assist with ensure the correct ONRC classification transitioning to ONF is applied to each of the roads in our district. Council also has 3 permanent counting sites in strategic locations that continuously count the number and classification of vehicles. We look to expand on this number of counters and monitoring during the 2021 – 23 NLTP period.

High Productivity Motor Vehicles (HPMV's)

The Land Transport Rule: Vehicle Dimensions and Mass Amendment 2010 (VDaM Rule Amendment) implemented on 1 May 2010, allows for High Productivity Motor Vehicles (HPMV's) to travel on approved roads within New Zealand.

The VDaM Rule Amendment makes changes to the 2002 rule for some heavy vehicles requirements and allows for long-term permits to be issued for HPMVs to operate (with divisible loads) on approved roads. The main changes affecting the road network are:

- HPMVs can operate by permit at a gross mass above 44 tonnes up to a maximum of 62 tonnes.
- HPMVs can operate by permit at lengths greater than 20m.

The mass limits allowed as-of-right (i.e., without a permit) are not changed by the VDaM Rule Amendment.

Because specific HPMV routes have to be approved with input from road controlling authorities, Council has some control over the impacts of this rule change on the district's roading network. Council has no approved HPMV routes and treats every request for access as an overweight permit situation. 50 Max is currently by overweight permit only, going forward we plan to assess our structures to cater for 50 max loadings and aim to open our network to cater for these vehicles where possible.

7.2.4 Changes to Levels of Service

Changes in Technology

Changes in technology can affect road construction and the vehicle fleet. The following are considered the most likely technology advancements affecting future demand and performance on the network:

- Stabilising and recycling for road construction and maintenance. Where there is sufficient pavement depth this will reduce the need for heavy vehicles to carry aggregate and waste material over the network. Unfortunately, many of Mackenzie's pavements lack adequate depth to successfully complete this repair method.
- In recent years, the vehicle fleet in New Zealand has changed markedly. Some of the changes that will continue to have an effect on driver expectation or road performance have included:

- Increased power and changes to drive train configuration in trucks leads to greater potential damage on steep hills and intersections as trucks change gear, accelerate and decelerate. Given the presence of significantly more automatic transmission vehicles means vehicle are more likely to take on more challenging routes than they would have historically. The improvements to power steering led to greater damage with turning vehicles, including cars, entering and leaving the roadway and at intersections.
- Larger Trucks require wider intersections and corners to accommodate increased turning circles.
- Cars with thinner metal on the body that are more prone to damage from loose metal and lower chassis requiring unsealed roads to be graded more frequently. With these changes' road users expect a higher standard of road with fewer changes in standards across a network.
- Computers in vehicles, various sensors, traction control, ABS or equivalent braking, etc. means cars can travel faster on gravel or icy roads without the drivers requiring the knowledge or experience. This creates higher wear and safety risks for other users especially if the technology aids cannot cope or evasive action is taken due to the feeling of loss of control.
- The increased availability and use of light weight SUV type vehicles with 4WD is the cause of the increased "short" corrugations on a number of unsealed roads and this being most prevalent on Lilybank Road leading to the ski field. This is also proliferating into camping areas Haldon Road, boat harbour and Lake Alexandrina roads (both outlet and south end) and as vehicles fleet changes on the rural roads i.e., Stoneleigh Road and Clayton Road. The increased use of in car travel information systems or smart phones with (GPS), especially tourists, that direct them on in-appropriate and less safe for their driving ability due to taking shortest or scenic routes rather than the most appropriate. A number of these decisions are not also sensed check meaning vehicles or drivers

Changes in Customer Expectations

In recent years there has been an increasing awareness on the part of drivers with respect to safety issues. It is anticipated that the following safety issues will become an increasing priority for Council in determining design and operational standards.

- Improved safety district wide
- Reduction in the number of loss of control crashes.
- Slower speed limits in busy areas or where vulnerable users are present.
- Improved accessibility and amenity on rural roads with future request for seal extensions and traction seals. Less tolerance for dust nuisance.
- Urban areas little to no acceptance for any unsealed carriageway. Further request for seal extension and seal widening.
- Demarcation / protection between
- Increased carriageway and shoulder widths.
- Improved surface condition of unsealed roads.
- Improvements in modal shift, active modes, amenity, connectivity and accessibility in urban areas.
- Further shared space areas.
- Appropriate facilities and parking provision.

- Improvements in surfacing selection for amenity.
- Improvements in urban form.
- Upgraded Intersection controls, delineation, warning signage traffic calming.
- Bridge end protection.
- Destination signage, information and wayfinding for tourists/ visitors to the district.

Changing LoS Demands

The intended Levels of Service defined in Section 3 are considered to be representative of the service demands of the current and the future community. However, if Council is not successful in obtaining sufficient funds from Waka Kotahi (New Zealand Transport Agency) to fund the operations, maintenance and renewals of the Mackenzie District roading network then Council may have considered the following.

- A reduction in maintenance and renewal spend on lower trafficked roads (level of service reduction or district wide).
- Review its Policy in maintaining access to the last house which may result in - Disposal of asset components (e.g., bridges, cattle stops, sections of roads).
- Fund the shortfall via ratepayer contributions.
- Explore other funding sources

Policy or Management Changes

Changes to transportation practises, driven by Waka Kotahi (NZTA), will have an effect on Councils' current levels of services as defined in Section 3. The ONRC was designed to standardise the performance of our roads throughout New Zealand, aiming to address historical inconsistencies, and promote economic growth. The ONRC (primarily focused on movement) is now transitioning to the ONF which is focused on movement and place that the transportation system serves. This allows further benefits to be recognised and incorporated i.e., well beings, health benefit, etc.

The emphasis is putting forward a strong business case supported by robust data and evidence, which justifies the business case for funding, but this is conditional on other districts bids and funding given the available funds continue to decrease from central government. The ONRC has been developed by subject experts from the Road Efficiency Group (REG) – a collaboration between Local Government New Zealand and the New Zealand Transport Agency. When used with the ONRC Performance Measures online reporting tool, they are a significant resource to help asset managers better understand their network and tell their investment story. The REG programme is focused on sector excellence and continuous improvement across the transport sector to lift asset management practises this can only be achieved if all Road Controlling Authorities (RCAs) are monitoring and measuring their roads with the same performance measures, standards and data capture being consistently captured and assessed against over time.

Land Transport Management Amendment Act 2008 (LTMA)

The introduction of the LTMA saw the establishment of the Waka Kotahi (NZTA) with greater flexibility in determining funding alternatives to Transportation and methods of improving the efficiency of the Transport Sector in New Zealand.

The Act has changed Waka Kotahi's (NZTA's) objective from allocating resources to achieve a "safe and efficient Transportation system" to allocating resources "in a way that contributes to an integrated, safe, responsive and sustainable land transport system."

Specific targets have been set for the whole transport sector which are detailed in two key documents that are part of a raft of changes contained in the LTMA and are to be the driving force behind achieving an affordable, integrated, safe, responsive and sustainable transport system throughout New Zealand. The two documents are:

- New Zealand Transport Strategy 2013 (NZTS)
- Government Policy Statement on Land Transport Funding (GPS 2020)

Under the Act, all land transport programmes (including those prepared by local authorities) must consider all the NZTS objectives and the purpose of the Act, which includes ensuring funding is allocated in an efficient and effective manner.

When preparing the NLTP, Waka Kotahi (NZTA) must also consider relevant regional land transport strategies and the National Energy Efficiency and Conservation Strategy (NEECS).

Waka Kotahi (NZTA) expects all activities proposed for inclusion in the NLTP will come from processes which exhibit the principles of integration, sustainability, responsiveness and safety, and have the attributes of being forward-looking, collaborative, accountable and evidence based.

Waka Kotahi (NZTA) has undertaken to work with organisations during planning and strategy processes to assist with these requirements.

GPS for Land Transport 2021 - 31

The objectives are to provide: 'A transport system that improves wellbeing and liveability'.

- Healthy and safe people
- Environmental sustainability
- Resilience and security
- Economic prosperity
- Inclusive access

Investment will be guided by four strategic priorities



Figure 18 GPS strategic priorities

The implementation of Connecting New Zealand included the setting up of “Safer journeys” which has now evolved to a new road safety strategy ‘Road to Zero’ which is focused on:

- Infrastructure Improvements and speed management
- Vehicle Safety
- Work related road safety
- Road user choices
- System Management

Our Vision: A New Zealand where no one is killed or seriously injured in road crashes.

Government Policy Statement on Land Transport Funding (GPS)

The Government Policy Statement on Land Transport Funding (GPS) sets out what the Government expects to be achieved from its investment in land transport through the National Land Transport Fund (NLTF). It states how large the investment will be, broadly how it will be spent and how the revenue for it will be raised.

The GPS is issued by the Minister of Transport every three years.

Essentially the GPS currently directs funding to high trafficked areas of the country (including state highways), rebuilding Canterbury land transport system, Auckland transport and public transport. This suggests that rural local roads, especially in low trafficked areas are less likely to be high priority for subsidised funding.

Financial/ Development Contributions

Financial Contributions are another means of funding network infrastructure, reserves or community infrastructure. Mackenzie District Council does not have a 'Financial Contribution Policy' for transportation funding. A contribution policy should be developed and include a methodology for calculating the cost of the effects a development will have on existing community infrastructure including roads. This should ensure that the negative effects of development are in part funded by the developer rather than the ratepayer. As part of the district plan review development contributions has also been considered moving away from the current financial contributions. Currently Council does not have a development contributions policy. Historically there has not been significant development in the District but recently it has taken off. With the District Plan review being well overdue and relatively permissive (operative 2004) there is little mechanism to charge these until the District Plan is notified. Into the future either development or financial contributions will be implemented to address current issues around connectivity.

7.3 EFFECTS OF DEMAND ON ASSETS

Overall implications for the network of continual demand for improvement in levels of service tied to a relatively static population and with increasing tourist traffic generated vehicles and changes in land use and farming intensification practises on the road are:

- An increased rate of deterioration on road pavements, as maintenance cannot keep up with road user use and vehicle deterioration impacted by climate change effects.
- An increasing focus on road user safety.
- An increased level of expenditure to attain current consulted levels of service.
- A relatively static ratepayer base to fund Mackenzie District Council's contribution to the roading budget.

Projections must be based on an understanding of the composition of the district's roading network. The network has 213km of sealed and 519km of unsealed road. Given that increases in demand are expected mainly from heavy vehicles servicing agricultural industries and that only 8% of the network is in an urban environment, the analysis will focus on demand aspects for the rural portion of the network.

The majority of the district's roads were originally formed/constructed with thin pavements mostly transitioning from tracks to unsealed roads, these pavements were not expected to carry either the numbers or weights of the heavy vehicles they presently do, let alone any projected increases. Most of the district's roads and bridges were built to carry single axle trucks and trailers, with occasional dual axle trucks. The gross mass of these trucks was around 16 tonne, current HCV classified vehicles can be up to 50 tonne or greater. There is little understanding of the rate of failure of these pavements under heavy loading, as most analyses are based on the assumption of strong pavements constructed to best practice. Many rural roads only carry a small volume of heavy traffic, but this changes significantly when land use intensification, including dairy conversions occurs or where irrigation / water rights are available. Small changes can result in rapid deterioration, this may make it necessary to monitor the effects of specific industries on individual roads. In the case of on-farm development projects, in particular forestry, dairy conversions, farm intensification as a result of irrigation, it will be necessary to closely monitor individual developments. Funding for road improvements as a direct result of these changes has to be funded within existing constrained budgets.

Traffic volumes are low within the District. Current demand focuses on the standard of roading and in particular the sealing of unsealed roads to reduce the maintenance cost of metalling/ grading on our

high-volume roads, remove dust nuisance and to provide a better level of roading surface. Satisfying this demand through seal extensions is being carried out to the greatest extent that Council can manage this is ideally to enhance the network and make it more efficient. It is limited by the availability of Waka Kotahi (NZTA) financial assistance. The Council is committed to continue with seal extension projects where Waka Kotahi (NZTA) co-investment can be achieved, and the need is justified. There must overall benefit to the network given current budget constraints, currently it is very difficult to obtain Waka Kotahi (NZTA) approval. Council acknowledges for the majority of roads in the district there currently is not the need to carry out holistic seal extensions currently this may be appropriate if gravel resource can't be sourced locally. But providing we can continue to source materials locally they can be maintained as unsealed roads relatively cost effectively. There are a proportion though of urban and high-volume sections of rural roads that are overdue and require sealing due to unsustainable maintenance costs, safety and amenity factors. These consist of Lilybank Road, Braemar Road, Hayman Road, Haldon Road, Lake Alexandrina Outlet Road in the rural. Eversley Reserve Streets, Kimbell Roads, Beauchamp Place, Albury Roads, and seal widening of unsealed shoulders in Fairlie.

Significant urban and rural land subdivision has occurred in recent years through the District. When each subdivision is completed its roading network is vested in the Council, who then takes over responsibility for on-going maintenance. Whilst there should be no major repairs or maintenance required for several years, street cleaning and street lighting costs do impact immediately. New subdivisions can also increase traffic volumes on existing roads which, in turn, can increase maintenance requirements. Council requires developers to complete a second seal coat prior to vesting of the asset in Council. Council has acknowledged that two coat seal on cul-de-sac heads carries risk of failure, therefore policy has been implemented requiring all cul-de-sacs to now be surfaced with 30mm of hot mix.

7.4 DEMAND MANAGEMENT PLAN

There are three recognised components to a demand management strategy:

- **Transport demand management** – a transport system approach which seeks to achieve safety and modal shift (i.e., to low impact modes such as cycling and walking)
- **Traffic demand management** – a single network approach which seeks to optimise or reduce traffic flows
- **Travel demand management** – focuses on the individual travellers and seeks to change travel behaviour through various initiatives (such as education and marketing).

The **Canterbury Regional Land Transport Plan (RLTP) 2021-2031**– Is the vision that remains the overarching goal for the Regional Land Transport Committee and guides future relationships across the sector, as well as future planning and investment. To help achieve this vision, the RLTP sets the direction for the Canterbury transport system for the next 30 years.

Accordingly, the plan:

- Outlines the economic, social and spatial context in which the transport system operates
- Identifies regional transport issues and challenges anticipated over time

- Describes how these challenges will be met; achieving the vision and objectives through policies, measures and investment priorities over time
- Includes a regional programme of proposed land transport activities for the next 3 years (2021/22 – 2023/24) and prioritises significant new improvement activities
- Provides a ten-year financial forecast of anticipated investment and revenue for the region's land transport activities

The RLTP enables a more comprehensive and integrated approach to meeting regional transport challenges by laying the foundations for a more collaborative planning and investment environment that involves all transport providers. It also supports moves to advocate for legislative and policy change where the Committee feel it is needed, as well as secure investment for the region's transport system to ensure Canterbury maximises its potential and contribution to national wellbeing.

The strategy also outlines that the forecast for the future in rural areas is the continued use of private motor vehicles as the primary mode of travel, or between rural areas and urban areas as the distances to be travelled are often too far and the population too dispersed to provide realistic alternatives. Maintenance of the rural road network is essential to maintain high levels of access and mobility in rural Canterbury. Other modes of transport would have been limited in rural areas historically but walking and cycling are beginning to become more popular as more a regular travel choice with greater numbers of locals and tourists choosing these modes of transport. These alternative modes of transport are made more popular via advertising and technology. With an absence of public transport in rural areas tour buses for longer journeys or active modes are the only option to motor vehicles.

In terms of freight movement, again roads will continue to serve most local freight transport needs such as the movement of goods to and from farms or from processing plants to export terminals.

7.4.1 Asset Based Demand Management

Asset Based demand management encompasses traffic demand management. For this network it is best managed through "Pavement Use" Hierarchy. The adoption of a roading hierarchy, which identifies a tiered roading system based on road function and planned levels of service, is important to enable the effective management of traffic. The hierarchy of Council roads is defined and classified in Figure 14.

In essence, given the nature of the Mackenzie District network, the hierarchy reflects use and place rather than traffic volumes.

There are minimal asset-based demand options that do not have a significant cost attached. However, provision of differing standards of pavement, surfacing, traffic services etc. dependent on the Council Maintenance Groups as detailed in Section 4.

7.4.2 Non-Asset Based Demand Management

Non-asset-based solutions for managing demand are available as alternatives to asset-based solutions and generally fall into the transport and travel demand management categories. Possible non-asset-based solutions are:

- Traffic Bylaws on heavy commercial vehicles on preventing use on lightly constructed roads within the district
- Threshold and speed hump installation.

- Traffic calming
- Education communication programmes targeted at stakeholder expectation
- Speed restrictions.
- Subdivision rules restricting development from existing roads that are of sub-standard width and safety.
- The use of development impact fees (DIF), development contributions and or financial contributions.
- Closure of public road serving only one property and lying entirely within that property.

National non-asset-based demand management solutions include alternative transport modes. Although vehicle ownership and usage are high in Mackenzie District due to the rural nature of the district, it is important to consider the use of other modes of transport as ways to manage demand on the network where possible. Public transport systems, car-pooling or alternative transportation (including cycling and walking) are sustainable and environmentally friendly transportation modes as convenient pedestrian, bicycle, and public transport networks can reduce reliance on vehicle transport. However, low volumes of population, combined with dispersed communities, means that public transportation is not a cost-effective option at present and is unlikely to be so in future given the relatively small static population in the district. It is more likely that there will be private transportation company's setup in the district to ferry tourists about town with their bags in the short term.

7.5 ASSETS PROGRAMMES TO MEET DEMAND

The Canterbury Regional Land Transport Plan 2021-2031 outlines that in rural Canterbury the focus of implementation of the strategy will be on improving safety and the efficient use of motor vehicles and encouraging the use of other modes. Historically there hasn't been the infrastructure nor need to cater for or support these alternate modes but with the development and growth in our towns this is now necessary. Given the highly dispersed population and relatively low volumes of traffic on most rural roads there historically been no need for any large scale improvements to infrastructure or services. With increases in visitors and tourism numbers declining (as a result of Covid 19) and development in our major towns this is now changing with a number of our roads requiring some form of improvement or increase in level of service. Because of the relatively small numbers of people living in the Mackenzie District there are significant challenges surrounding the funding of transport initiatives. The focus of implementation in rural Canterbury will be on maintaining and renewing road networks to retain community connections, resilient routes and reliable travel times.

The capital works programme includes works that will assist with meeting the current and future demands on the network.

The significant capital works improvements for the next 10 years include:

- ***Bridge renewals and component replacements*** – this will ensure that accessibility to all parts of the network is maintained. The Cass River bridge on Godley Peaks Road still has remaining life but does not cater for heavy traffic. This causes issues for the landowner running their business a ford and consent is in place which they operate and manage. The cost to replace this structure is somewhere between \$700,000 – 1.8 Million. Something needs to be done about this issue so that both the land owner and council have clarity on a direction and action going forward. This is a significant cost

to the ratepayer's district wide for the primary access to one property. The District has a number of these structures and a policy requires formation.

- **Seal Extensions** – Council endeavour to carry out seal extension through this LTP period. This is to deal with levels of service issues within our townships. We also plan to carry out a large-scale project on Lilybank Road, Braemar Road, Hayman road, Haldon Road and Lake Alexandrina Outlet Road due to the cost to maintain as an unsealed road is becoming unfeasible. In our townships this consists of Eversley Reserve Streets (Arthur, Railway and a short section on North), Kimbell Roads (Siegarts, Stanton Road and Perambulator Lane), Beauchamp Place - Tekapo, Albury Roads (Station, Queen, High) and seal widening of unsealed shoulders in Fairlie (Gall, Talbot, Gray, Martin, Demark, Gillingham).
- **Low Cost Low Risk Projects** – Under new Waka Kotahi (NZTA) guidelines (General Circular investment – 11/04) Council's Bridge replacements are now able to be funded from Bridge & structure renewals or Low Cost Low Risk. Then funding worthwhile Low Cost Low Risk projects that cannot be funded through another work category. Low Cost Low Risk have maximum individual project cost of \$2M.

The issue of under width pavements could possibly be considered as a capital improvement item and would go some way to contributing to the economic and safety outcomes of the network, although Council's ability to obtain funding for such a programme of works is currently severely limited. The process of seal widening is catered for through the pavement renewal process where the widening of the seal is justified.

7.6 FUTURE DEMAND IMPROVEMENTS

In order to have a more accurate idea of the impacts of demand on the network and managing any growth, Council should consider the following:

Traffic Count Data

Direct measurement of current demand through annual traffic counting should be completed through a targeted approach ensuring that traffic counts are completed on an annual cycle for high use/high wear roads to give information on past traffic trends. This data can then be used to extrapolate future traffic trends, based on this and other demand data.

Development vs Financial contributions policy

Council has investigated options and had workshops and a report commissioned. In years 1 to 2 of the LTP Council will investigate application of an appropriate development contribution or financial contribution policy and proceed with implementation of which ever Contribution's policy is deemed most appropriate. This will be required to ensure that the negative impact of development is in part funded by the developer rather than the ratepayer.

Land Use Research/ Spatial Plan Study

Further work has been completed in this space in a spatial plan and urban design process over the 2018/21 LTP This has been built in partnership with our treaty partners through (AEC) Aoraki Environmental, interactive workshops and Consultation with the community on current zones, and what was important to the community then reviewed and suggested changes to land use may impact on demand. This was in preparation for the review District Plan which will inform and incorporate these changes and future predictions of development and asset creation within the District, which

potentially could impact on the Transportation Assets. District plan review is programme for completion in this long term plan period years 1 – 3 (2021 – 24 LTP).

Customer Demand Changes

Council undertakes Customer Surveys annually, and this helps to establish any changes in customer expectations as they relate to demand on the network.

8 RISK MANAGEMENT

8.1 RISK MANAGEMENT STRATEGY

Council's approach to risk management has been reviewed since the development of the last AMP. A more focused approach has been implemented, which also recognises the drive for greater resilience in the network.

The identification and treatment of risk is dependent upon funding being available. Mackenzie District Council acknowledges this needs to be undertaken at as 'whole of network' approach, incorporating the state highway network and the neighbouring authorities.

8.2 UNDERSTANDING THE CONTEXT

As for the levels of service, the context for the application and development of risk must be set to ensure that risk development is not completed in isolation, as the identification analysis and treatment of risk will impact at all levels in the management of the asset, from community outcomes through to service level delivery, strategic goals and operational delivery.

8.2.1 Strategic Context

This Activity Management Plan (AMP) for Transportation sets out the strategic context as it relates to risk management. It outlines the relationship to identified community outcomes, activity rationale, strategic result and strategic action. Further the plan sets out the relationship to other plans, legal requirements, financial strategies, regulatory and policy obligations of the Transportation activity.

8.2.2 Organisational Context

The organisational context is approached through the identified activities of managing the Transportation asset, as the activity identifies the risk associated with staffing, the elected representatives, work areas, location and IT systems.

8.2.3 Risk Management Context

The risk management context refers to the risk-related activities undertaken within the Transportation activity. The remainder of this section sets out the risk management context in terms of risk management activities, likelihood scale, and consequence scale. A risk assessment matrix and risk register are introduced, as are the required analysis and format for a risk treatment plan.

8.2.4 Considered Risks

The risks considered in this edition of the AMP reflect the framework discussed in Waka Kotahi (NZTA) Research Report 415: Case studies and best-practice guidelines for risk management on road networks.

This approach identifies risk groups and provides a thorough representation of the type of risks that should be considered.



Figure 19 Risk groups

8.3 RISK SUMMARY

A high-level review of the risk profile for Mackenzie District's Transportation activity has been undertaken using Waka Kotahi (NZTA) Research Reports 415: and 546: Measuring the resilience of transport infrastructure (February 2014) as guidance.

8.3.1 Risk Category: Planning Risk

Risk Type	Specific Risk Description	(my) Comments	Consequences					Consequence Rating	Likelihood	Level of Gross Risk	Mitigation Strategy (Existing Controls)	
			Corporate image	Financial / economic	Environment	Health & Safety	Service level/ Effectiveness				Action	Costs
Compliance	Non-compliance with legislation and legal requirements		5	4	2	3	2	4	4	16	Training & awareness	
	Inability to comply with council’s own standards		4	2	2	2	2	4	4	16	Training & awareness	
Planning Status	Inadequate asset management/infrastructure strategy planning	Consider also S17a reviews Professional Services Contracts	4	3	2	1	4	4	2	8	Ensure adequate resources are available ARC collaboration	
	Insufficient business continuity planning for disruptive events	Opportunity to improve lifelines process RCAs considering “Emergency reserve” funding and “Minor event” funding	3	3	1	1	2	3	5	15	Ensure adequate resources are available link risk to resilience planning	
	Ineffective input into regional strategic planning		2	2	3	1	2	4	4	16	Ensure adequate resources are available	
	Insufficient foresight and intervention to sustainably maintain a network into the future	Increasing cost Maintaining in perpetuity Declining assets due to increased traffic volumes	4	4	4	4	4	4	3	12	Sustainable infrastructure policy. Appropriate intervention funded to build out of the issue.	
Climate	Underestimating/understanding the effects of climate change		1	3	3	1	3	2	4	8	Ensure appropriate advice is sought available	
	Overestimating the effects of climate change		1	4	3	1	1	2	4	8	Ensure appropriate advice is sought available	
Assumptions and Projections	Poorly defined levels of service		2	1	2	1	1	3	4	12	Included in AMP processes	
	LoS		2	1	2	1	1	3	4	12	Included in AMP processes	
	Population Projection		2	1	2	1	1	3	4	12	Included in AMP processes Growth Study completed for district	
	Demand Change		2	1	3	1	2	3	4	12	Included in AMP processes	

8.3.2 Risk Category: Delivery Risk

Risk Type	Specific Risk Description	(my) Comments	Consequences					Consequence Rating	Likelihood	Level of Gross Risk	Mitigation Strategy (Existing Controls)
			Corporate image	Financial / economic	Environment	Health & Safety	Service level/ Effectiveness				Action
Management Processes	Inadequate portfolio management		3	4	2	4	3	4	3	12	<ul style="list-style-type: none">• Structure (management)• Appropriately trained personnel• Have technical audits• Have independent review network• Work in-line with contract documents• Ensure quality control• Monitor contractor
	Inadequate capital works contract management		4	4	2	4	3-4	4	3	12	<ul style="list-style-type: none">• Appropriate supervision• Contract documents in place• Appropriate/qualified civil works contractor• Documentation• Technical knowledge• Design / drawing / spec• Photos• Site inspection at critical times
	Inadequate maintenance contract management		3	3	2	4	4	3	3	9	<ul style="list-style-type: none">• Appropriate staffing levels• Holding contractor accountable for their contract obligations• Auditing• Contract document• Site inspections• Technical knowledge• Data collection
Relationships	Service level agreements between transport/roading and other parties		3	3	2	2	3	3	3	9	<ul style="list-style-type: none">• Have a written agreement• Communicate issues• Monitor agreed levels• Spot check• Monitor vehicles• Have defined measures• Adjust/be aware of seasons• Prescribe maintenance regime• Discuss/communicate variances

Risk Type	Specific Risk Description	(my) Comments	Consequences					Consequence Rating	Likelihood	Level of Gross Risk	Mitigation Strategy (Existing Controls)
			Corporate image	Financial / economic	Environment	Health & Safety	Service level/ Effectiveness				Action
	Shortage of local contractors and consultants		4	4	3	3	4	4	3	12	Address through procurement strategy including: <ul style="list-style-type: none">• Approach larger players to establish forward• Keep in competitive marks• Keep works local where possible• Discuss with key stakeholders• Early involvement• Design builds• Collaboration• Share work around• Have a good spread of short/long term contracts• Don't package to larger portions of work over
Control	Inadequate event management	Suggestion to develop sub-region resilience strategy and link with lifelines include proactive resilience works and emergency response	3	3	–	4	4	4	3	12	Address through resilience strategy including: <ul style="list-style-type: none">• Run scenarios• Monitor costs• Right equipment for job• Work out entire picture• Monitor landform changes – e.g. loss of overland footpaths• Warning signage/road closures• Carry out preventative works as soon as practical to limit further damage• Have completed preventative prior to event• Communication• Experienced decision makers
	Poor Workmanship		3	2	2	3	3	3	4	12	Address through procurement strategy including: <ul style="list-style-type: none">• Quality Control• Appropriate materials• Well training staff• Appropriate weather• Partnership

Risk Type	Specific Risk Description	(my) Comments	Consequences					Consequence Rating	Likelihood	Level of Gross Risk	Mitigation Strategy (Existing Controls)
			Corporate image	Financial / economic	Environment	Health & Safety	Service level/ Effectiveness				Action
	Ineffective enforcement measures		3	3	–	2	3	3	3	9	Address through procurement strategy including: <ul style="list-style-type: none"> • Work to policies/plans and introduce new • Limit/no exceptions • Random audit • Rectify exceptions/hazards • Discuss why with public • Have approved standards

8.3.3 Risk Category: Physical Asset Risks

Risk Type	Specific Risk Description	(my) Comments	Consequences					Consequence Rating	Likelihood	Level of Gross Risk	Mitigation Strategy (Existing Controls)
			Corporate image	Financial/Economic	Environment	Health & Safety	Service level/ Effectiveness				Action
Performance	Sub-optimal condition level Unsealed Roads		2	2	3	3	2	3	3	9	Ensure adequate resources are available to monitor
	Failure Risk Bridges		4	4	4	5	3	5	2	10	Bridge Management Strategy Engage qualified structural bridge engineer to regular inspections
	Over Loading Pavements	Significant Issue: Education programme (transport companies and farmers) Enforcement	1	3	2	2	2	3	5	15	Encourage law enforcement Work with transport providers
	Inadequate Functional Performance		2	2	2	1	2	2	4	8	Maintenance and Operational Management

Risk Type	Specific Risk Description	(my) Comments	Consequences					Consequence Rating	Likelihood	Level of Gross Risk	Mitigation Strategy (Existing Controls)
			Corporate image	Financial/Economic	Environment	Health & Safety	Service level/Effectiveness				Action
	Poor Amenity Performance		3	1	1	1	2	2	4	8	Address through LCC planning
	External Damage E.g. Bridge		3	3	3	2	3	3	5	15	Maintenance and Operational Manag
Natural Hazards	Geo-hazards		5	5	4	4	4	5	3	15	Lifelines strategy Resilience/adaptation strategy
	Floods		2	4	3	2	3	4	3	12	Lifelines strategy Resilience/adaptation strategy Drainage investment
	Snow		2	3	1	2	3	3	2	6	Have adequate plans and resources in place t
	Wind		1	2	1	2	2	2	4	8	Maintenance and Operational responses to (e.g. fallen trees)
	Fire/others	Also consider RSAPs and technical audits Common issue with out of context curves More delineation used in Mackenzie (snow and fog)	3	2	2	3	2	3	5	15	Lifelines strategy Resilience/adaptation strategy Work with forestry
	Pandemic, Virus, Disease Outbreak	Severe pandemic that impacts the local, national or international economy	5	5	1	5	3	5	3	15	<ul style="list-style-type: none"> Have resilient programmes and network Keep and encourage a diverse local econo Invest wisely Maintain asset with good sound asset management practices to limit damag
Safety/Security	Crashes		1	1	1	2	1	2	5	10	Safety programme

Risk Type	Specific Risk Description	(my) Comments	Consequences					Consequence Rating	Likelihood	Level of Gross Risk	Mitigation Strategy (Existing Controls)
			Corporate image	Financial/Economic	Environment	Health & Safety	Service level/ Effectiveness				Action
	Sabotage – Signs		1	1	1	2	1	1	3	3	Maintenance and Operational Manag
	Spills		1	2	3	3	2	3	3	9	Maintenance and Operational Management response

Asset Specific – include highest risk items for descriptions above (e.g., sabotage – signs)

- Roads/pavements
- Bridges
- Side walks
- Parking
- Cycleway
- Traffic Signs
- Road Markings

8.3.4 Risk Category: Management Risk

Risk Type	Specific Risk Description	(my) Comments	Consequences					Consequence Rating	Likelihood	Level of Gross Risk	Mitigation Strategy (Existing Controls)	
			Corporate image	Financial / economic	Environment	Health & Safety	Service level/ effectiveness				Action	Cost
Finances	Inadequate Funding		4	5		3	5	5	2	10	<ul style="list-style-type: none">Sufficient AMP processStrong funding applicationsAdequacy in rates chargedNot over investCPI adjustment	
	Financial Response to Disasters		3	5	4	4	5	5	3	15	<ul style="list-style-type: none">Resilient networkProperty resilience	
	External economic influences			4		4	4	4	2	8	<ul style="list-style-type: none">AMPCash reserves	
	Consumer Costs		3	4	–	–	3	4	3	12	<ul style="list-style-type: none">Maintaining network effectivelySound asset managementHolding levels of service with finances	
	Global Financial Crisis/ Depression	From world war or worldwide pandemic	5	5	1	5	3	5	3	15	<ul style="list-style-type: none">Have resilient programmes and networkKeep and encourage a diverse local economyInvest wiselyMaintain asset with good sound asset management practices to limit damage and risk	Billio
People Resources	Staff Skills/Knowledge Base		4	4			4	4	3	12	<ul style="list-style-type: none">Succession planTraining on jobPolicies / recordsProcesses written up	
	Critical Council Size	Section 17a reviews	3	4	–	–	4	4	4	16	<ul style="list-style-type: none">Multi party funding agreementCollaboration contract (ARC)Consultants (external) help	
	Loss of System / Institutional Knowledge		4	4	–	–	4	4	3	12	<ul style="list-style-type: none">Standard operating proceduresOffsite storage/Cloud base systemElectronic that than paper based	
	Technology		2	3	2	–	3	3	3	9	<ul style="list-style-type: none">Resources reviewed remotelyPaper copies/duplicateGeneratorInternal (closed base) system	

Risk Type	Specific Risk Description	(my) Comments	Consequences					Consequence Rating	Likelihood	Level of Gross Risk	Mitigation Strategy (Existing Controls)	
			Corporate image	Financial / economic	Environment	Health & Safety	Service level/ Effectiveness				Action	Cost
	Shortage of local contractors and consultants		3	4	–	–	4	2	4	8	<ul style="list-style-type: none">• Open tenders• Collaboration• Larger contracts• Multi party funding agreement	
Politics	Lack of political alignment		4	3	–	2	4	4	3	12	<ul style="list-style-type: none">• PR with council• Provide answers rather than options• Present issues and associated costs indicating ‘do nothing’	
	Inadequate Governance /Policy		4	4	4	4	3	4	2	8	<ul style="list-style-type: none">• Have policies in place and operate under• Operate under governing legislation	
	Public Satisfaction		3	2	–	–	3	3	3	9	<ul style="list-style-type: none">• Carry out public surveys• Answer/follow-up/action public complaints	
	Loss of public trust		5	3	2	5	5	5	1	5	<ul style="list-style-type: none">• Risk management process• Governance/management	
	Loss of political trust/dysfunctional organisation		5	4	3	4	4	5	1	5	<ul style="list-style-type: none">• Risk management process• Governance/management	
	Rating		4	4	–	–	3	4	3	12	<ul style="list-style-type: none">• Plan in advance• Communicate with public• Advertise make people	
	Background/Influence – Bias/Elective Members		3	4	–	–	3	3	4	12	<ul style="list-style-type: none">• Educate elected members• Provide supporting information• Discuss pros and cons individually	
	Lack of Supporting Economic Growth (Tourism)		4	4	3-4	2	4	4	3	12	<ul style="list-style-type: none">• Adjust infrastructure where possible• Recognise needs• Apply for additional funding with supporting info• Get community/elected members on board• Form forward plan	
	In-adequate Communications Plan		3	2	1	1	3	3	3	9	<ul style="list-style-type: none">• Commit sufficient resources at this risk	

8.3.5 Consequences Rating

Consequence	Code		1	2	3	
	Level		Insignificant	Minor	Moderate	
Interpretation	Image, Reputation and Public Trust and Council Trust		No media attention or damage to reputation.	No media attention, but minor damage to image to a small group of people.	Negative local media coverage, community concerned about company performance.	Negative major decre
	Financial/ Economic (Sum of)	Financial Direct Costs (Repair, Lost Revenue, 3 rd party damage, legal costs)	< \$10,000	\$10,000 to \$50,000	\$50,000 – \$200,000	\$20
		Economic impacts on users and businesses	Equivalent to < \$10,000	Equivalent to \$1,000 to \$50,000	Equivalent to \$50,000 – \$200,000	\$20
	Environmental		No breaches	Minor breaches affecting very small part of the network	One-off major breach, affecting a small part of the network	Several m signific
	Public health and safety		No health or safety impact.	Minor safety impact on small number of people.	Serious safety impact on small number or minor impact on large number of people.	Extensive i impacts, s
	Service level/ Effectiveness		One-off minor failure to meet levels of service	Minor failures to meet levels of service.	One-off major failure or widespread minor failures.	Some ma

8.3.6 Likelihood Rating

Likelihood		Interpretation	Probability
Code	Name		
5	Almost Certain	Is expected to occur several times a year	0.8
4	Likely	Could occur once a year	0.6
3	Possible	Could occur at some time in the next 10 years	0.4
2	Unlikely	Could occur at some time in the next 50 years	0.2
1	Rare	Could occur only in exceptional circumstances (unlikely next 50 years)	0.05

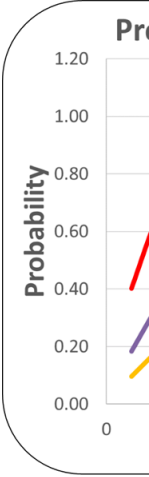
Note:

Binomial Distribution:
where:

$$Pe = (1 - (1 - 1/T)^n)$$

T = Return period
n = number of years

	Likelihood	1
		Insignifi
5	Almost Certain	M
4	Likely	M
3	Possible	L
2	Unlikely	L
1	Rare	L



9 LIFECYCLE MANAGEMENT PLANS

9.1 LIFECYCLE MANAGEMENT – AN OVERVIEW

This section of the AMP outlines the work planned to keep the assets operating at the current levels of service, defined in Section 4 at the lowest lifecycle costs. The overall objective of the Life Cycle Management Plan is:

To maintain performance measures to ensure that the current strategies do not consume the asset leading to an unexpected increase in maintenance/renewal or improvement expenditure in the future.

This lifecycle management plan covers the following:

- **Background Data** identifying where possible:
 - Physical parameters of the assets as outlined in the description of the transportation asset included in Section 3
 - Current capacity and performance of the asset relative to the levels of service defined in Section 4 and demand projections of Section 5
 - Current condition of assets
 - Asset valuations
 - Historical data
- **Operations and Maintenance Plan:** This covers planning for on-going day to day operation and maintenance to keep assets serviceable and prevent premature deterioration or failure. This plan includes:
 - Current trends and issues, including results from growth analyses, level of service (LoS) shortfalls, etc.
 - Any deferred work and associated risks
 - Maintenance decision making process
 - Strategies required to meet levels of service
 - How tasks are prioritised
 - Future Costs, current and future works in detail for the first three years and in summary form for the balance.
- Two categories of maintenance are carried out:
 - Unplanned Maintenance: Reactive work carried out in response to reported problems or defects (e.g., pothole repair, dig-outs)
 - Planned Maintenance: Proactive work carried out to a predetermined schedule (e.g., Re-gravelling, grading, bridge inspections).

A key element of activity management planning is determining the most cost-effective blend of planned and unplanned maintenance as illustrated in the figure below.

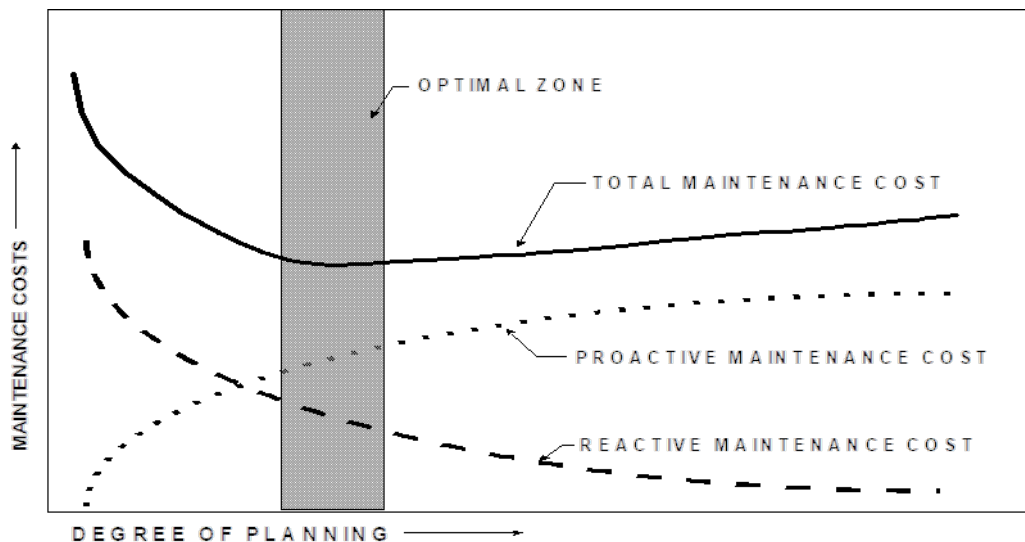


Figure 20: Balancing Proactive and Reactive Maintenance

- **Renewal/Replacement Plan:** This covers Major work which restores existing assets to their original capacity or their required condition (e.g., resurfacing, rehabilitation or footpath reconstruction). This plan includes:
 - End of life projections, including results from growth analyses, LoS shortfalls, etc.
 - Future Costs, current and future works in detail for the first three years and in summary form for the balance
- **Asset Development Plan:** This section of the plan covers the creation of new assets (including those created through subdivision and other development) or works which upgrade or improve an existing asset beyond its existing capacity or performance in response to changes in usage or customer expectations (e.g., forestry harvesting routes). This plan includes:
 - End of life projections, including results from growth analyses, LoS shortfalls, etc.
 - Renewal decision making process
 - Renewal strategies and methods to meet required LoS
 - How renewals are identified, prioritised and to what standard they are replaced
 - Future Costs, current and future works in detail for the first three years and in summary form for the balance
- **Disposal Plan:** This covers activities associated with the disposal of a decommissioned asset. Assets may become surplus to requirements for any of the following reasons:
 - Under utilisation
 - Obsolescence
 - Provision exceeds required level of service
 - Uneconomic to upgrade or operate
 - Policy change

- Service provided by other means (e.g., private sector involvement)
- Potential risk of ownership (financial, environmental, legal, social, vandalism).

The lifecycle plans are developed separately for the following assets:

- Sealed roads
- Unsealed roads
- Bridges, fords and other structures
- Drainage control facilities
- Traffic services
- Footpaths
- Street lighting

The maintenance and construction standards and response times for these components vary according to road user demands that are reflected in the Road Maintenance Categories.

9.1.1 Waka Kotahi (NZ Transport Agency) Work Categories

Waka Kotahi's (NZTA's) Work Categories (WCs) were reviewed, and new categories established in 2020 and outlined in their Planning, Programming and Funding Manual² shown in [Table 20](#). These are the WCs used for all financial reporting. This Life Cycle Management Plan reports on work within these WCs. For clarity we have identified the WC numbers for the work within each section of the Life Cycle Management Plan.

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Table 20: NZ Transport Agency Work Category Structure

Activity Class 1 – Transport Planning		
Activity	Work category No.	Work category name
Transport Planning	001	Regional land transport planning management
	002	Transport Modal Development
	003	Activity Management Planning
	004	Programme business case development

Activity Class 8 – Maintenance and Operation of Local Roads		
Activity	Work category No.	Work category name
Structural maintenance	111	Sealed pavement maintenance
	112	Unsealed pavement maintenance
	113	Routine drainage maintenance
	114	Structures maintenance
	121	Environmental maintenance
	122	Traffic services maintenance

² The Waka Kotahi (NZTA) Planning, programming and funding manual, First Edition, 2008

Activity Class 8 – Maintenance and Operation of Local Roads		
Activity	Work category No.	Work category name
Corridor maintenance and operations	123	Operational traffic management
	124	Cycle path maintenance
	125	Footpath Maintenance
Level crossing warning devices	131	Level crossing warning devices
Minor events	140	Minor events
Emergency reinstatement	141	Emergency works
Network and asset management	151	Network and asset management
Property management	161	Property management (state highways)
Financial grants	171	Financial grants

Activity Class 10 – Renewal of Local Roads - Maintenance and Operation of Roads		
Activity	Work category No.	Work category name
Structural renewals	211	Unsealed road metalling
	212	Sealed road resurfacing
	213	Drainage renewals
	214	Sealed and Unsealed Pavement rehabilitation
	215	Structures component replacements
Corridor renewals	221	Environmental renewals
	222	Traffic services renewals
Associated improvements	231	Associated improvements
Preventative maintenance	241	Preventive Maintenance

Activity Class 12 – Improvement of Local Roads		
Activity	Work category No.	Work category name
New road infrastructure	321	New traffic management facilities
	322	Replacement bridges and other structures
	323	New roads
	324	Road Improvements (reconstruction)

Activity Class 12 – Improvement of Local Roads		
Activity	Work category No.	Work category name
Property	325	Seal extension
	331	Property purchase (State highways)
	332	Property purchase (local roads)
	333	Advance property purchase
Low Cost Low Risk Projects	341	Low Cost Low Risk Rooding Improvements
Resilience Improvements	357	Resilience Improvements
Road Safety Promotion & Demand Management	421	Travel Demand Management
	432	Safety Promotion, education and advertising
Walking and Cycling Improvements	451	Walking facilities
	452	Cycling facilities

9.2 MANAGEMENT PROGRAMME

9.2.1 Method of Service Delivery

Council staff manage the roading network with some assistance from consultants. Maintenance of the network has historically been delivered through a competitively tendered multi-year contract with a common document written and compiled by our collaboration (with aid of a consultant) between the four councils (Ashburton, Timaru, Waimate & Mackenzie). Changes have occurred in the last three years of the LTP period. The contract is due for retender Ashburton went out alone to the market last year with revision two of the original contract document due to issues with delivery on the ground and a number of other commercial reasons. Timaru and Waimate are currently out to the market with a consistently written revision 3 of the original contract and adopting some of Ashburton's document amendments (with Mackenzie inputting and contributing throughout the development process). This has been released to the market to be tendered as two separate contracts using a similar contract specification.

Mackenzie required a 17a Review to be completed so pulled out of this contract late in the piece as we were not able to meet the timeframes of our other partners, to allow sufficient time for this to be completed. As part of this process Mackenzie District Council have chosen to step back as part of this process and ensure a fit for purpose contract is in place to deliver outcomes sought into the future. Given the organisational change and the change in councils strategic approach to a sustainable infrastructure strategy it was deemed this was the most appropriate time for a step change away from a traditional maintenance contract. Council is committed to adopting a new procurement process through a request of interest (ROI) process to run through an initial selection process for suitability, short list and request further information and detail and submission, review response, appoint an appropriate contracting party, begin partnership and negotiate terms and conditions and an

appropriate contract model and form to deliver appropriate outcomes. We envisage this will take the existing works to date the next step forward to be revision 4 in the Aoraki Collaboration.

Our collaboration is known as the Aoraki Roothing Collaboration (ARC). Other works such as resealing (currently we have a combined 2-year contract with Timaru & Waimate District Council), and large renewal projects are let as competitively priced contracts on an annual basis.

The current contracts let are included in [Table 21](#).

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To ensure activities are providing the best efficiencies possible, work is generally clustered in such a way that works are carried out within set corridors. The historically the maintenance contract has encouraged a joint approach to solve roading issues for the lowest whole of life cost.

The current road maintenance contracts (5-year flat contract -an extension was granted to the contract given its alignment with the LTP process) place considerable onus on the contractors to self-manage all road maintenance activities; this involves regular inspection of roads, locating maintenance requirements and carrying them out under a performance-based specification. The maintenance has been delivered but services could have been better and have required a lot of resource with changes in personnel during the contract.

Table 21: 2011 Physical Works Contracts

Contract No.	Contract Name	Length (Years)	Responsibilities	Contractor
1222	Road Maintenance (November 2015 – November 2020 Ext 30 June 2021)	5	Sealed pavement maintenance Pre-seal repairs Unsealed pavement maintenance Vegetation control Tree Removal Traffic services maintenance Drainage maintenance Footpath maintenance Minor bridge maintenance Sealed/Unsealed AWPT Culvert replacements Slip removal Flood damage repairs Pavement Marking	Whitestone
2419	Sealing District Roads	Bi-annual	All resurfacing (chip seals). Combined contract with Timaru District Council	Fulton Hogan
1255	Street Lighting Maintenance	3 years	All lighting maintenance	Negotiated annually (Netcon sole supplier)
1222	Bridge Maintenance	Annual	Routine and structural bridge repairs	Tendered or maintenance contractor depending on scale
1222	Sealed Pavement Rehabilitation	Annual	Rehabilitation and Area Wide Pavement Treatments for sealed roads where quantity warrants a standalone contract	Tendered or maintenance contractor depending on scale
Priced Work	Improvement Works	Annual	Seal Extensions Major Safety Improvements	Tendered or maintenance contractor depending on scale
Priced Work	Minor Safety Works	Annual	Safety Footpath Guardrail Installation Sight Benching	Tendered or maintenance contractor depending on scale

Council's Subsidised Procurement Strategy for Land Transport Programme (2019) provides full details of how all subsidised work will be procured. Regular tendering of contract activities helps to ensure reasonable marketplace price is accomplished for all phases of the work.

Council has also investigated combining specific operations (e.g., renewal activities) with other Local District councils (as part of the Aoraki Roads Collaboration) to improve value for money by achieving best market rates available and optimising the efficient and effective use of the existing infrastructure and resources. The only successful contracts achieved to date under this regime has been the combined Road Resurfacing contract. The maintenance contract was let as 4 separate contracts.

9.2.2 Forward Works Programme

Historically the sealed roads in the Mackenzie have been in good condition and there has not been enough approved funding available to embark on a significant renewal programme. Over the past three-year funding block a bow wave in the resurfacing FWP has been dealt with and reduced to a manageable level going forward. This spike in the programme was identified forming during the preparation of the 2015- 2018 LTP period. Local share funding was injected into this work category over the last three-year period to get on top of this due to it been not approved in initial funding request. Subsequently cost scope adjustments were applied for to limit the aspects of this investment. The methodology is still to continue to work within the available funds are spent on the areas of greatest need on the network incorporating ONRC classifications into this decision-making process. When funding request are rejected or not fully met results in these bow wave reforming and the asset further deteriorating.

However, a forward works programme has been developed to protect the assets in the condition they are in, to avoid consuming the asset and improve the resilience of the network. It is difficult to predict fully the areas requiring sealed road rehabilitation due to the harsh winters in the Mackenzie and the effect of frost heave on the network. This can only be modelled on the best case scenario.

A 30-year resurfacing FWP has been developed based solely on RAMM data. In any one year, the age and condition of the oldest or at-risk seals are assessed to determine the remaining useful life and thus formulate that years reseal programme. This still requires some in the field testing to verify the programme is reflective of the condition of the road. This remains part of the council's improvement plan as well as to develop further FWP for other activities over the next three years aiming to begin this programme and projects in year one.

This initial programme has been used as a basis for works included in this AMP and is network checked prior to being undertaken each financial year.

9.2.3 Asset Valuation

A valuation is undertaken every three years in order to assess the value of the network, the depreciated value and the annual depreciation. Details on Asset Valuation and Depreciation are held in Section 10 Financial Summary.

9.2.4 Historical Data

Historical data is used to assess past performance and to see if future trends can be applied. At a network level, these trends can indicate if the condition of the network is deteriorating or improving. The different forms of historical data and their location are outlined in [Table 22](#).

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Table 22: Historical Data

Type	Location	Comment
Roughness	RAMM	Current and historic testing has been completed using an axle response metre to measure roughness with technological advances in is likely this may be measured with a laser profiler in future given constant data across the network and improved accuracy. It has been deemed until all party's measure roughness via laser. It is more consistent to use the existing supplier for consistency of results.
Sealed Rating Data	RAMM	Faults are manually rated. Some interpretation discrepancy may exist between rating teams. The percentage of the network has changed on the recommendation of other District Councils and Waka Kotahi (NZTA) from 10% to 20%.
Carriageway surfacing data	RAMM	Holds surfacing history. Surfacing data must be maintained to obtain confident surfacing history.
Past Unsealed Pavement Maintenance	Spread sheet	Provides a full summary of grading and metalling completed over the last 10 years
Past Maintenance Costs	RAMM	Provides summary of maintenance costs and works completed.
As Built Drawings	RAMM from As Built Plans each year	Collected at end of construction verified and entered into RAMM.
Pavement Structure	RAMM	All new pavement construction records include pavement composition details

Historic expenditure summaries have been produced in the past from the Waka Kotahi (NZTA) website. The information that produced the following graphs is no longer available and consequently the graphs could not be updated. The most useful comparisons are made with other areas or authorities with similar characteristics, rather than with the whole country. The data for Council is compared with a peer group of similar Council authorities. The peer group used for comparison with Mackenzie District is Group E which consists of largely rural areas with small provincial towns with low traffic volumes. 24 local authorities are included in Peer Group E, with approximately half in each of the North and South islands. Waka Kotahi (NZTA) has different sets of comparison data available on their website³.

Figure 21 shows the total maintenance based on Lane Kilometre, compared to average costs for Peer group E. These figures show that overall costs have increased over the last 10 years. The costs in \$/lane-km for the district are slightly higher than the average for the peer group.

³ <http://www.nzta.govt.nz/planning-and-investment/transport-data/data-and-tools>.

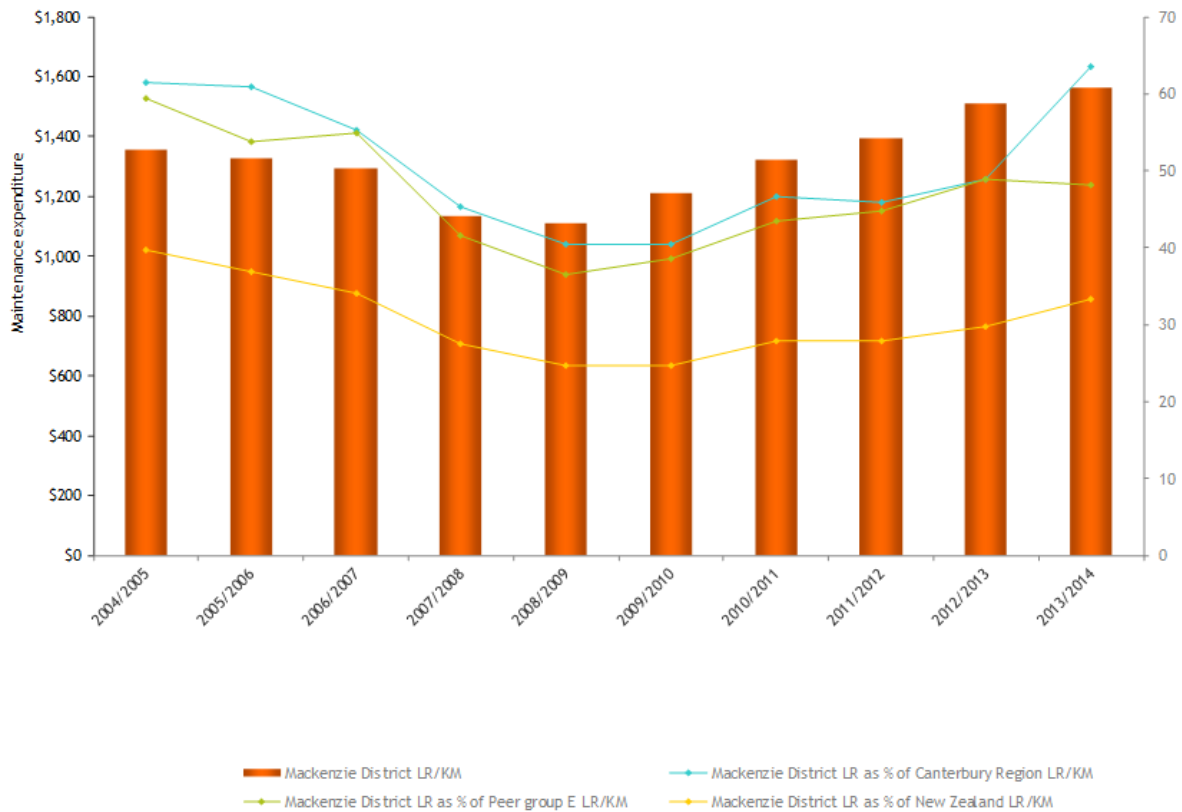


Figure 21: Total Maintenance and Renewal Costs and \$/land.km for Mackenzie DC and Peer Group E ONRC graph

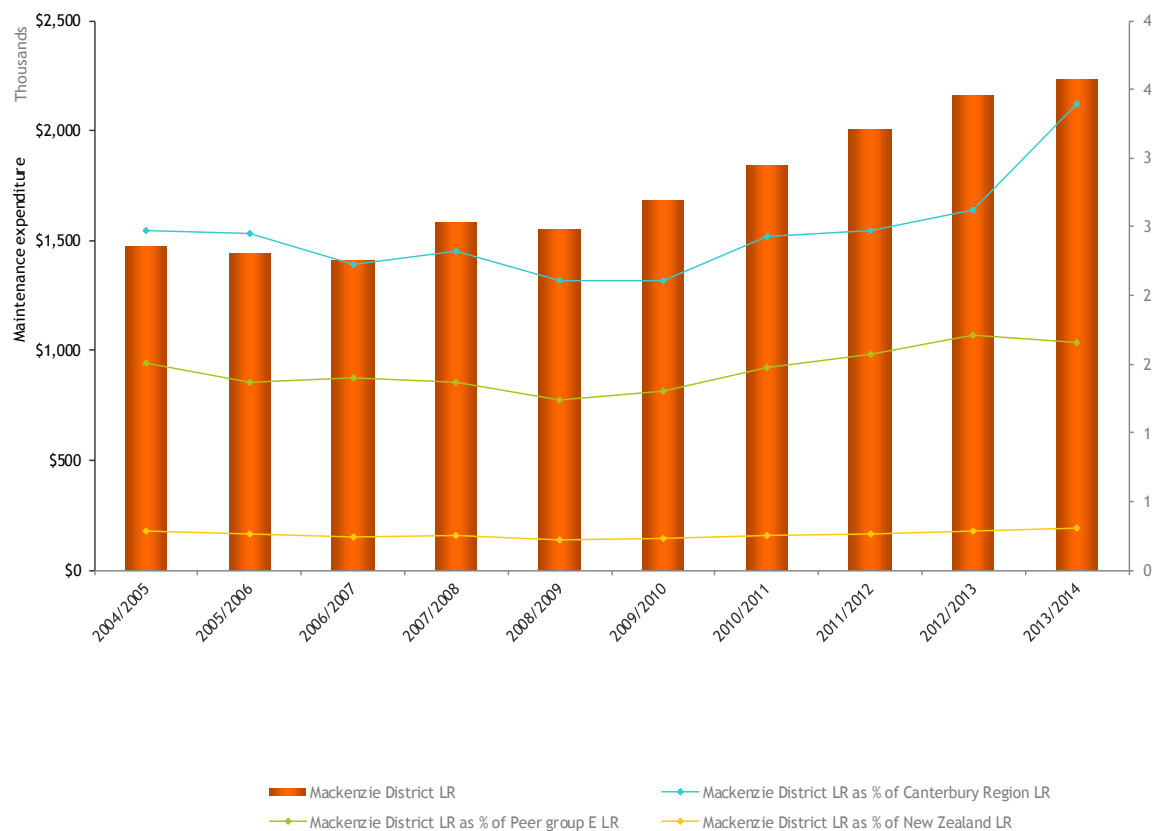


Figure 22: Expenditure comparisons (10 years expenditure totals only, compared to peers, region, NZ)

9.2.5 Traffic Counts

Council own and manage their own traffic counting programme. Council has 4 Classifying “Metro” counters and 3 Classifying ‘Pico’ Counters which have been used to permanently used to monitor sites to build a full picture of what is occurring on these sites. Currently these are being used to monitor traffic volumes on Lilybank, Haldon and Braemar Road to collect a full year’s data to be able to analysis these volumes against gravel loss surveys to build a picture of what is occurring on these roads. Council also has some ‘TRAFx’ counters for both traffic and pedestrians but we have had some issues with these due to the cold conditions meaning they aren’t as consistently reliable. These ‘TRAFx’ counters only provide a count as a number and do not classify therefore there are a number of assumptions to be made.

Over and above this during the 18- 21 LTP period Council have completed Christmas counts on the network undertaking 3 weeks of counting using Council’s existing 4 counters as well as utilising Timaru District Councils traffic counting contractor and their 10 counters to undertake 14 counts a week across varying locations the district. This results in 52 counts for this period. We have currently budgeted for further counters for the 2021 – 24 LTP period to provide furthermore complete complex counting information of vehicular traffic while also provisioning for pedestrian and cycle counters to further monitor modal shift and track uptake and increases in this space.

Council have also invested in a game camera to assist in traffic monitoring, counting and for compliance to aid in ensuring quality data is obtained. Answer and explain damage or out of ordinary wear and tear, etc. This is currently used relatively in frequently but is another tool staff utilise in compliance with Councils Privacy Policy.

9.2.6 Other tools

The transport team also have a drone which is used mainly for scoping, monitoring and compliance at this stage. Works where the drone is used currently are primarily for river works, assess structures this or for capturing events or overviews of sites.

Staff also have available a range of testing and measuring equipment to aid in testing and ensuring compliance and quality assurance of construction works both as part of council activities as well as works completed by others i.e., utilities reinstatement works, subdivision, etc.

9.3 SEALED ROADS

9.3.1 Sealed Roads Background Data

Sealed Roads Scope and Nature of Asset

The purpose of a sealed road is:

- To provide a surfaced/paved network suitable for the efficient movement of vehicles and people, with an all-weather surface appropriate to its location and function in terms of skid resistance, noise reduction and smoothness, and that has a structure suitable for legal traffic loading requirements.

Only 213.4km or 29.1% of the district’s roads are sealed – 50.07km of urban roads and 163.3 km of rural roads.

The key issues relating to the sealed pavements are:

- Optimising the use of limited funds to maintain the condition of the asset
- Visitor number and domestic tourism and the increased numbers of free independent travellers is causing greater damage and is requiring a higher level of service. (international tourism has been impacted significantly and almost disappeared completely as a result of the borders closing this has reduced the constant pressures around NZ holidays but domestic tourism aiding in filling some of the gaps.)
- Setting levels of service that align road user expectation and lifecycle costs
- Keeping Pavements Waterproof
- Providing adequate seal width to cater for capacity on higher trafficked roads (if funding is available)
- Land Use intensification, water consents increasing productivity, Forestry and dairy conversions.
- Development, creating and vesting new roads with Council, with no guaranteed increase in funding from Waka Kotahi (NZTA) into the future.

Sealed Roads Current Condition

Many of the District's roads evolved from tracks to unsealed roads that were constructed to absolute minimum standards in terms of pavement strength, width and drainage facilities. As traffic volumes increased individual roads were widened, extra gravel added as considered appropriate and surfaces sealed. Construction consisted of river run or pit sourced gravel subbase on some individual roads with the majority consisting of a thin layer of crushed aggregate base course and a single coat chip seal surface. The metal courses were often laid over silty clay subgrade of unknown bearing capacity with little or no consideration given to whole of life strength requirements needed to satisfactorily carry the expected traffic loads over the roads expected life. Only since the 1970's has pavements been designed to carry an expected traffic loading over a projected 25-year design life, and the 1970's design loads were significantly less than the current design loads given recent increases in heavy commercial vehicles (HCV). The cost of construction has also been considered in the past and it is often that the pavement design comes in at a significant cost which are outside of budget allowances meaning a risk assessment is undertaken and pavement reduced, or a shorter length of construction is completed.

Maintenance work includes the following activities:

- Repairing minor defects: potholes, depressions, heaving, shear failures, cracking, edge breaks, chip loss, shoulder damage and bleeding bitumen

The condition of the sealed road network is monitored as follows:

- Regular routine inspections by Council and Contractor personnel. Defects found are included in the programme of works to be undertaken by the Maintenance Contractor. The number, size, location and date of defects are logged in RAMM Finance (previously Contractor) to provide a measure of conformance with the key performance measures required within the contract
- A formal biennial road condition roughness and rating survey. The information from this survey is recorded in RAMM and used to:
- Assist with the development of a forward reseal and reconstruction work programme

- Provide surface and pavement condition data and enables the possibility of the “Treatment Selection Algorithm” to be undertaken in RAMM
- Calculate surface condition indices that provide a measure of the performance of the sealed surface
- Report to Waka Kotahi (NZTA)
- Biennial roughness surveys of the sealed network to ascertain the current condition and provide a measure of performance against the required levels of service.
- Annual maintenance costs per kilometre for work types are calculated from the costs recorded within the maintenance contract and the trends used to establish relative network surface condition
- The safety of the network is gauged by recording accident information (including near misses where reported currently there is a gap in data), analysing accident trends and the statistical data produced in the Waka Kotahi (NZTA) “Road Safety Issues” and “briefing notes” reports. All serious crashes on local roads are assessed by the Roding Team to investigate if road conditions were a factor in the crash.

RAMM Rating Historic Trends Graph

The biennial visual road condition rating survey is used to measure, and record defects shown by each road element in a standard and objective manner. This provides a measure of the condition of each road element, which can be used to assess routine maintenance and rehabilitation needs. The historic trends are dependent in our network given the climatic conditions that occur in our district. The amount of cracking for example is a lot greater in winter than it is in summer as in winter given pavements contract it opens up allowing water into the pavement causing greater damage and in summer (given the hot dry weather) the binder softens sealing up the cracks therefore providing a possible false representation of historic trends and network condition depending on when the survey is carried out.

Figure 23 shows the historical results from visual condition rating. The latest condition rating data in RAMM is from 2018.

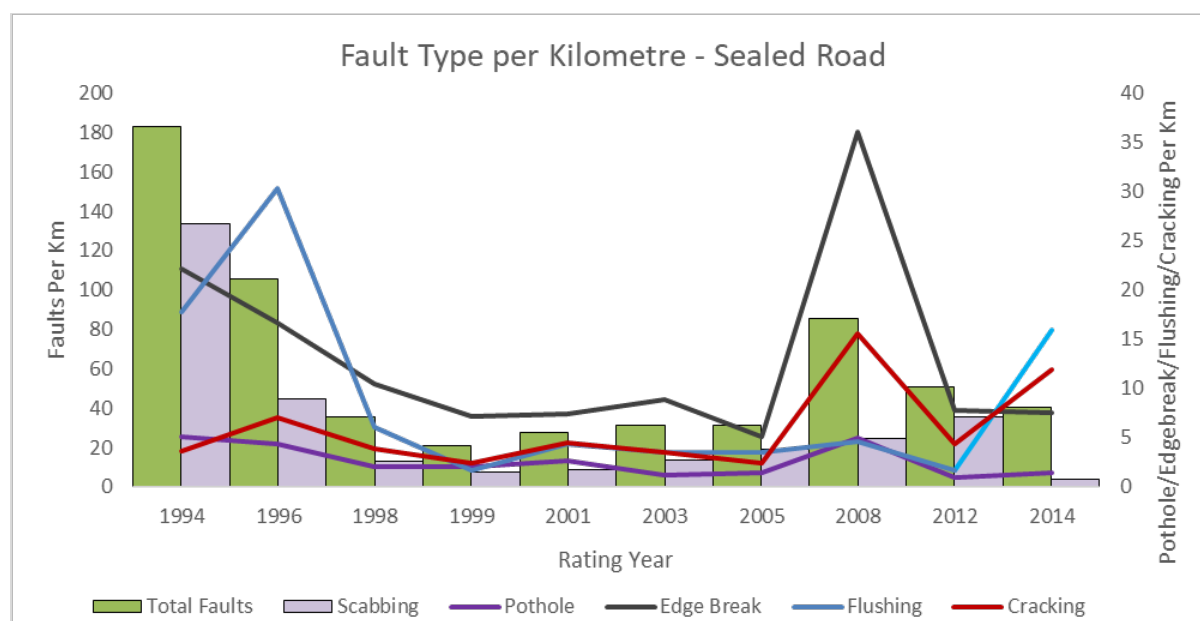


Figure 23: Historical Visual Condition Rating Data for Sealed Roads

The historical data shows that condition significantly improved in 1998 and since then has remained relatively stable, with the exception of potholes which have increased in the 2008 survey. This survey also shows very low percentages of alligator cracking, rutting, shoving and slightly increased percentage of flushing to just over 1%. The data shows that although the general condition of the pavement and surfacing remains stable, there is an increase in isolated pothole pavement failures. This indicates that maintenance intervention levels for sealed roads are appropriate to maintain the condition of the pavements at an acceptable level (given current infrastructure), but a greater focus may be required on completing pavement repairs to a good standard in isolated areas.

Even though there has been a significant amount of pavement drainage improvements on the seal road network, the number of heaving and shoving failures appears to be increasing. This is most likely to an increase in HCVs across the network. Traffic classification data is showing a range of 10% to 27% HCVs with an average of 16% across the network. Which is higher than the industry standard of approximately 10%.

Roughness, Pavement Integrity Index and Condition index

Pavement Integrity Index (PII) is a combined index of the pavement faults in sealed road surfaces. It is a 'weighted sum' of the pavement defects divided by total lane length. PII combines surface faults (CI) with rutting and shoving. A high PII corresponds to high pavement integrity.

Surface Condition Index (CI) is an overall condition value that reports an aggregation of a number of surface defects over a specified length of road pavement.

Figure 24 shows that over the last three years there has been a static or slight rise in PII and CI, albeit small at less than 2%. Roughness has also remained static corresponding to the STE stabilising on 97%.

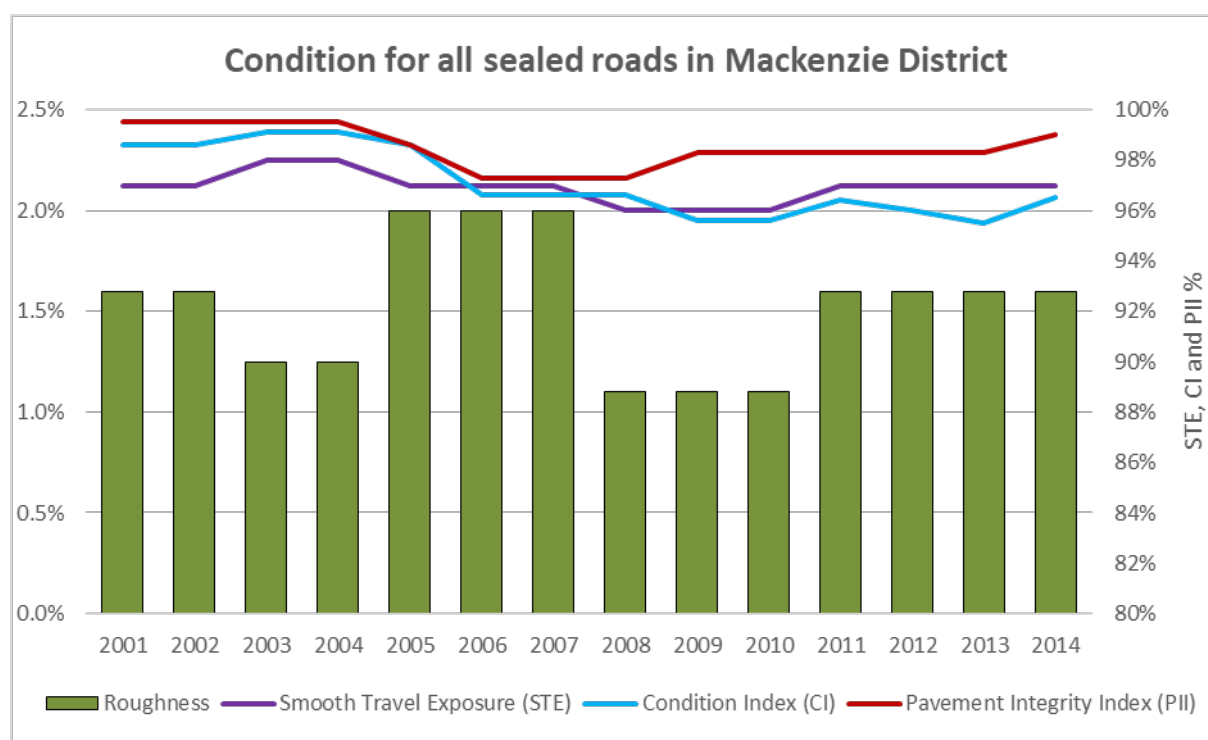


Figure 24: Historical Condition Data for Sealed Roads

Sealed Roads Current Capacity and Performance

The capacity and performance of the sealed carriageway is directly related to its condition. The intention of this plan is to maintain condition at an optimal level that maximises road user benefits

whilst optimising lifecycle costs. However, this objective could be compromised if there is a lack of Waka Kotahi (NZTA) financial support. The result of which would be a minimisation of life cycle costs and appropriate Levels of Service had to be compromised. This could result in trying to maintain the asset to a similar condition for less funds effectively consuming the asset which a number of other road controlling authorities have allowed to happen and are now requiring greater investment to try and catch up. This goes against all sound asset management and engineering principals that the Mackenzie District has prided itself on over the years on the philosophy that maintenance is the key.

Mackenzie District Council has historically injected local share funds to limit the asset deteriorating given we have other funding stakeholders being our rate payers. The majority of our ratepayers are intergenerational therefore have a large investment in the infrastructure assets in the Mackenzie District and do not want to see the assets that have been built and maintained over time to what they are today lost. Our AMP is based on maintaining and renewing the asset and improving the asset where required while progressing toward a sustainable infrastructure into the future. This is to prolong the requirement for large scale unnecessary renewals and intervening with heavy maintenance works. Given we sit within the middle of our peer group for maintenance cost and given the current condition of our network we believe that our asset management practices are optimised.

Arriving at an optimum level of maintenance is a complex process that has to be based on an accurate and detailed asset inventory, actual condition data and a sound working knowledge of the asset component and its mode of deterioration. The maintenance level also relies heavily on climatic conditions and the effects of climate change that occur within the network annually as it can severely affect the amount of works/ maintenance required depending on the scale of the weather events. Maintenance in the District has been increasing with the tourism growth especially with the number of free independent travellers exploring our network. International tourism has been impacted significantly and almost disappeared completely as a result of the borders closing this has reduced the constant pressures around NZ holidays but domestic tourism aiding in filling some of the gaps. These works have previously been prioritised due to pressures on the network from international tourism with this reduction and only holiday periods getting up to pre Covid 19 levels Council have been able to re prioritise works on the network focusing on other areas around farming, township maintenance, land intensification and development rather than the damages caused by increased traffic volumes.

The asset's capacity is a measure of its ability to meet its design standard, agreed levels of service and any perceived future demand that may be placed on the asset. The future demand that was predicted five years ago has been exceeded with the current growth we are experiencing which is putting increased pressure on all infrastructure assets across the district. The current capacity and performance of the sealed carriageway component of the Council road network is shown in Levels of Service [Table 15](#). If maintenance funding isn't approved as per our application, it is likely that performance measures won't be met forming another bow wave of works.

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9.3.2 Sealed Roads Operations and Maintenance Plan (WC-111)

Current practice has to apply a combination of "reactive" condition driven and network lifecycle techniques to determine the work necessary to maintain the network within financial constraints (see chart Appendix IV). Council would like to transition away from this methodology to a more preventative sustainable model to ensure faults are repaired in a timely fashion and that the treatment selected delivers the most appropriate repair to aim to permanently treat the fault requiring repair. These methods rely heavily on:

- An Asset & Roading Manager's knowledge of the network

- Annual or biennial inspections to obtain the condition data used in the RAMM Treatment Selection Algorithm (TSA)
- Buy in and ownership of the district
- Accurate base inventory
- Life and cost information of each asset component
- Historical maintenance cost of each road (From 2016 this data will be recorded by carriageway section in RAMM)
- ONRC transitioning to ONF Classification

Over the last three years, due to inflation the maintenance costs have increased annually (CPI being applied to 5-year maintenance contract) with the resulting condition generally remaining static but with an increase in shoving/ heaving failures and ever-increasing amount of edge break and low shoulder this has reduced somewhat as a result of the reduction in tourism but has occurred more in the rural sector. It indicates that in order to keep the network maintained at the similar condition level, future maintenance cost will need to increase. However with a lower number of vehicles maintenance may decrease slight over this LTP period but as the borders reopen tourism should begin to return. Increase in maintenance costs for inflation is likely to continue along with increases in farm production, forestry, HCV's and visitors the network will likely continue to deteriorate if not appropriately funded.

Advanced asset management techniques that model asset performance under varying maintenance and financial conditions could be used to further optimise and prioritise road maintenance effort and expenditure. It is considered however that the low limited traffic loading and limited maintenance requirements, coupled with detailed knowledge held, on the majority of our network, does not warrant this sophistication of approach.

Maintenance Standards

The technical LoS required are detailed in the maintenance standards that implement these technical LoS is set out in Council specifications contained in the road maintenance contracts.

Maintenance Programme

The majority of the pavement maintenance is reactive, but we want to move away from this to a more preventative sustainable approach: repair the fault once and futureproof the asset.. Budgets have typically been based on historical expenditure, particularly that of the last three years. The increase in heaving and shoving failure means that at risk areas have had, or are programmed for, extensive drainage improvements. The ever-increasing amount of low shoulder and edge break (due to the increases in traffic) also increases the need for costly maintenance repairs. Council wish to maintain and remove these failures by completing seal widening where there are long length of edge faults occurring.

The Council has budgeted between \$229,000 and \$234,000 pa for sealed pavement maintenance over this LTP period. However, this may need adjusting to cater for new roads and to reflect significant improvements.

9.3.3 Sealed Road Resurfacing and Sealed Pavement Rehabilitation (WC 212 and 214)

Renewals include resurfacing, smoothing and pavement rehabilitation. The identification of sealed pavement requiring renewals is brought about in a number of ways:

- Regular drive-over inspections

- RAMM rating surveys
- Surfacing treatments that require water proofing
- Ratepayer service requests
- Contractor inspections/reports
- Annual maintenance costs

The required level of renewal varies depending on:

- The age profile of carriageway surfacing and structure
- The condition profile of the carriageways
- The deterioration of the top surface
- The level of on-going maintenance demand
- The likely future demand on the road
- ONRC transitioning to the ONF
- Other improvement works being required.

This information is used as base data in the generation of road condition forecasts, forward works programmes and road renewal programmes. Waka Kotahi (NZTA) project evaluation methods are used to determine Benefit/Cost ratio. Road rehabilitation is carried out only if Waka Kotahi (NZTA) co-investment can be met, seal extension council have been funding fully for the last 3 years of the LTP period 2018 – 21 or if winter conditions render a section(s) of the network impassable where funds are typically diverted.

Renewals Treatments

Sealed Road Resurfacing

Sealed Road Resurfacings are pavement resurfacing where the reseal is to be applied to an established sealed road. Examples of these activities include:

- Conventional chip reseals, including second coat seals (generally two coat)
- Void filling seal coats
- Texturising seals
- Other special purpose surfacing (polymer modified seals) that fall into the maintenance chip seal Waka Kotahi (NZTA) category
- AC/ Slurry will be required in future due to higher traffic volumes and intern greater stresses occurring. Levels of service have also been increased in subdivision developments in high stress areas only typically which we eventually require replacement.

Sealed Road Pavement Rehabilitations

Rehabilitation is pavement renewal, generally of a limited area in which there are no geometric improvements to be actioned. These may include:

- Thin asphaltic overlays
- Unbound granular overlays
- Treatments involving ripping and/or reshaping
- Chemical stabilisation treatments.

The budget focuses on repairing frost heave damage caused by winter freeze/thaw conditions. This would include improving the drainage (if necessary) followed by a 150mm overlay. The amount of

frost heave is generally dependent on scale of the climatic conditions over the winter months, traffic volumes on the road and is typically variant of where the damage occurs, but generally it is more than often in the high country.

Basic rehabilitation works are not to increase the existing seal width or provide a seal width greater than the standard for the traffic use of the road. On some of our secondary collector roads the use is changing significantly with the increases in tourism and farm intensification. The final widths of these roads are currently being considered to reduce long term maintenance costs as regular large-scale damage is currently occurring to the edge of the road indicating that the existing seal surface is not quite wide enough. In this situation seal widening improvements would be considered at the same time as rehabilitation works were carried out. Formation widening may also be undertaken where it is required for support or structural integrity.

Historically, in any one-year, sealed road pavement rehabilitation has been as a result of damage caused by winter freeze/thaw conditions. Godley Peaks Road, Lilybank Road, Braemar Road and Haldon Road have been the most at risk roads in the District. This has not completely used the available budget and any surplus has been used for sealed road resurfacing to reduce the overdue list and to balance the unsealed metaling costs on our rural roads. In more recent years sections have been completed around the Takapō/Tekapo township (Lakeside Dr, Pioneer Drive, Godley Peaks Road & Lilybank Road.

Council have made substantial improvements to drainage in sections that are known to cause issues. This has abated the need somewhat, but there is still a generally requirement to carry out rehabilitation on sections of Haldon Road, Godley Peaks Road, Lilybank Road.

Actual: In order to resolve the issues identified above, Council has budgeted between \$130,000 and \$210,000 pa for the rehabilitation of sealed roads within the district. This budget did not change as a result of budgetary constraints.

Sealed Road Improvements

Seal Widening

Seal widening allows for the widening of existing surfacing where this is the least-cost maintenance treatment necessary to overcome edge break or to reduce shoulder maintenance. Work may include shoulder strengthening and/or formation widening where this is necessary to maintain the structural integrity of the pavement. This work may also be carried out to improve safety. Due to lower traffic volumes on a number of our roads that should be widened it is difficult to get a qualifying B/C to get the projects approved saying this there is a greater need on our secondary collector roads now as mentioned above and some of these others are now lower priority than in the past. Previously deserving roads were widened using the old Minor Safety allocation, but due to a change in funding categories these are now funded out of Low Cost Low Risk work category or form part of road improvements.

Low Cost Low Risk

Improvements are described by Waka Kotahi (NZTA) as low-cost/low-risk improvements. The Low Cost Low Risk budget is set at a maximum of \$2,000,000 for each project, with a co-investment rate equal to our base rate.

Council still needs to fund almost half of all work costs and so this restricts the quantum of work typically actioned each year as well as the available resource available to deliver these projects. A higher financial assistance rate (FAR) would significantly reduce the impact funding has on

improvement projects. As a result of Covid 19 the Low Cost Low Risk projects have been reprioritised due to international tourism almost completely disappearing and the pressures being removed for some time. This enable improvements that benefit the overall community to be prioritised over primarily tourism improvements. We are now planning to undertake a safety focused improvement programme working on various areas of the district for the benefit the various stakeholder groups that make up our district while preparing for the return of international tourism once borders reopen.

As a result of the pandemic, tourism has proven to be a significant risk for the economy. Tourism brings with it, greater expenditure in local businesses. However, tourism does not benefit infrastructure. It only increases the pressure put on the Council's infrastructure and leaves the rate payers to pick up the bill. Rates are difficult to increase as wages are relatively low in the area. This could also be a consequence of the high number of visitors to the district⁴.

With development, growth, visitor increases and tourism occurring in rural New Zealand it puts large strain on small towns infrastructure to cater for the increased traffic volumes (e.g., higher levels of service required, greater maintenance costs, more car parking, etc.). A number of these items are not currently subsidised by Waka Kotahi (NZTA), co-funding isn't supported to the appropriate level or the local share isn't available. For the remainder of items there is subsidy but approximately half of cost is still required to come from the rate payers. This may mean rate payers are contributing to repairs which likely would not be present if not for tourism (e.g., Chip seal, signage, realignment etc.).

Additional maintenance and required improvements could be carried out with local share funds if these other factors were not present but because of these, there has to be a trade-off currently between improvements and maintenance given our reducing FAR rate to 51% for year 1 of the 2021-24 LTP. Majority of the community would rather forego improvement for tourism (unless mutually beneficial) and prioritise improvement in other areas which is the methodology going forward, rather than sweating the asset and reducing level of service to what they have currently. This is due to transport infrastructure being key for the community and requires resilience as majority of the districts rural properties which are serviced by no exit roads with no alternatives. The improvement requirement is acknowledged by the ratepayer but given it also supports the greater New Zealand economy it is thought additional funding shall be subsidised to support this whether there is a targeted accelerated F.A.R or the F.A.R is increased overall given it typically is not just improvements that tourism or the increases in HCV loadings effects. This would also take some of the heat off due to farm intensification and growth in tourism into the future. Selection criteria in this category are based on improved safety, addressing network issues and optimising lifecycle costs including road user costs.

Low Cost Low Risk Projects typically include:

- Small, isolated geometric road and intersection improvements
- Traffic calming measures
- Lighting improvements for safety
- Installation of new traffic signs and pavement markings, or upgrading these to the current standard, where the cost is in excess of \$10,000
- Provision of guard railing
- Sight benching to improve visibility
- Construction/implementation of new or improved pedestrian facilities

⁴ Wages are kept low, with travellers working for their accommodation/ food (Woofers) while on holiday or here on holiday with a working visa.

- Construction/implementation of new or improved cycle facilities, and shared pedestrian and cycle paths
- Stock access structures
- Formation of new access or 'trailer parks'
- Minor engineering works associated with community programmes
- Traction seals
- Seal extension
- Seal widening
- Speed limit changes

Waka Kotahi (NZTA) have determined that all projects with a value less than \$2,000,000 will be funded from Councils Low Cost Low Risk Project allocation. This means that Council's bridge replacement programme is funded historically from this work category. This has now reverted for renewal back to its own category. Only new structures would be funded in this space. There are only two bridges in the district with an estimated construction cost greater than \$1,000,000 and these will have to be applied for separately due the ruling on bridge replacements. Waka Kotahi (NZTA) approved an allocation of \$2,000,000 per annum for the 2021-24 NLTP. An application has been made for a significant increase in level of funding of \$1 – 1.35M per annum.

Sealed Road Resurfacing

The average annual resealing achieved over the previous 3-year timeframe is 12.4km per year. The average annual first coat sealing achieved over the previous 3 years is 0.43km per year. It is unlikely for this level to be maintained in the future given the increases in vested assets due to the developments as well as the increases in traffic volumes with higher stresses put on existing chip seals.

The expected life of a seal is dependent on whether it is a first coat or reseal, what type of seal (e.g., single coat or two coat, large or small grade chip), and the amount of traffic using the section of road. Based on a Councils sealed pavement length a target average annual reseal length of approximately 1.7% could be regarded as the average annual need. Actual resurfacing over the last 10 years has been less than this amount to fit in within approved budgets.

A full review of our seal histories using an average reseal life of 18 years for 2 coat seals and 3-8 years for 1st coats was completed in 2015. As part of the FWP exercise, the existing back log of resurfacing (i.e., where the existing seal age is older than the agreed default seal lives) had been calculated. This showed there was theoretically 154,000 m2 (approx. 26km) of deferred maintenance. These seals were between 22 and 34 years old. The backlog had been partially caused because over the last ten years 16km of sealed roads have been added to the asset register either through development or LINZ handing over Hayman Road (5.2km) to Mackenzie District. The other impact is the ever-increasing cost of bitumen against a fixed allocation from Waka Kotahi (NZTA) and no allowance for inflation historically.

The bow wave of overdue sealing has been reduced to a manageable amount this was able to occur in an accelerated timeframe than originally thought, due to favourable tendered rates from our collaborative contract. There are still a number of these older seals, but these will be dealt with going forward as well as a number of assets been vested in the district due to growth and development. There is a high likelihood in having to increase levels of service to get the life out of the surfacing in future for the best whole of life cost of the asset (e.g., asphaltic concrete instead of chip seal) especially in high stress areas and where large-scale development is occurring as proven in existing situations.

As such, the current LTP budgets between \$500,000 and \$530,000 p.a. for the first 7 years. This will clear the back log and maintain an average seal age of 18 years going forward to incorporate the second coating. Further increases may be required to incorporate seal extension projects in our towns, on Lilybank Road and other rural roads into the future. In year 8 of this LTP there is a programmed increase of \$100,000 (to \$630,000) this is to cater for the first reseal of the developments that are currently been vested with council after their second coat. This smoothed programme allows for various seal sections to be brought forward or extended out, based on local knowledge and is yet to be fully verified in the field.

It should be noted that this is an ideal situation that does not allow for early failure of any seal or inflation. It is also modelled on extensive work completed when preparing the Roding AMP for 2013/14.

Single Coat or Two Coat Seals

Historically single coat reseals, completed in 2006-2011, were used to extend the available budget as far as possible to make inroads into an increasing list of overdue seals. This has not generally been successful, so a move to two coat seals was implemented in 2012 to reduce the risk of premature failure and hopefully get the full life expectancy of at least 18 years from those seals. It is thought going forward a combination of these two coat types of reseal treatments will be considered as to balance out the binder to stone ratio as well as treat course or variant texture.

9.3.4 Sealed Roads Asset Development Plan (WC 323 and 324)

This plan includes for sealed pavement created through subdivision development, road reconstruction, Low Cost Low Risk projects, seal extensions and seal widening. Seal Extensions and New/Upgraded Roads is covered under the Unsealed Roads Asset Development Plan.

Only those projects that either meet Waka Kotahi (NZTA) criteria and attract subsidy or meet Council Policy are carried out.

New/Upgraded Roads for Development

Within the last 10 years significant urban and rural land subdivision has occurred in the District. When each subdivision is completed, any internal roading network is vested in the Council, which then takes over responsibility for on-going maintenance. While there should be no major repairs or maintenance required for several years, operating costs such as street cleaning and street lighting costs do occur immediately. New subdivisions can also increase traffic volumes on existing roads which, in turn, can increase maintenance requirements. To reduce costs and minimise risk to Council and Waka Kotahi (NZTA), Council requires that all sealed roads have a two coat second coat seal applied before they are vested with Council.

The construction of roads within new subdivisions is generally funded by the developers and must be constructed in accordance with The Mackenzie District Plan and the Council's Engineering Standards. On completion, provided the roads and associated assets comply with the Engineering Standards, they are vested in the Council (i.e., Council takes over ownership). There are few capital expenditure implications with this type of asset creation; the more significant implications are maintenance and renewal related. During the period 2019-2020, 1.5km of new roading assets with associated drainage, lighting and footpaths were vested with Council.

The costs of upgrading of roads external to new sub divisional development is a significant issue in the Mackenzie District Council, especially with development involving clusters of lifestyle units. It is

recognised that development within the District adds to the demands on the infrastructure of the District. The provision of major capital works ahead of developments, presents difficulties in who should provide the funding. Council, in communication with the community, needs to formulate a policy to provide a guiding framework for road improvement decisions and funding within the Mackenzie District.

The urban and land subdivision in Council has increased over the last three years in a large way. We are now expecting for at least 110 section a year to be constructed as a minimum for the next 10yrs and subsequent infrastructure to be vested. This is off the back of growth in tourism and investors choosing to buy into the district (holiday homes), retire to the district, or setup a commercial investment property (Air BnB, Rental accommodation)

Council is still working with a developer to construct two new hotel complexes in Takapō/ Tekapo. There is a second developer in the process of constructing a third new motel development which is nearing completion but has slowed down due to the impacts of Covid 19. A fourth developer has renovated an existing hotel and as we understand is exploring extending this existing hotel complex in time. There are also quite a number of other small scale holiday accommodation houses & motels that have been constructed. Predominantly these have occurred in Tekapo but there is another planned for Twizel. Air Bnb seem to keep appearing and these are ever increasing with the commercial accommodation providers of private holiday homes/ rentals. These all will/do have an effect on transportation activities in the wider area especially around parking and active mode and will have to be considered as part of the resource consent process and district plan review into the future.

The transportation strategy has been on hold for two years coming up three. This was to allow strategic document formation and planning across other areas of council to take place. We are likely to be able to recommence this strategy this LTP period now the other plans are nearly finalised. The reason for the transportation strategy was to address the traffic and transportation issues now and into the future looking out 25yrs- 50yrs, how the three towns will function. Firstly, consultation and plans were formed for Takapō/ Tekapo given it was assessed to be the greatest need upfront with the international tourism pressures at the time and given the growth and development. Then the planning and development of Twizel and Fairlie would be worked through either simultaneously, or separately depending on growth. To date the Takapō/ Tekapo plans have been consulted on and feedback compiled with some work completed on a development plan. The development plan begins to incorporate the feedback and provide further detail. The three minor settlements will not be considered in the meantime unless significant development occurs or is planned. Small improvements are like to occur at this stage until budgets increase or development results.

9.4 UNSEALED ROADS

9.4.1 Unsealed Roads Background Data

Unsealed Roads Scope and Nature of Asset

The unsealed road network in Mackenzie District comprises 71% of the districts road asset and carries approximately half of the total vehicles travelling on the network. Pavement design standards have not been specifically set for the unsealed road network.

The roads are typically surfaced with a modified M/4 AP20 aggregate and constructed to achieve a 4 to 6% cross fall along straights with a maximum 10% super elevation on corners, however many have adverse camber due to the effects of traffic wear and past maintenance.

Details of the unsealed road network are held in the RAMM system. This mainly involves inventory data such as the length, width and start and end points of a section of road.

The network is divided into two portions: the roads in the Pukaki Ward and in the Opuha Ward.

Roads in the Pukaki Ward primarily consist of six long no-exit roads (one is silt to two separate roads that provide access to farming areas. Due to the extreme climate in the Mackenzie Basin and the impacts of climate change and the seasonal variance, the unsealed roads are very dry during the summer months. Little maintenance can be done except grading the loose stone back over the road surface to remove windrows and to protect the bound pavement beneath. Dust nuisance can be a significant problem. Metalling of unsealed roads is normally carried out in spring and autumn when the roads are sufficiently damp for the new metal to adhere to the existing road surface. However, drought conditions can exist at any time of the year and limit what maintenance works can be carried out. Because of the climate changing and seasonal variances we have been adapting our unsealed road practices and using grading attachments and material property selection to aid in the mitigation of these effects into the future.

The Opuha Ward roads have less demanding maintenance needs and level of service issues. The climate does not present the same extremes encountered in the Mackenzie Basin. We do receive a greater number of heavy rain events which cause flooding events that typically effect isolated areas of the Opuha ward. The worst areas affected are typically around the foothills where there is a fast run off coefficient. As a result, road maintenance activities are able to be planned and executed in a more programmed and controlled manner. During periods of extreme dryness, a high number of complaints are received regarding dust. It is not Council policy to apply dust suppression to any of unsealed in response to those complaints even though we are having good response to our “rotten rock” trials in relation to reduced dust generation. In extreme case signage may be erected to aid in limiting the dust nuisance but this is only in cases where there are no other existing mitigating factors.

Unsealed Roads Current Condition

The unsealed road asset is in constant equilibrium/changing condition depending on traffic use, weather, position in its maintenance cycle etc. This condition is monitored through Contractor and Roading Manger or the Engineering officers’ inspections. Complaints and queries from users are an additional source of information on potential issues.

No formal condition rating information is collected, and it is not intended to do so in the future as condition changes very frequently on these roads (up to daily on some roads) and such formal surveys would provide little repetitive meaningful data. Technology is becoming available to efficiently capture meaningful data on the unsealed network that could provide valuable insight into the performance and levels of service on the network. Staff are currently investigating costs v benefits of obtaining such equipment. Some of the existing methods have been tested for instance ‘roadroid’ app but due to the equilibrium of unsealed roads it is very hard to draw a conclusion currently it is more just trends. We have undertaken some roadroid data capture, but this typically only shows and flags what we see from visual inspection with fault occurring in the usual places.

Maintenance is aimed at maintaining the asset to an acceptable LoS. However, on some route’s significant fluctuations in traffic volume affect both condition and the ability to maintain acceptable LoS economically. Lilybank Road has reached this threshold where it is uneconomic to maintain and now is in a holding pattern until a seal extension programme begins. The Roundhill Ski area on Lilybank Road has seen increased Ski traffic of up to 600vpd on a road designed to take its normal loading of 80 vpd to the high-country stations. This increased loading impacts the pavement at the worst

possible time of the year. As well as the ski field there are 4 high country stations on the road, one of which (Lilybank Station) is located on the north side of the McCauley River with only a river crossing access (by natural ford crossing) On Lilybank Road with the growth in tourism there are a number of people wanting to experience back country New Zealand and walk the DoC trails as well as sight see which occurs on a regular basis. There are also numerous hunters, 4x4 groups, fisherman, trampers, jetboaters, etc. that use and access this area for recreational activities.

Braemar Road is another road that is subjected to military exercises out of the Balmoral Military Camp for training which typically happens for a 2-4week period per training exercise with larger operations lasting a one to two month(s). In winter currently there are weight restrictions placed on Braemar Road to limit frost heave during winter conditions as it often becomes impassable. The 2 stations on the road are worked with during these times. Allowing servicing to the back of Tasman Downs and Braemar Station as well. There are also a number of forests/logging operations that occur on the adjoining Mount Cook Station Road as well as on Braemar Road which are a significant consideration. This road is also the scenic alternative to the State Highway (SH8). Recently one of the stations has undergone transformation from a typical high country station to a large scale Farm stay/ hotel for tourism. Given the impacts of Covid 19 this has not yet been commissioned nor the changes in increased Braemar Road traffic and the makeup is realised.

Godley Peaks Road has become busier as the Dark Sky Project (previously Earth and Sky) reopens their operation. With the domestic tourism growth for astronomy tours that run from the top of Mount John as well as a café. They have currently placed a toll on their private road of \$8 per vehicle toward the maintenance of their road which has been increasing annually over the past couple of years. Covid 19 has impacted these operations with the almost complete reduction in international tourism meaning operation closed for a period of time. There is also a significant number of free independent travellers using the road to access Lake Alexandrina campsite to stay the night rather than freedom camping as Council has a bylaw prohibiting this activity. This is also a popular sightseeing and photographic location given views of the lake, natural reflections, reserve wildlife and grazing animals in the natural landscape, etc. It is also used as a popular camping, holiday spot, recreational area and fishing settlement for domestic tourists. It also has cultural significance Whakarukumoana (Lake McGregor) specifically and Takamoana (Lake Alexandrina) to the local Rūnanga who used this area as their food basket collecting and preparing Tuna(eel), Putakitaki (paradise duck), crested grebe, weka, moa, plant life, etc as well as using this as a place of learning and made camp in these locations. In addition to the tourism and significance of the area there are two working stations at the end of the road who are intensifying their operations and have water rights allowing them to irrigate which is also increasing productivity. There is also a number of pastoral supplements required as part of these operations with one of the farms having 400 HCV movements last year on and off the property. Which are required to use the ford as the bridge is weight restricted. With now modern truck there are issues with the electronic and mechanics with this practice.

Haldon Road services one of the 4 well known campsites on Lake Benmore being 'Haldon Arm' which sees a large amount of traffic over summer from campers, boaties or recreation. It also accesses the Takapō/ Tekapo River, Albury via the Mackenzie Pass and Kurow via the Hakataramea Pass. There are also 7 working stations on the Haldon Road with permanent resident of which a number travel to town on a daily basis.

Mount Cook Station and Hayman Road adjoining currently form part of the Alps to Ocean cycle trail as well as been a logging route for Mount Cook Station and the access to Takapō/ Tekapo B Power Station belonging to Genesis. It also one of two main accesses to the Tekapo canal for fishing now the old Canal roads have been closed for the majority of their length. These adjoining roads also service 3

working stations. Off-roading of the cycle trail will be completed on Hayman Road by Year 2 of the LTP. This also serves as an alternative route to State Highway 8 via Braemar Road. At this stage, a large percentage remains unsealed. This roading alignment is also subject to shoreline erosion by Lake Pukaki as a result of the northwest winds generating waves on the lake. This is extremely significant in some locations and may result in loss of the current road into the future. Regular bi yearly inspection is undertaken to monitor and Meridian Energy has ownership for and manages the rock protection works and the lake level through there operating easement and historic agreement with Mackenzie District Council dating back to the NZED days.

Glen Lyon Road runs up the right-hand side of Lake Ohau and is the western boundary of our network. The road is used to access a DoC hut & trails as well as provides access to the headwaters of Lake Ohau for fisherman, jet boats and other recreational activities. There is also a working station at the top end of the road being Glen Lyon station which recently has logged approximately 30,000t of timber. With further forestry still in place to be harvested into the future. This is the most at risk road in the District followed by the erosion sections on Mount Cook Station Road and Hayman Road. The road has been cut into the side of the mountain for a significant portion of the total road length. This makes the nature of the alignment very tight with a large drop off to Lake Ohau on the True LHS amount of gravel is left in place to act as an edging on this road as the installation of a barrier along this section would be cost prohibitive currently and the embankment appears loose. There have also been 3 large slips in recent years and others previously typically caused by heavy rain. In a large event there would be significant cost in clearing and or re-establishing this link in a timely manner or for a cost effective sum. Especially after a significant earthquake or rainfall where slip paths have taken out the roads or structures completely. It is recommended that policy be put around this risk to mitigate this into the future.

A number of roads in the Opuha Ward are also down to base material being exposed making maintenance relatively difficult. These are in various locations but to date have been round the Clayton, Sherwood and Ashwick area, Behind Fairlie and around the back of Albury/ Cannington area. The only explanation for this is the change to wearing courses 5 - 10 or more years ago resulting in a reduction in maintain gravelling and an increase in wearing course treatment. A number of these roads affected carry a significant proportion of heavy traffic, agricultural vehicles and seasonal variances spreading harvesting, logging, etc This was deemed appropriate at the time and has performed well in the areas which have had these treatments undertaken, resulting in longer lives being achieved.

Independent Practice Assessment

To assist Council with the preparation of this Business Case, Council has commissioned an independent review of the management of their Unsealed Roads. Dr Theuns Henning has considered the data available and toured the network with the Roothing Manager discussing the management approach.



Dr Theuns F.P Henning

CMEngNZ, IntPE
International expert in asset management
and infrastructure

Dr Henning's report findings –

From the author's review of information cited, and the inspection of the network, it is evident that Mackenzie District Council follows best practices with the maintenance and renewals programme on their unsealed road network. It is also believed that the investment level for this network is appropriate, particularly when considering the benchmarking result with peer authorities. There are challenges on

this network with some roads having to cope with significantly high traffic loading such as Lilybank Road that service a popular ski field area. According to economic principles, this road should be sealed, but under current funding regimes, that would be difficult. In these cases, the Council follows the next best strategy by ensuring the right material is placed on the road to improve the level of service in a cost-effective manner. Likewise, there are roads that are under high loading stress such as the Braemar Road that provides access to a military practice area. When armed vehicles travel on this road during wet days, significant damage is done to the road. Similarly, 50MAX/HPMV forestry trucks are limited to early morning hauls during winter, so they travel while roads are frozen. Again, for these cases, councils work in a collaborative manner to ensure that costs for repairs of the road network is minimised.

Perhaps the one area that Council could improve on is by collecting the right information that could support investment level and validate the appropriateness of maintenance and renewal practices. Some recommended data capturing includes:

- Record material properties used on the roads on the basis of the Paige Green Chart. This will not necessarily alter current practices, but by recording the information, a record of good performance could be built up over time and included to future tender specifications
- Currently, costs records and gravel loss per for roads should be linked to specific material types and blends
- Cost records could be stored in more detail in order to allow categorised analytics. e.g., splitting routine costs to emergency repairs and profile improvements
- Routine inspections could be stored as an ongoing record of condition trends to demonstrate seasonal variations and maintenance needs
- An official condition data survey would be of limited value and is not recommended for this network

Access to materials remains a concern. Sites for extraction are not freely available (particularly in areas of outstanding natural landscapes) across much of the district. This is likely to lead to longer cartage, meaning better materials and blends is more efficient.

Unsealed Roads Current Performance and Capacity

Performance

The road user perception of unsealed roads is that they are of inferior quality to sealed roads due to issues with carriageway width, roughness, dust, mud, corrugations, potholes, soft areas and increased vehicle operating costs. These issues are being continually assessed by the maintenance contractor with work programmed and executed to keep the roads within agreed LoS.

The Council recognises that some unsealed road users may never be satisfied until “their” road is sealed but acknowledges that this is not always viable given the length of the unsealed network, low use and cost involved. Life cycle costs of all but the shortest sealed roads (< 200m or so) are significantly greater than those of unsealed roads. That is why the District has so many of the latter. The change-over point in terms of total life cycle costs, including road user costs, is between 120 and 200 vehicles per day, depending on the road characteristics. However, as Waka Kotahi (NZTA) requires a benefit cost ratio in excess of 4 before it will consider co investing in such work and as the Council is generally not prepared to carry the full costs of such work it is only programmed when there is very strong justification. This may change in the future as a result of gravel resource availability and supply issues through transportation costs, etc.

Despite this there is on-going pressure for seal extensions, this is mainly in areas that are difficult to maintain cost effectively as an unsealed road given safety, traffic volumes and gravel consumption as well as areas that are difficult to maintain i.e. humps and hollows, bends approaches to structures and approaches to intersection where acceleration and deceleration occurs as well as for dust mitigation.

Capacity

Where traffic volumes are low, and the terrain is open a single lane carriageway of approximately 3.5 to 4.0m in width can suffice as long as there are sufficient passing opportunities. Council's normal operating width is 5.6m out to approximately 7m depending on traffic volumes, heavy vehicle use, alignment, etc. When there are more than about 80vpd and the road is longer than 1 to 2km it must be wider to allow opposing vehicles to pass at slow speeds if necessary.

A carriageway width of 3.5m is acceptable where:

- The road is in a low speed environment
- There is good visibility
- The environment places stringent controls preventing a wider carriageway
- Adequate passing opportunities are available
- Safety records are satisfactory

Before proceeding to rebuild any unsealed carriageway the Roading Team assess whether:

- The data currently held in RAMM is accurate (road inventory, traffic estimates, etc.)
- Land use or any proposed change in land use
- Any crash statistics
- the change to carriageway width warrants the level of expenditure anticipated
- Local knowledge
- One Network Road Classification transitioning to the ONF

Unsealed Roads Historical Data

Little historic data unseal road data is formally held in RAMM on the physical construction and maintenance cost of the unsealed roads. However, Council has built up significant maintenance data over the past decade including grading frequencies, quantity of maintenance metalling applied etc. and their respective costs. These records are held and updated regularly on spread sheets. This data is being loaded into RAMM per road. From October 2014 the maintenance data will be recorded in RAMM finance (previously contractor) by carriageway section. As part of improvements, we plan to form a user defined table within RAMM to hold unsealed road data as is it is a significant proportion of the maintenance spend. This then allows for further analysis, displaying of data, Forward Works programming, etc. to be kept up to date. We plan to use our data/ asset management resource to aid in undertaking this work.

Cross Section Surveys and Gravel Loss

Council has 24 Sites where the road surface is levelled to a datum to analyse the gravel loss over time. The sites are surveyed every two to three months and the information compared over time. The five most highly trafficked roads, being Haldon Road, Lilybank Road, Godley Road, Hayman Road and Braemar Road are most closely reviewed due to their high traffic counts and fragile nature. Information gathering at some of these sites has been going on for a number of years, but the programme has been ramped up considerably in the last three years. This is due to a number of material trials been carried out from varying sources on which monitoring sites have been established to measure these materials performances.

The graph below shows one of the sites on Haldon Road as a typical example.

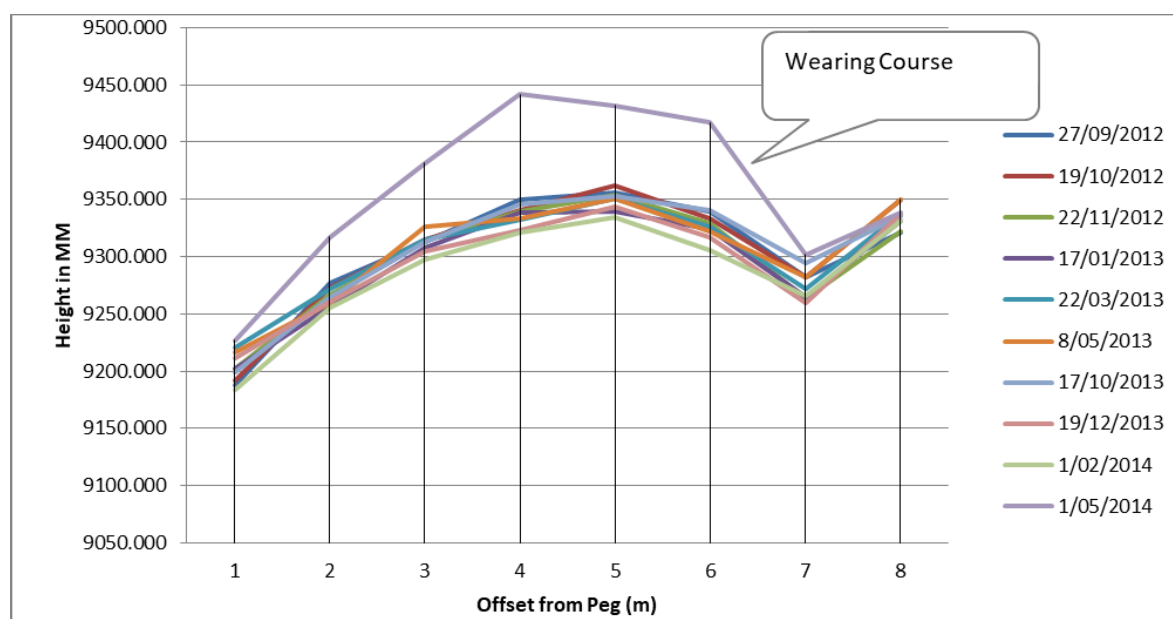


Figure 25: Haldon Road Gravel Loss - Site 2

Analysis of this data shows that, for the big three roads (Haldon, Lilybank, Braemar) we lose 17mm off the crown on average annually, equating to 6,000m³. For the balance of the unsealed network the loss is on average 7mm of the crown, equating to 15,500m³.

To avoid consuming the asset this metal loss needs to be replaced on a regular cycle. At current contract rates the cost to replace approximately 28,000 m³ across the network is \$650,000 - \$700,000. Council on findings and with increases in traffic predict for this LTP period to be approximately 30,000m³ at an increased cost of \$835,000 due to increases in consenting cost and availability of gravel resource resulting in increased transport cost. Given Council is in the process of retendering their road maintenance contract there is an unknown risk of costs increasing higher than what is currently predicted. It forecast unless there is some intervention with seal extension as provisioned for gravel quantities and cost will continue to increase. Intervention will enable cost to be managed and will likely be reduced into the future providing gravel resource provisions can be sourced close to sites across and throughout the district.

Annual Grading Lengths

Figure 26 shows the length of grading completed each year over the last 10 years. The cumulative length of grading completed each year has decreased over the last 10 years. This drop is in part due to the addition of fine material (silty clay) to our maintenance metal. Therefore, more funding has been made available for Unsealed Road Metalling, which could further decrease in maintenance costs in future. In the last LTP period it can be seen the need for the increases in grading cause by logging harvest increase in tourism activities etc. Covid 19 had little effect on our unsealed roads given the rural sector remained an essential service. Therefore, there were still high numbers of traffic working on a regular basis, cartage of supplies, Pick up and deliveries, etc.

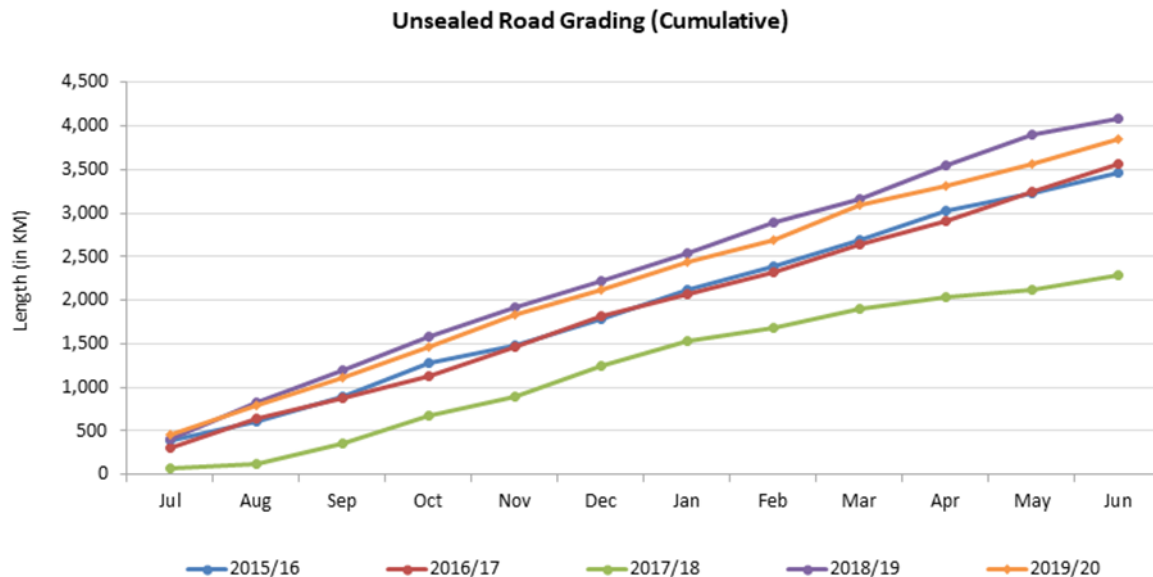


Figure 26: Historic Grading Lengths

Annual Metalling Quantities

Figure 27 shows the historic quantities of aggregate applied to unsealed pavements as running course and wearing course within the District. Running course is surfacing material, whereas wearing course is a thicker application of metal compacted with a roller to aid in the compaction, binding and longevity of the material aiding in building up the pavement structure and improve the cross fall resulting in a stronger roadway with improved drainage characteristics.

The current maintenance strategy has been to minimise the amount of running course applied to the unsealed road network. But given the base showing through in a number of areas more of this type of treatment is required to be undertaken. This holds the levels of service on the roads and protects the base material of the asset while allowing effective grading maintenance to take place. The available funds are therefore becoming more balanced across both activities to address this issue rather than continuing whole heartedly with the historic methodology. But on the other hand, letting other roads fall apart in the process, losing LoS, requiring additional spend in future, becoming less or un-trafficable, causing damage, reducing safety and increasing complaint isn't appropriate.

Haldon Road, Lilybank Road, Braemar Road, Godley Peaks Road, Hayman Road and Mt Nessing Road (the big four) have significantly more traffic than the balance of the unsealed network and therefore the greatest gravel loss in any one year.

As can be seen in Figure 27 total metalling has not been able to achieve the required amount of material approximately 30,000m³ of metal to avoid consuming the asset. This is due to insufficient historical funding and reduction in F.A.R as part of its co-investment by Waka Kotahi (NZTA) toward the maintenance of the network. Council does not fund any non-subsidised road maintenance in the unsealed road area. An increase in funding is required to enable Council to maintain the current level of service on those roads already upgraded and improve the strength and enable maintenance of the balance of the network. This is to ensure resilience is maintained given the majority of the network has only one access point. The current funding levels are insufficient to avoid consuming the asset and further deterioration. An approved seal extension programme would slow this increase and would likely reduce these costs into the future especially on our higher volume roads, all existing practices remaining equal. This is unlikely though into the future with gravel resources as discussed below.

Mackenzie has primarily sourced their gravel from the rivers around the district over time to manage gravel build ups, manage the waterways and reduce the risks of flooding in the most cost-effective manner for the ratepayers and the community. Predominantly most of these extraction works have occurred close to Council infrastructure assets or roadways. Sourcing from rivers has allowed for close sourcing of materials and resource for road construction, maintenance gravel, gravel renewal, etc with limited cartage. Recently we have been advised as a result of riverbed surveys that we are unable to source gravel for the majority of rivers in the district any longer. This is made harder by ownership changes, changes in rules & legislation, environmental controls, consenting cost, protection areas, etc. Due to this issue and the likelihood of increased cartage there is almost certain increase of cost increasing significantly into the future.

Retendering of Councils Road Maintenance contract also raises uncertainty around the cost of delivery which we have heard is likely to be in the order of 35% or greater from some suppliers due to consenting costs etc. This results in the whole of life cost of treatments and optioneering into the future needing to be reconsidered district wide to ensure transported related infrastructure remains cost effective into the future and cost do not just continue to increase. This is dependent on securing of alternative gravel resources, in what locations these resources can be secured, gravel provisioning as part of the district plan, gravel consents, suitability of material, etc. It is also dependant on whether Environment Canterbury will allow gravel extraction consent from rivers beds into the future if so when and with what level of certainty that can be assured.

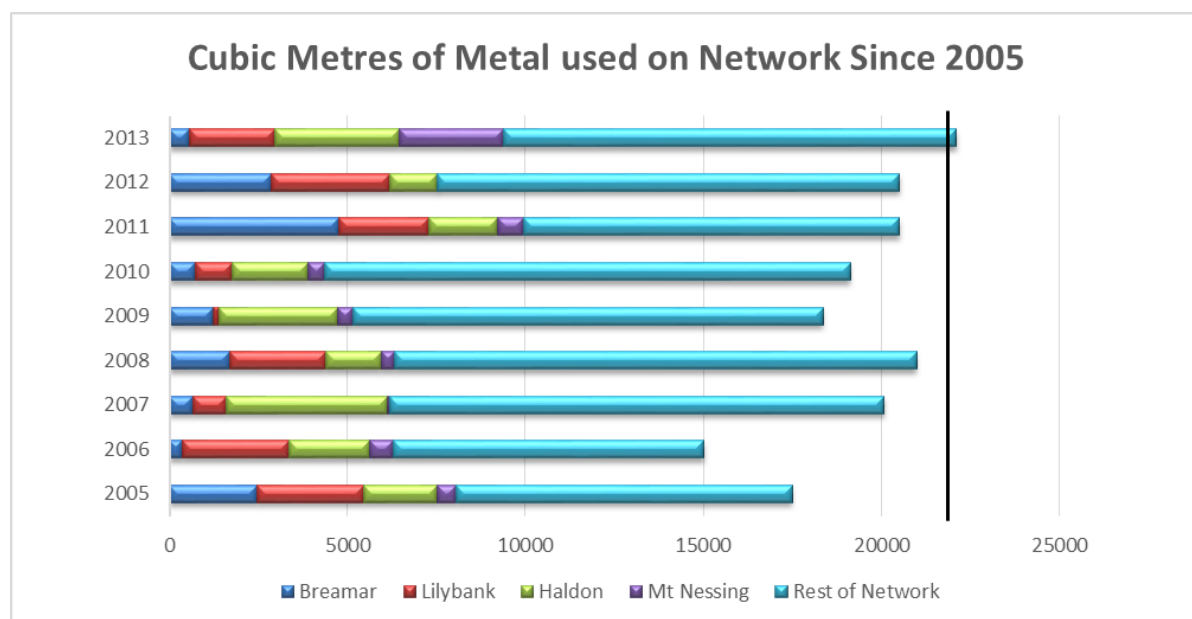


Figure 27: Annual Metalling Quantities

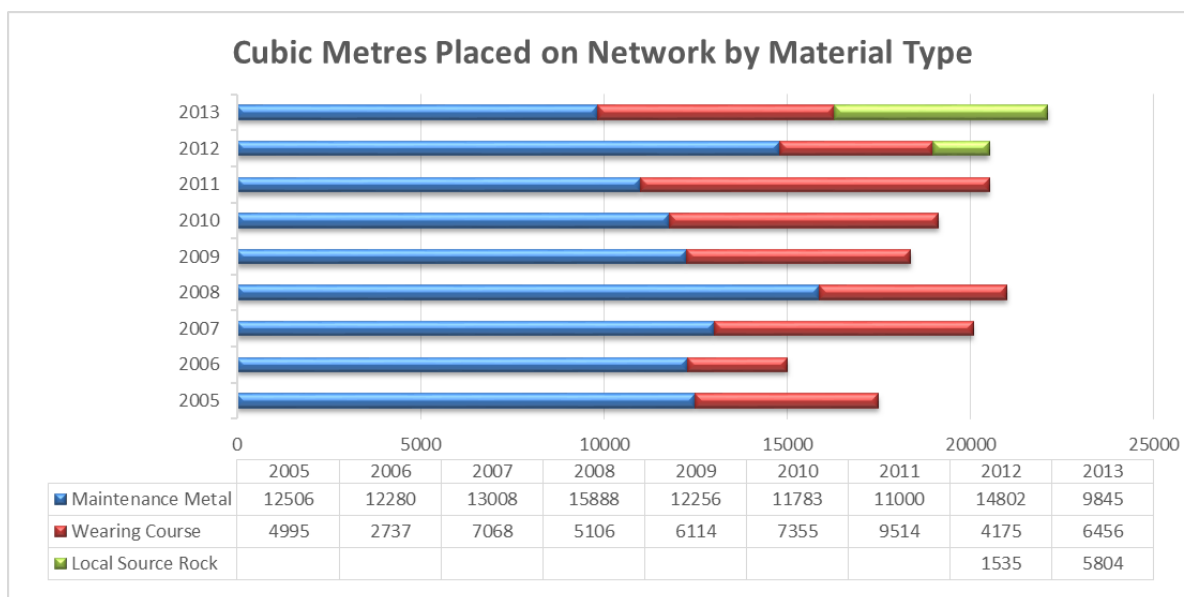


Figure 28: Historic Running and Wearing Course Application

9.4.2 Unsealed Roads Maintenance and Renewals (WC 112 and 211)

Maintenance Standard

Maintenance is delivered through competitively tendered contracts. The Contractor is paid at scheduled rates to maintain the network of unsealed roads to the required standard. The rates cover all work including:

- Pothole repairs
- Surface and shape restoration (grading)
- Laying additional maintenance aggregate
- Vegetation control (spraying)
- Maintenance of surface water channels
- Traffic services maintenance

Resources are applied to unsealed roads on a need's basis. Unsealed roads are prioritised yearly from Priority 1-3. Priority 1 roads are in very poor condition and need a full stabilisation or reconstruction treatment to be able to continue to function as a road safely trafficable at 70km/h. Priority 3 are in average to poor condition showing corrugations and bony patches. Programmes over recent years have been very reactive, and it has been identified that further funding is required to complete P1 and intervention on P2 roads and begin a gravel replacement programme to counter gravel loss/migration. Council is working towards having a 3-5 yearly forward works programme instead of completely reactive maintenance.

Maintenance Metal Supply

Currently, most materials are sourced from local rivers and streams within the Pukaki and Opuha areas. As these are alluvial materials there is a large number of round rocks in the mix, even when passed through the crusher many round stones are retained whole even though the crushing sources are selected at the largest stone source available. This means that the mechanical interlock of river won materials is of a lesser quality, with a resulting roading surface that is friable and hard to retain. As extraction of suitable materials from rivers becomes increasingly difficult, with constant delays as a result of increasing consenting requirements, Council is moving towards more pit materials, which

contain more broken faces and provide a better mechanical interlock. This in turn provides a safer, more durable driving surface. Sources are being sought off private land to limit the number of pits around the district this also benefits the landowner where they may want land or rocky outcrops levelled out.

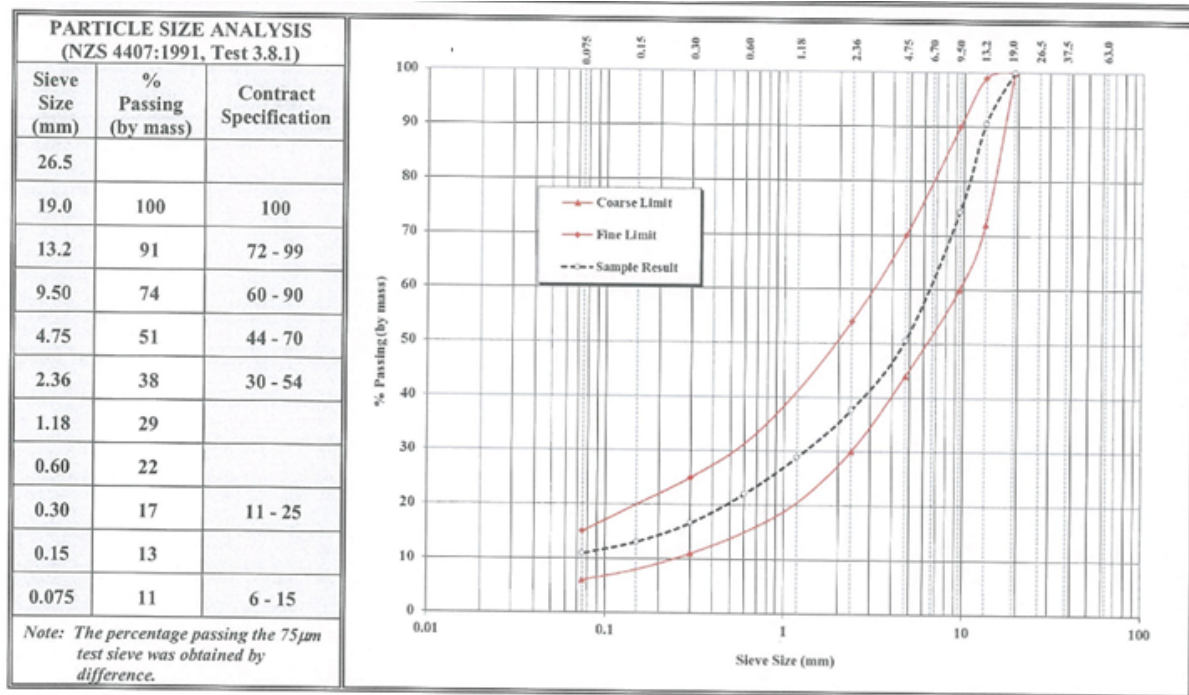


Figure 29 Particle size analysis

Currently there are three pits used today with a further three to four pits to investigate. We also are looking for other new sources throughout the district to limit cartage costs and maintenance as well as being an alternative to alluvial gravels.

The first pit is privately owned, on Mount Nissing Road, Aorangi Downs. This pit provides good “rotten rock” material. But as this material is high in clay content, we are high in fines the material has now gone through a couple of harsh winter periods and performed extremely well in freeze thaw cycles. The use of this material has now been extended to fill scour damage caused by flooding due to its good interlock. The material has also been crushed and blended with crushed alluvial maintenance metal as an alternative binding agent to silty clay. Due to such a good mechanical interlock and the weakness of the parent stone the material continues to create additional fines keeping the surface tightly bound meaning dust is severely limited with the use of this material. Given the strength of the parent rock and the weak veins hold it together the material breaks down very easily which for goes the cost as it can also be laid as straight pit run without the need for the crushing also it is easy to win given the softness.

The second pit is a slip face in the Mackenzie Pass, which frequently spills and causes large rock slips and build up over Mackenzie Pass Road. This material is durable, but lower in clay content. There is a section laid on Haldon Road and Braemar Road, the performance of this material has been monitored and is performing well. The shape is maintained but the source did require crushing due to the size of the parent material when initially laid. The material has required a modified AP20 light running course to be over the completed construction to provide additional suitable fines as the material began to ravel when originally laid.

The third is on private land also, on Clayton Station this is the newest of the three sources. The pit provides a “rotten rock” material. The material currently is still in the trial stages as it doesn’t have the same properties as Aorangi Downs as it has a greater proportion of fines and the parent stone is harder therefore requires crushing. Due to the additional of fines it doesn’t have the same dust suppressant properties but is good for blending with gap graded alluvial aggregate which has lost its fines and needs new fines reintroduced to bind. The material was also affected after heavy rain where it became very slippery/ greasy but once dry is like concrete. The material was crushed at the time at an AP40 and AP20 size. The AP40 was a little bit too big there for it is thought going forward it will be better in crush as an AP32 going forward.

AS mentioned previously, three to four trial sources are being investigated on other private properties in the district. One of these is in the Opuha Area, another couple are on the Haldon Road and the final one is in the Pukaki area which could provide a suitable source for Hayman, Mount Cook station and Braemar Roads.

Care is taken to avoid carting gravel from one basin to another to limit noxious weed seed spread where practicable. As such this means that clay and metal sources must be found in both basins. This also has the added benefit of shorter cart times resulting in lower whole of life costs. Rock sources also continue to be explored in the Pukaki area toward Twizel and there are various trials to complete on the Haldon road using other source materials that have not currently been used. Plan Change 13, legislation which focuses on the protection of the natural environment and sites of natural significance mainly in the Mackenzie basin, causes significant issues when trying to find appropriate locations/ pit sites for extraction.

Clay Maintenance Metal Initiative

A major initiative commenced in 2010/11 was the introduction of silty clay to maintenance metal and wearing coarse aggregate. Historically, maintenance metal available in the area has been deficient in fines and has had poor cohesion. This resulted in roads having to be graded more frequently and replacement metal applied more often to maintain roads to the required standards. Research has shown that material loss can be minimised by the addition of clay to the aggregate, and this results in cost savings through reduced maintenance grading and material application frequency.

Beginning with the spring metalling programme in October 2010, several silty clay sources were identified within the Mackenzie District and stockpiles established in strategic crushing locations. This proved to be quite an exercise in logistics since silty clay deposits are not abundant, particularly in the Pukaki Ward. However, most of the clay for the Pukaki Ward was eventually found there and did not have to be carted on a long haul from Fairlie. It also avoids any concerns of weed distribution between the Mackenzie Basin (Pukaki Ward) and Fairlie Basin (Opuha Ward). The crushing subcontractor then thoroughly mixed the silty clay in the desired proportion with the river or pit run material using a loader. This mixture was then fed into the crusher resulting in a homogeneous stockpile of clay-infused aggregate.

Sixty-one unsealed roads then received maintenance metal. Wearing courses were constructed on four roads: Godley Peaks, Haldon (part), Hamilton, and Middle roads. Similar to wearing course, stabilisation using silty clay binder was applied to Lilybank, Lochaber, and Godley Peaks roads.

The results of the silty clay initiative have, so far been very encouraging and beneficial for the district. Grading due to this has reduced in 2010/11, while the overall standard of surface shape (lack of potholes, corrugations etc.) and pavement drainage (surface water channels clean etc.) has remained acceptable. The savings formerly used for grading have been made available for other improvements.

The exceptions to the above are roads with minimal aggregate thickness or flat surface shape which receive occasional heavy traffic loadings such as logging activities, carting in winter feed, pastoral supplements and feeding out using large tractors and silage wagons. Examples of roads effected in this way are the top end of Lilybank Road Haldon Road and Godley Peaks Road. These will always need additional grading following such activities to restore surface shape.

Tourism is also becoming a large factor with the majority wanting to explore back country New Zealand as well as farm intensification with water rights being made available. This has been impacted as a result of Covid 19 with also a complete reduction in international tourist with the closing of New Zealand's borders. The use has continued though with strong advertising and marketing campaigns encouraging the domestic market to come and explore the district and free independent traveller exploring a slice of paradise off the beaten track in the Mackenzie District.

The silty clay material is performing well through the worst of the winter period, but the condition of the network where this material has been used continues to be monitored for performance and if necessary, changes to the blend may be made as a result of field observations.

The only downside so far, is that cars have been observed travelling faster on the hard surface of these unsealed roads. Obviously, this is not completely desirable since it is still an unsealed road with loose material on the surface and the potential for loss of control crashes exists. Due to the increase in fines the pavement is kept well bound with the dust created remains similar with no marketed difference. The binding achieved by the addition of the silty clay has provide cost savings via reducing maintenance costs. Additional signage has had to be erected at the change in road surface to warn motorists.

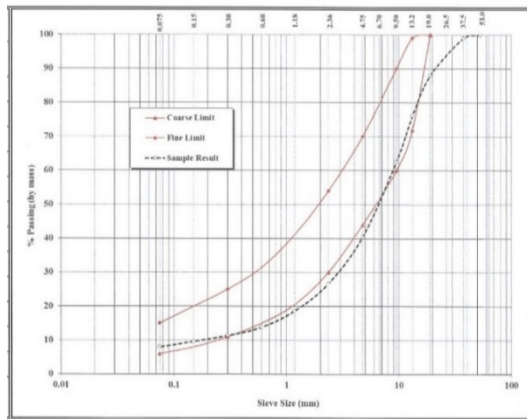
Maintenance Metal Trials and Unsealed Road Network Resilience

During 2012/13, a number of roads were significantly scoured out by heavy rain and these areas were rebuilt using local sourced materials, namely 'rotten rock', as a quick and economical fix to reopen the road. The material performed well having a high number of broken faces that provide a great mechanical interlock thus resisting any future scour.

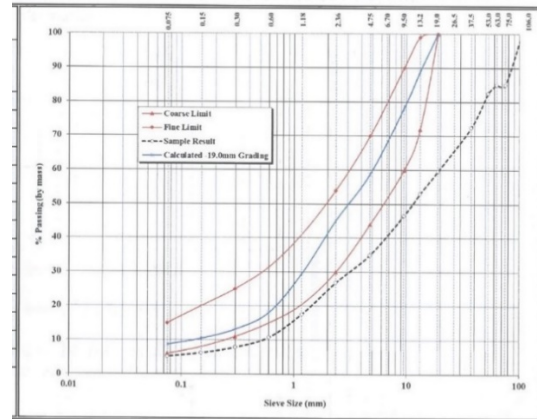
Observations showed this material had a lower dust generation and required less grading to maintain the required level of service. These observations encouraged staff to use more of this product across various locations to test the viability of the range of sources as a replacement for conventional AP 40 with a high silty clay content. Some material was won directly from the pit and laid on the road where the rock size was small but in other cases it was crushed and screened to a maximum size of 32mm.

The results of these trials continue to be closely monitored for required maintenance and gravel loss with encouraging results being recorded to date. Maintenance grading has been significantly reduced as have the recorded gravel loss results. The surface has good skid resistance in all conditions and reduced dust generation making it a safer alternative to conventional materials.

"Rotten Rock Material" - Grading Graph



Aorangi Downs Weathered Rock



Mackenzie Pass Weathered Rock

Staff used this material straight out of the pit on a 1km section of Blainslie Road and a similar length on Stoney River Road. We observed the improved strength of the subgrade and after the passage of traffic has setup, and the road settled a smooth mosaic with good skid resistance and a good ride quality is typically that outcome that results and remains present. It also has some dust suppressant properties lessening the impacts of the dust nuisance, in some cases being so effective to almost suppress the dust completely.

Following the success of these sites it was decided to apply 100mm of weathered rock from the Aorangi Downs pit on a 300m section of Hamilton Road following a complaint of serious dust nuisance.

This section of road was laid down and compacted in place and has required no grading for 9 months. After that time maintenance required was five passes with a grader that had Sandvik bits attached to redistribute the fines. It had no further grading for a further 14 months and today typically only receives one maintenance grade a year and some minor pothole filling. The traffic count on this section is 201vpd and during the dairy season has 4 tanker movements per day along with associated farm traffic. Not only is the regular maintenance significantly reduced there has been no dust complaints either. The dust particles are quite a lot larger and heavier than normal and do not travel as far. Subsequent to these works there have been a number of other small sites that have been carried out in the Opuha Ward typically between the end of seal and the beginning of the unsealed road e.g., School Road, Nixons Road, etc.

Gravel loss is severely reduced compared to the amount typically lost off the crown annually. This coupled with reduction in maintenance and reduction in dust nuisance has proven the success of these trials has encouraged further trials and applications of these treatments while continuing to look for and explore using other local sourced materials.

The Aorangi Downs pit is on private property and Council is continuing to try and obtain long term access to it to ensure its availability in the future if the farm is ever sold as it has been on the market on and off in recent times.

Braemar Road

The next trial site was a 1km section on Braemar Road. Braemar Road has a high number of HCVs (15 – 35% depending on the time of year) using the road, from Meridian Energy carting rock, logging operations from Mt Cook Station Road, Station servicing traffic (stock cartage, supplement supply, etc.) and the NZ Defence Force with their large personnel troop carriers using the road regularly.

The initial costs to construct this were higher than maintenance metal due to the long cart from Mackenzie Pass source even though there was no cost to acquire the material. Just had to load out from a face. A significant improvement in the strength of the sub grade has been obtained with no frost heave through winter and only 1mm material loss off the crown in 12 months.

Mt Nessing Road

Mt Nessing Road in the Albury area was the next road to be added to the trial. This was chosen as it is a key route to high country properties in the area that also passes close to the Mt Nessing Golf Course. In the past Council has had to apply a significant of maintenance metal to maintain an acceptable level of service but still received a number of complaints halfway through the grading cycle due to surface deterioration and dust generation.

Six kilometres of locally sourced material 'rotten rock' was constructed from the end of seal in a 100mm wearing course overlay from the Aorangi Pit, with no further processing. The cost completes this was \$14,600 per kilometre. If we had completed this with our normal clay enhanced wearing course, it would have been \$18,000 per kilometre.

Haldon Road

Haldon Road in the Mackenzie Basin is one of our "Big Four" that has an average traffic count of 110 and peaks between 300 and 350 vpd. This road has high number of holiday traffic heading to Haldon Camp during the summer period as well as the normal traffic associated with servicing a number of high-country stations. This is also a road where in the past Council has had to apply a significant of maintenance metal to maintain an acceptable level of service due to the high number of holiday traffic.

Four kilometres from RP 23050 - 27290 was constructed with 100mm overlay of locally sourced material from the Mackenzie Pass slip. This material had been further processed by screening out the material larger than 32mm. The cost to complete this was \$22,000 per kilometre. If we had completed this with our normal clay enhanced wearing coarse, it would have been \$17,700 per kilometre.

We have recently undertaken other blends and recycling treatment on this road. By both adding silt clay fine to recycle material that was fines deficient this worked ok but did not last significantly given high proportions of traffic and seasonal variances while also been relatively exposed to strong north west winds which blow away the fines. With the effects of climate change and the absence of winter and wet conditions this also has not helped in retaining these materials

We have subsequently completed a wearing course using rotten rock as the fines portion and adding clay as standard with the addition of 20% Clayton rotten rock to aid in binding the material. These appears to have been relatively successful to date but additional work is required to monitor this over time.

Lochaber Road

Lochaber Road is one of the largest unsealed roads in the Opuha Ward which services a number of stations and is a continuation of Clayton Road which services the Ashwick and Sherwood areas. Due to its sub alpine location, it is subject to a range of climatic conditions throughout the year requiring a higher level of resilience to maintain access. Lochaber Road and an average annual daily traffic count of 49 with 10% of this been heavies. A 100mm overlay was completed using a local source a new local source rotten rock material was available from an adjacent property we completed a large wearing course trial. The source appears to be slightly higher in fines compared to our other sources but goes very hard once laid and compacted. Monitoring continues on this site results to date have been promising and it has subsequently been used elsewhere in the district. We undertook substantial

drainage construction in the area as it did become slippery during the winter, but this was typical after a grade and as a result of farm movements. It is still too early to draw any conclusions given the material hasn't yet gone through a bad winter and we haven't yet had to retreat the surface, but findings to date have been very positive. The material did take in and hold water after extremely heavy rain as the material was graded to remove surface imperfections, but there was a lot of free moisture still present and was put down to works being completed at the wrong time. This has not reoccurred since the drainage has been completed and we hope this addresses any issues into the future.

Results to Date

The first rotten rock trials with the materials from the Aorangi Pit and the Mackenzie Pass Slip given the performance from the metal loss surveys and on road performance the trials are deemed to have been highly successful. The material isn't planned to be rolled out right across the network but will continue to be used where these sources are in close proximity to the site or there is a specific situation or where the properties of this material is deemed necessary to address a specific issue.

With the recent source trials, it is too early to draw a full conclusion even though larger trials have been completed, this is off the back of prior findings from the other successful source trials. With this locally sourced weathered rock 'rotten rock' material future sources suitability will be determined the same way as previous, by laying down small trial sites and assessing the performance of the source. These/future trials of weathered rock material require testing/ trial to ensure performance through the worst of the winter period and the other environment conditions experienced in our diverse network. The condition of these trial sites is closely monitored for material loss, performance and maintenance costs as part of the overall trial. If deemed suitable and comparative to other sources large trial sites with then be constructed and monitored once performance is reliable will become an approved source material going forward. Confidence in this 'rotten rock' will be furthered as more sources are explored and trialled.

The aim is to have a range of this source material across the district to be used as maintenance material in future, act as blending material as well as, serve as an alternative binding agent to the silty clay to modify the maintenance gravel properties. The primary aim is to introduce fines, re-introduce fines to fine deficient (gap graded) material from the shoulders of the road and blend the two products to reuse this material (that would otherwise be cut to waste, by product that will not rebind) and improve efficiency by limiting maintenance costs. We believe this material allows for innovation and is another tool in our toolbox when maintaining our unsealed roads aiding in our asset management of our unsealed network.

Maintenance Programme

Changes in land use (farm intensification), development and increased tourist traffic have significantly increased traffic volumes on some areas of the unsealed road network so that the current quantum of road maintenance work is barely adequate to maintain the roading network to current standards and performance measures. Although the clay maintenance metal and the rotten rock trial initiatives has helped with preserving the unsealed maintenance condition, an increase in unsealed maintenance expenditure is still required to maintain the road condition in a fit for purpose resilient condition.

Council has budgeted between \$400,000 and \$410,000 pa for general unsealed road maintenance, which largely includes grading, pothole repairs and patch metalling.

Renewal Programme

Improvements are also required on a number of our roads with the increases in traffic and tourism to improve alignments, road widths, visibility (sight distance) and maintain metal depth (wearing

course/pavement) given metal losses, increases in HCV weights and limited weak pavements especially during winter. The current budget for metaling renewals for 2020/21 is \$685,000. This increases to \$820,000 pa for the remaining years.

Metalling costs are forecast to increase year 1 and then remain relatively consistent with escalation for the next three years this is provided that gravel resource can be secured. The maintenance contract is about to go out for tender with the successful contractor to begin year 1 on the 1 November 2021 this is a bit of a risk, but sufficient budget should be allowed in our bid to cater for this if costs do come in higher, with imposed cost fluctuations from year 2. The main increases will be due to increased cartage and consenting costs if gravel resource cannot be secured or made available close by. If rivers are no longer able to assure a supply gravel we are going to need to consent and open land based pits. The next three years will depend on co-funding received, the weather conditions, maintenance cost due to the wear caused by the increased use of the road by heavy vehicles and agricultural vehicle, further exploration of the district by domestic visitors, the return of tourism, land use changes and farm intensification generating increased traffic volumes and metal loss.

Best Practice: A Best Practice approach would include a seal extension programme for Lilybank Road, Braemar Road, Hayman Road and Haldon Road which would ultimately reduce the cost of unsealed road metalling. However, budget constraints will limit Council's ability to proceed with this work. This is further explained under Section 9.4.4 'Seal Extensions' below

Actual: The Council will budget \$700,000 for the first three years of this LTP period and then increase its budget to \$822,000 p.a. for unsealed road metalling works across the district. However, a higher portion of this budget will need to be invested into the high risk roads (i.e., Lilybank, Braemar, Hayman and Haldon) as the seal extension programme for these roads has been pushed out beyond this LTP period.
There is a risk that the maintenance and renewal costs for these roads continue to increase (beyond what was originally budgeted), especially if no seal extensions are undertaken in this LTP period.

9.4.3 Unsealed Roads Improvements

On our unsealed roads renewals include area wide pavement treatment (generally stabilisation) and replacement of wearing course metal. The Councils emphasis over the last 5 to 10 year maybe longer has been to focus on wearing course material replacement and this is budgeted for on an annual basis. We are now finding as a result some of the roads are beginning to wear through to base material. We propose into the future to strike a balance between both wearing course and maintenance gravel. The maintenance material isn't providing much strength, but it allows the road to be maintained. This acts more as a holding treatment. Rehabilitation projects are included on an as needed basis and are identified from regular network inspections. It is not often that these are required. Typically, the only time that a rehabilitation is required is either due to frost heave or water ingress making the pavement all soft and spongy and sometimes impassable. Rehabilitation is also required when the base has broken though, or topsoil/ clay has come to the surface or if the road is dug out to make way for new construction.

The reason for this methodology is to maintain the network in perpetuity as we would struggle to fund the local share of a large-scale unsealed rehabilitation going forward unless these were small lengths or a holding repair. Council would typically prefer to put the money into seal extension instead. Therefore, it is best to maintain what we have putting on a 100mm wearing course as a light pavement top up/ running course on typically our secondary collector/ access roads and typically maintenance

metal on our low volume access roads. This methodology obviously depends on the network/ road inspections and some sections of these roads may require a different treatment dependant on their condition and activities on those roads going forward (e.g., change in land use).

Rehabilitation is generally based on complete failure of the subgrade i.e., Ski field traffic on Lilybank Road, which creates soft spots in the road surface after traversing areas which have experienced frost heave conditions. These sites, under normal traffic loadings (under 50vpd) would not cause an issue. Council has rebuilt a section of Lilybank Road up toward the ski field turnoff on a regular basis over previous winters, this has tied up a large portion of our current available budgets reducing the works that can be carried out on other lower need but bony/failing roads. Frost heave conditions haven't been a major issue over the last 3 years with relatively mild winters relatively low amount of snow fall, This still remains as a risk to be managed but with climate change effects warm winter may become more of the normal weather pattern. Seasonal variances and north west wind during winter have aided in snow melting and disappearing quickly, but we are getting random storm events either side meaning the typical southerly storm events don't seem to occur as often. The same issues arise on Braemar Road due to NZ Army winter exercises and transporting heavy goods off high country stations this is typically limited due to an HCV weight restriction being placed on these roads over this time. Damage also occurs on Haldon Road due to the camp traffic, heavy commercial vehicles, agricultural vehicles feeding out etc, and other regular high country station traffic.

Although Lilybank Road has been rebuilt with a minimum of 60mm wearing course from the end of seal, approximately 2.6km from SH8, to the ski field turnoff it requires a large amount of running/wearing course in any one year to hold the surface at an acceptable level of service for the 600vpd that frequent the Roundhill Ski Area. Monitoring sites have shown an average loss of material off the crown of 17mm. Over the 25km to the ski field turn off a minimum of 2100m³ is required annually to hold the road and avoid consuming the asset. We have tried to reduce this lose with the application of a number of rotten rock recycling treatments focused on adding to the fine proportion of material to the gap graded product off the shoulders of the road. Then blending this on the road with the grader. Laying this out at a uniform depth across the road then water rolling and compacting this material. This is part of the holding treatment used while seal extension funding is secured which to date have been relatively successful. These treatments have been achieving a quality running surface to date and utilising material that would otherwise need to be pick up and carted to waste or flanked of the road prior to laying new material. Under the current Council methodology, we get the best of both worlds. Dr Theuns Henning as part of our "Review of the management of their Unsealed Roads" observed the results of this practice and commented favourably around this treatment given the running surface of the road, compared to other sections that were not treated.

9.4.4 Seal Extensions

Since 2001 the Council has embarked on an ambitious road improvement programme. Over 40 kilometres of seal extension, spread throughout the District, has been achieved. Over the three-year funding block from 2018 - 21 this funding was reinstated from the previous 2015 – 2018 budget where it was removed. Going forward with this LTP this has been recommended and extended to incorporate rural seal extension as well as urban as there are some roads that are no longer satisfactory as gravel roads given development, existing in built up urban centres, maintenance spend continuing to increase and not being able to keep up or increases in traffic volumes.

There are however areas of the District where residents are required to travel over relatively long lengths of unsealed road before encountering a sealed road. Farming families are becoming more

mobile and are travelling these unsealed routes far more frequently than in the past. This is on the back of modern vehicles becoming cheaper, all-wheel drive/ 4x4 vehicles more available, technology/convenience making it more viable to travel and self-sufficiency slowly declining on some farms due to the intensification of their land and operations. The lower travelling speeds, greater ride discomfort and dust nuisance is becoming unacceptable and considerable pressure is being applied to the Council to seal these roads. It is currently beyond the Council's financial means to fully fund the sealing in large sections or of whole roads all at once. Waka Kotahi (NZTA) funding assistance criteria allows funding only for seal extensions where there are particularly high traffic volumes coupled with high unsealed road maintenance costs (neither of which are prevalent in the majority of Mackenzie District).

As such, there are limited opportunities for Council to undertake any seal extensions within this LTP period.

Subsidised Seal Extensions

Subsidised seal extensions included as part of the District Land Transport Programme are subject to Waka Kotahi (NZTA) benefit/cost procedures that must show benefit to the road user. Benefits include safety, travel time cost savings, reduced roughness, reduced vehicle operating costs and maintenance cost savings. Roads which may meet the benefit conditions usually have high heavy traffic volumes such as the major routes to production forests or roads which have high maintenance costs (e.g., due to steep grades).

Council will consider written applications for seal extending a maximum of 200 metres to suppress dust in front of dwellings (prior to 2002 or where there has been a significant change in land use). Applicants will be prioritised by the severity of the nuisance and preference will be given to cases where the use of the road has markedly changed. To gain approval for the work the following must be met:

- Council to fund 50% of the cost up to \$10,000 total cost then any costs over and above are to be covered by the applicant
- Council must have funds available (total \$10,000 per year)

MDC undertakes seal extensions when Waka Kotahi (NZTA) co-investment funding can be secured, and the local share of the funding is available. Waka Kotahi (NZTA) dust nuisance funding as per General Circular 16/04 will be considered/ applied for where the project meets the criteria of medium to high dust risk category as laid out in this circular.

Best Practice: Council initially budgeted \$160,000 p.a. to deal with dust and maintenance issues in the Eversley Reserve, Kimbell and Tekapo Beauchamp Road. Typically, this type of activity is only undertaken if Waka Kotahi (NZTA) financial assistance is available. However, it was considered 'Best Practice' to fund this activity (despite the lack of financial assistance) to respond to increasing community pressure and to reduce the increasing costs of maintenance and renewal on these unsealed roads. This is considered to be more sustainable, especially considering the uncertainty around acquiring the necessary materials (i.e. gravel).

Actual: However, due to budgetary constraints, Council have requested financial assistance from Waka Kotahi (NZTA) to assist in the urban seal extensions along Eversley Reserve, Kimbell and Tekapo Beauchamp Road. This activity has now been absorbed into the Low Cost Low Risk activities and has also reduced to between \$30,000 and \$60,000 pa and will not commence until Year 4. This means

Council no longer have to fund 100% of urban seal extensions. But the updated programme has reduced the length of seal extension which can be undertaken within this LTP period. This increases the risk of a bow wave later on and also may cause further deterioration and customer dissatisfaction.

Non-Subsidised Seal Extensions

Seal extensions which do not qualify for Waka Kotahi (NZTA) financial assistance require 100% Council funding. Sealing can provide tangible (for which a monetary value can be assessed) and intangible (cannot usually be easily quantified in monetary terms e.g., improvements to air and water quality, reduction in carbon dioxide emissions, etc.) benefits. Tangible benefits generally fit into five main categories:

- Productivity gains for properties alongside the road to be sealed
- Improvements to ride for driver and passengers
- The safety and health benefit for all parties
- Vehicle operating cost savings
- Travel time savings

Council has adopted a ranking system to determine the relative priority for seal extension options. The advantages of a ranking system are:

- It can take into account many factors with a weighting solely applicable to the Mackenzie District
- Provides relativity to assist in deciding the seal extension priorities

Non-subsidised seal extensions typically include rural seal extensions as these are areas of lower traffic volumes. However, the Mackenzie District has several unsealed roads which experience high volumes of traffic during peak tourism periods (Lilybank, Braemar, Hayman and Haldon Road).

Best Practice: A Best Practice approach would include an allowance for scoping and planning for year 1 (at \$12,000) and then from Year 2 onward a budget of \$300,000 pa would begin in year 2 of this LTP and span two to three LTP periods (20- 30 years) to limit the unsealed maintenance cost going in favour of funding a treatment for the best whole of life cost. This work could be completed in stages, with the ultimate goal being the complete renewal (i.e. seal) of all high risk roads (Lilybank Road, Braemar Road, Hayman Road and Haldon Road).

It should be noted that Council can override this decision and utilise funding elsewhere if the need arises.

Actual: At this stage, Council is unable to undertake any seal extension projects due to budgetary constraints. A \$12,000 expenditure remains in Year 1, to prepare a business case/scoping study for future possible works. However, the need for these seal extensions still exists and is critical for mitigating the increasing maintenance and renewal costs.

Manuka Terrace Financial Contributions

The reserve fund generated by financial contributions towards the sealing of Manuka Terrace from the various subdivisions since 2004 has been extinguished by the sealing of the first 2.4km of the road from the south end. Council no longer collects financial contributions from those developers subdividing in Manuka Terrace therefore it is likely to remain like this into the future.

9.5 BRIDGES

9.5.1 Bridges Background Data

Bridges Scope and Nature of Asset

The purpose of road bridges is to provide convenient continuous all-weather access over rivers, streams and similar obstacles. Other structures included in this lifecycle management plan are culverts with a waterway area greater than or equal to 3.4m², cattle stops and fords.

The key issues relating to the management of road bridges are:

- Maintaining the structural integrity of bridges
- Ensuring the bridge foundations are protected against scour, degradation and aggradations
- Funding to replace bridges
- Replacement of/or disposal of uneconomic bridges e.g., Bridges serving one land owner i.e. Cass River, etc.

There are 95 bridges (includes 7 large culverts) in the District with a combined length of 1,842m. They range from small, simple old timber structures to multi-bay modern steel and concrete structures. The District's bridges are maintained in good order and are generally fit for purpose.

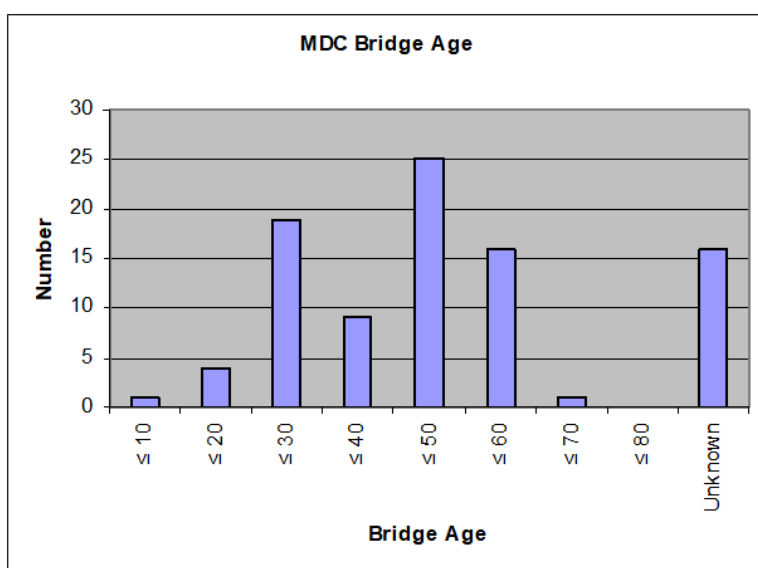


Figure 30: Ages of MDC Bridges

Figure 30 shows the distribution of all bridge ages. Given the large percentage of unknown age, work has been undertaken to provide an estimate of the remaining lives of these structures by Council's structural engineering consultant.

Eleven timber bridges have no construction date recorded but the age of timber bridges is not as important as their condition. The Council is unlikely to be able to establish actual construction dates, but these bridges do get checked annually and our consultant's report gives updated estimates of remaining useful life, so this is covered by procedure. Seven bridges have adjacent fords; 20 provide access to single properties. It needs to be noted that NZTA have restricted bridge replacement funding to those that have reached the end of their useful life.

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Table 23: Bridges that provide access to one ratepayer

Name	Bridge Number	Road Number	Displacement	Span
Harris Stream Bridge	88	124	38070	18.5
Black Birch Stream Bridge	87	124	34630	6
Darcy's Bridge	86	124	30240	8.2
Jollie River Bridge	84	154	45520	78
Cass River Bridge	78	126	16560	124
Rhoboro Rd				
Grampians Bridge	70	128	1375	5.6
Aires Station Bridge	77	0	200	29.4
Cloudy Peaks Bridge	62	0	40	36
Tiffens bridge	64	186	3540	18.2
Single Hill bridge	58	181	200	12
Goodmans Bridge	26	159	5200	17
Trotters Road Bridge	29	195	430	6
Otama Road Bridge	1	166	296	6
Deepdale Bridge	11	115	6380	24
Watts Bridge	17	199	131	16
Hewson River Bridge	50	143	20870	42
Otama Road Bridge	1	166	296	6
Deepdale Bridge	11	115	6380	24

Bridges Current Condition

Condition inspections are undertaken by both the maintenance contractor and the bridge maintenance professional services contractor. The RAMM database is used to store inventory information, results of inspections undertaken, condition and any other relevant data.

The main reason for the deterioration of concrete structures is carbonation (loss of ability of concrete to prevent corrosion of reinforcement) but in the arid atmosphere prevailing in the Mackenzie District, carbonation is not a problem. Timber is a less durable material suffering from decay and insect attack (which can be controlled by chemical treatment), natural defects such as cracking and splitting and, in the case of timber decks, surface abrasion from traffic.

Bridges Current Capacity and Performance

Load Capacity – Design loadings have increased as vehicle sizes and carrying capacity have been increased. Appendix III provides details of the 18 bridges that do not meet current standard Class 1 loads and are weight and/or speed restricted. Three of these bridges have been replaced.

Traffic Capacity – All bridges except one are single lane bridges, however given the low traffic volumes on the roads they serve this is considered appropriate for capacity purposes.

Natural Hazards – Bridges are at risk from natural hazard events such as floods, earthquakes and slips. It is only in recent times that earthquake standards have been incorporated into bridge design. Most bridges were designed to have sufficient waterway area capacity to handle design flood flows. Erosion and scour of piers are a concern for some bridges.

Council has a number of bridges that are at risk from natural flood disasters and earthquakes. Some of these are being replaced and others have had work completed to improve their resilience. Staff recommend that it is worth undertaking a study of structures focused around lifelines to assess critical structures and look at ensuring these against natural events.

9.5.2 Bridges Operations and Maintenance Plan (WC 114)

The routine maintenance contract is tendered every five to ten years in line with Councils procurement strategy for land transport which is endorsed by Council and Waka Kotahi (NZTA) and includes the routine inspection, maintenance and repair of bridges. Works are carried out in accordance with Waka Kotahi (NZTA) specifications and manuals.

Maintenance works are undertaken to:

- Ensure safety to the public
- Protect the investment in assets by extending the life of the structure
- Minimise repair costs

The type of maintenance work activity undertaken includes:

- Planned maintenance inspections
- Repairing structural defects (e.g. concrete spalling, corroded fastenings, rotten timber, undermining of foundations)
- Repairing/replacing damaged components (e.g. handrails, guardrails, bridge joints, etc.)
- Restoring protective coatings (e.g. painting)
- Maintaining drainage
- Waterway area clearing (debris removal from piers and waterway)
- Seismic retrofitting to increase the earthquake resistance of strategic bridges

Maintenance Strategy

Maintenance programmes are arranged from inspection reports. Steel superstructures are generally painted at regular intervals as required.

Council's inspection and programming regime:

- On-going superficial inspections co-ordinated with other routine maintenance work
- General inspections and a full structural inspection of all timber bridges and a third of the remaining bridges undertaken each year on a three-year cycle by a Bridge Engineer, taking into account such factors as structural integrity, defects, safety and appearance
- Special inspections after specific events such as earthquakes, severe floods or instances of overloading

- All timber structures or structures that are weight restricted are inspected annually.

Maintenance programmes are developed from the schedules of defects identified during the inspections. Repair treatments and priorities are determined by considering the effects on:

- Public safety (top priority)
- Traffic movement
- Future costs if the work is not done

Each item of the bridge maintenance programme is the most cost-effective response to the defect identified, except where a bridge is programmed for replacement but urgent works are necessary, shorter term but lower cost remedy is selected.

Standard Waka Kotahi (NZTA) economic evaluation criteria are used to evaluate treatment options.

Maintenance Standards

The technical LoS required are detailed in the maintenance standards that implement these technical LoS is set out in Council specifications contained in the road maintenance contracts.

Maintenance Programme

The bridge consultant has prepared a bridge replacement plan that provides the Council with increased certainty on the cost of maintenance and renewals over the next ten years. From this it has been forecasted that an annual budget between \$105,000 and \$115,000 pa will be required for on-going routine and structural maintenance for this LTP period.

Appendix II details the current expected annual expenditure on Bridge Maintenance for the next 10 years.

9.5.3 Bridge Renewal/Replacement Plan (WC 341)

Asset renewal is undertaken when a structure, or significant components of a structure, has reached the end of its economic life. Renewal provides for the following work:

- Replacing a structurally inadequate bridge
- Replacing a bridge for non-structural reasons such as inadequate width or waterway area
- Structurally modifying an existing bridge to increase its standard capacity to a level higher than originally provided

Renewal Strategy

The Council has a robust Bridge Replacement Strategy (2010-2050) which details bridges due for replacement or complete removal. This should be read in conjunction with this section.

The Council's general policies on river crossings (bridges) are:

- River crossing projects are economically evaluated in accordance with Waka Kotahi (NZTA) project evaluation methods for possible inclusion within the subsidised District Land Transport Programme.
- River crossing projects which cannot be economically justified in terms of Waka Kotahi (NZTA) project evaluation methods are recommended on a case-by-case basis to Council.

The Waka Kotahi (NZTA) Bridge Manual is adopted for the design of new structures and for the evaluation of existing structures.

Renewal needs are identified from the planned inspection programme and are largely condition/over-weight restriction (performance) based. Prioritisation of works and the selection of renewal options are made on the basis of an economic evaluation using Waka Kotahi (NZTA) criteria. Cost/benefit calculations include an assessment of risks associated with earthquakes and floods. The lowest cost option, considering all life cycle costs over a 25-year period, is selected except where funding limitations necessitate shorter term (lower cost) options for works that cannot be deferred.

Renewal Standards

The applied standard is the Waka Kotahi (NZTA) Bridge Manual.

Renewal Programme

Council's Bridge Replacement Strategy lists the bridges in [Table 24](#), which are to be replaced over the next 20+ years.

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Best Practice: The table below identifies seven bridges will reach their end of remaining useful life in this period, however, only three have been identified for replacement with another bridge, two potentially to be handed over to the adjacent landowner, and another three replaced with a box culvert or concrete ford. This would come to a total replacement cost of \$3.25 million.

Actual: Council has decided to take a prudent approach with regards to its bridge replacement strategy. Of the bridges listed in the table 24 most only serve a single owner or have alternative access by an adjacent ford. These low access, low volume bridges are therefore not an immediate priority for Council and will not be replaced.

Council has also commenced a process to determine which bridges can potentially be divested back to the owner or alternatively which bridges can be replaced with a ford, or culvert. At this stage Goodman's Bridge fits into this category. Otama Road and Mowbray Road could also be replaced with a box culvert, which current funding can facilitate, if necessary. Furthermore, Council will continue to undertake regular inspections to ensure the bridges are safe to use and still fit for purpose.

Council will still have budget within this LTP period for both maintenance and renewals activities for bridges. The council will seek to maintain the safe and appropriate level of service by maintaining and replacing structural components when necessary (e.g. running boards, wheel guards, side rails, etc.). It also allows for the clearance of gravel and debris build-up under the bridge to reinstate the design flow carrying capacity. Approximately \$200K per year is budgeted for renewal and maintenance activities for bridges (and structure components of bridges) over the next 10 years.

Table 24: 20+ Year Bridge Renewal timeframes

Bridge No	Bridge Name	Replacement Timeframe	RUL (Years)	Costing Parameters			Replacement		Notes
				Length	Width	Rate/m ²	Cost	Year	
1	Otama Road	3 - 10	8	6	2.7	5,403.00	\$77,400	2023	Replace (possibly with a box culvert)
13	Coal Pit Rd No 2	10 - 15	10	12	4	\$3,910.00	\$208,000	2025	Replace (new bridge)
26	Goodmans Bridge (Nixons Road)	3 - 10	5	17	2.1	\$3,910.00	\$169,500	2020	Don't Replace (replace with floodable ford)
41	Clayton Settlement	20+	35	66	2.8	\$3,910.00	\$838,700	2050	Replace (new bridge)
58	Single Hill	3 - 10	5	12	2.6	\$3,910.00	\$143,100	2020	Replace (new bridge) or divest*
78	Cass River	10 - 15	15	124	2.8	\$3,910.00	\$1,600,000	2030	Replace (new bridge) or divest
87	Black Birch Stream	10 - 15	15	6	3.2	\$4,030.00	\$89,500	2030	Replace (new bridge)
89	Mowbray Road	20+	25	8	3.2	\$4,030.00	\$119,300	2040	Replace (box culvert)

*Note: Single Hill Bridge is not on Council road reserve but is on private land. Any discussions about its future will be held directly with the landowner.

9.5.4 Bridges Asset Development Plan

Council has no plans for bridge asset development.

9.6 DRAINAGE CONTROL FACILITIES

9.6.1 Drainage Control Background Data

Drainage Control Scope and Nature of Asset

Drainage control assets consist of kerb and channel, surface water channels, catch pits and their connection to the nearest reticulation, soak pits, side drains, and culverts of less than 3.4 m² cross sectional area. The purpose of these assets is to provide a storm water carrying capacity for runoff from the carriageway, footpaths, berms and adjacent properties to:

- Allow the convenient and safe movement of pedestrians and traffic
- Protect paved areas from water ingress and resulting structural deterioration

The use of concrete kerb and channels, as opposed to open drains, is a recognised and accepted sign of urban development. Urban design is now moving to swale drains with associated vegetation and plantings to assist in the removal of hydrocarbons and heavy metal deposits prior to storm water discharge to waterways or water table or otherwise treatment via other means from the typical concrete type of kerb and channels or swales. With the flat profile of the majority of the district's urban areas, ponding and stagnant water can easily eventuate if well-formed channels are not used.

The key issues relating to drainage control are:

- Poor inlet detail to catch pits and culverts minimising hydraulic capacity
- Blockages
- Ensuring regular cleaning programmes take place

Drainage Control Current Condition

Council does not formally rate the condition of surface water channels, culverts, catch pits or drains. There is an on-going inspection and maintenance regime under the routine maintenance contract and this data is recorded in RAMM Finance (Previously Contractor).

Drainage Control Current Performance and Capacity

Performance issues for drainage control assets relate to:

- Coverage (i.e., are there open water channels or areas where water accumulates that should be serviced by pipe drains or formed channels?)
- Pavement damage due to drainage problems
- Improving drainage where storm events cause recurring scour problems
- Entrance capacity of culverts
- A large quantity of wash over culverts/fords
- River fords may require closing four to five times per year
- Conformity with standards (kerb and channel in all urban streets)

Overall, the performance of drainage assets is generally adequate as there has been replacement and up sizing of culverts in recent years to adapt and manage the effects of climate change. Council is aware of these less frequent and more intense events that are occurring and have therefore increased drainage maintenance spend to improve drainage assets to cater for these changes. With unsealed road widening overtime with traffic volumes a number of drainage channels have been filled in as a result of traffic throw, snow clearing, etc. and therefore require cleaning or reconstruction. The major concern is coverage & capacity, with a number of urban streets without any kerb and channel. Twizel and Takapō/ Tekapo were built to have relatively short lives during the construction of the adjacent hydro works. As such most streets were constructed with a sealed swale drain instead of kerb and channel. These are often quite flat and pond water that freezes in the winter. This is at times made worse with construction works that require to be dug through this sealed swale and that then requires reinstatement which often seem to be an issue getting levels to tie in correctly without ponding or damming up water e.g., UFB2 works in Twizel.

Without very extensive drainage works it is not possible to correct this problem easily. This option would be very expensive but may be required into the future if development becomes more intense in these areas with limited reticulated stormwater and no kerb and channel. In some areas it is more likely than others that kerb and channel will be required in future in Twizel. If not primarily for stormwater, then for safety and delineation of the footpath. The issue is worsening in these towns with the development we are experiencing with a greater number of impermeable surfaces being installed i.e., concrete/ asphaltic concrete driveway. Large new homes or large alteration/ garages with the majority wanting to extend hardstand coverage. Most existing drainage assets are performing well and have been adequately designed. The lack of an extensive stormwater network in Twizel means that water flows in sealed swales on the edge of the roadway using bubble up sumps to convey road run-off to the nearest reticulation. This has two problems associated with it:

- Water ponding in the swale causing icing and pavement deterioration
- Poor definition of the separation between the carriageway and the pedestrian areas.

Neither of these two problems can be economically resolved as the cost is prohibitive to construct kerb and channel in every street in Twizel and Takapō/ Tekapo that does not have it as well as all the additional associated pipework.

9.6.2 Drainage Control Operations and Maintenance Plan (WC 113)

Drainage maintenance work is included under the main road maintenance contract and covers:

- Minimum maintenance standards
- Frequency of routine inspections
- Response times to correct defects

Drainage continues to be an area of focus for road maintenance activities. A wet pavement is at least three times weaker than a dry pavement of the same material. Therefore, quickly diverting rainwater away from the pavement so that it does not have an opportunity to penetrate and weaken the pavement structure is of paramount importance in reducing costs of repairing base course and subbase failures. On hilly sections water travelling down the Surface Water Channel (SWC) must be diverted off the road pavements and shoulders before it accumulates enough velocity to scour out the side of the road.

Apart from roadway surface considerations, maintaining good drainage is achieved by keeping the SWC, cut-outs and side drains clean, keeping culverts clear and in good condition, providing headwalls at the culvert inlets and outlets, and soak pits where side drains or ditches cannot provide an outlet for the flow.

Drainage maintenance is achieved by undertaking the following activities annually:

- Chemical weed control in the surface water channels and side drains of both unsealed and sealed roads in the entire network to remove large vegetation obstructions forming
- Surface Water Table Rehabilitation
- Side Drain (Ditch) cleaning
- Culvert inspections - All culverts in the network are inspected on a regular basis. Following significant rain events, culverts are cleared of any flood debris.
- Culvert replacement when they are failed or under sized.
- Culvert extension projects where unsealed roads are widening due to traffic volumes increasing in turn cover inlets and outlets
- Headwall's maintenance and construction to maximise culvert efficiency, preventing scour around the ends of the culvert and preventing water entering the roadway subbase by migrating along the outside wall
- Soak pit cleaning/ reinstatement

Maintenance Strategy

Condition inspections: The maintenance contractors are required to report any defects observed during day-to-day road maintenance activity.

Unplanned condition assessments of critical drainage assets are required after each heavy downpour to assess the number of culverts, drains and sumps affected by blockages. This is completed by the contractor and the Roding Team immediately after the event. The Contractors are required to maintain an effective communication system and level of preparedness to ensure these, and other emergency works are undertaken within the specified response timeframes.

Planned maintenance: Damaged and malfunctioning drainage assets identified by Council inspections or contractor reports are programmed for repair according to the following priority:

- Public safety
- Network resilience
- Accelerated deterioration of pavement likely to occur
- Inconvenience occurring to road users, pedestrians and/ or property owners
- Untidy appearance

Maintenance Standards

The technical LoS required are detailed in the maintenance standards that implement these technical LoS is set out in Council specifications contained in the road maintenance contracts.

All critical drainage assets e.g., bridges, culverts, side and back drains etc., are required to be inspected and cleaned following major storm events.

Maintenance Programme

The majority of the drainage maintenance is reactive, so budgets are based on historical expenditure. However, in an effort to reduce future pavement maintenance costs for repairing soft spots and other

types of premature pavement failure in both sealed and unsealed roads, the Council has adopted a strategy to improve substandard drainage along specific roads. In 2021 – 24 funding block the total maintenance cost budgeted is \$135,000 p.a., as drainage is the number one cause of failure in road pavement and there has been some large-scale maintenance been completed in previous years but there is room for improvement across the district in the drainage space. This additional drainage work and calculating the capacity and upsizing culvert into the future will significantly aid in combating the effects of climate change. We propose an increase from previous years for this LTP due to more regular large scale high intensity storm events occurring and greater loadings on older infrastructure. It is expected that this maintenance cost requirement will carry on into the future.

The financial forecasts are presented in Appendix II.

9.6.3 Drainage Control Renewal/Replacement Plan (WC 213)

The renewal programme is prioritised on the basis of overall condition, hierarchy and extent of adjacent carriageway failure. Full renewal of kerb and dish channel is economical when more than 30% of the length of the channel is broken.

Drainage Renewals

WC 213 provides for drainage work which is not routine in nature but clearly demonstrated to reduce future maintenance costs to the roading agency.

Examples of qualifying work include:

- Renewal or installation of culverts with a diameter greater than 600mm but having a waterway less than or equal to 3.4m² (approx. 2.1m dia.).
- Repair and replacement of kerb and channel, provided that the deterioration is likely to adversely affect the performance of the pavement
- Installation of water channels, sub-soil drainage, or kerb and channel, where this is shown to be necessary to protect adjacent property from run-off from the road surface and the most cost-effective form of drainage control for the purpose of protecting the pavement

Preventive Maintenance

Preventative maintenance includes non-routine work required to protect the serviceability of the network and minimise the threat of road closure.

Rule: These works must be economically justified. They must be the long-term, least cost option for the road controlling authority, calculated in terms of present value (PV).

Standards

The Council preference is for a minimum diameter of 300mm concrete culverts under roads. Steel or aluminium culverts are not used where there is a likelihood of corrosion. Preference is now to use Polyethylene (providing there is sufficient cover) now for these smaller sizes going forward given there is no risk of corrosion and given their long lengths and how light the product is it speeds up and enables easier installation

Renewal Programme

The Council has budgeted between \$90,000 and \$110,000 p.a. for all drainage renewal works over the 10 year LTP period

The financial forecasts are presented in Appendix II.

9.6.4 Drainage Control Asset Development Plan

Most new assets are created as part of subdivisions and subsequently taken over by the Council.

The construction of new kerb and channel is driven by property development and, to a lesser extent, in response to customer/resident requests. The criteria used for justifying new construction includes evidence of ponding/flooding, incompatibility with urban standards, higher maintenance cost of existing storm water control and reduction/minimisation of life cycle costs for all affected assets and the network.

Prioritisation is evaluated on the basis of road hierarchy, location, safety issues, storm water control needs, the number of residential properties to be served and beneficial effects to adjacent assets.

Development Standards

Council has adopted the Land Subdivision Standard NZS4404: 2004

Development Programme

The cost of drainage development works is included in the Councils Drainage or Structural Renewal Programme. Depending on the size and waterway area of the asset.

Stormwater Management Plan

The way we manage stormwater has and continues to change. Traditionally, the stormwater system was built to collect and convey. The mind set was to get it out quickly and this approach is now changing to be more integrated and with a focus of slow it down, spread it out, and soak it in.

This new approach to stormwater management includes quantity and quality considerations, treatment, multiple use facilities, riparian corridors, recreation, wetland preservation and groundwater recharge.

This new approach has introduced a whole new array of issues that has resulted in basic changes in stormwater planning, design, operation and maintenance, construction, and financing. Now we have to find the resources to effectively satisfy the changes as well as the regulatory requirements.

Budget has been put into environmental renewal with infrastructure work occurring close to Lake Takapō/ Tekapo to install rain garden to treat stormwater for hydrocarbon and heavy metals given its significance, cultural importance, and value. Or alternatively the stormwater should be treated, and the water retained for reuse in other areas of Councils operations. As the move into the new stormwater approach occurs, it is also important to remember that the focus also needs to be on minimising costs and maximising the results achieved through the investments made.

Analysis of alternatives should include life cycle cost estimates and consideration for the four well beings (social, economic, cultural, and environmental considerations).

Canterbury Land and Water Regional Plan

The Canterbury Land and Water Regional Plan (LWRP) became operative in January 2014 and will be a key driver for the stormwater activity, as its provisions impose increased environmental requirements for stormwater discharges.

Rule 5.93 sets out the regime for lodgement of catchment/network applications. The applications have been submitted and being processed.

Compliance with the LWRP will be a major focus for the stormwater activity. Investigations into the specific application of the LWRP to each stormwater system within the Mackenzie District and potential issues, options and recommended solutions (including development of Stormwater Management Plans) is required. This is included as an Improvement item. The Stormwater Management Plans has begun for Council and is being led through the three waters space. I am unsure of the stormwater management plan status or whether this is complete at this stage. If not, it is important that this is finalised early in this LTP period to ensure a plan is in place to manage stormwater from transportation and elsewhere in our towns into the future. It is important that it is progressed year, but it will determine what treatment upgrades, if any, are required and the associated timeframes in conjunction with the Utilities team.

9.7 TRAFFIC SERVICES

9.7.1 Traffic Services Background Data

Traffic Services Scope and Nature of Asset

Traffic services are devices used for the orderly management and control of vehicles and people on public roads. They consist of road signage, road markings, edge marker posts (EMPs), culvert markers, traffic islands, roundabouts and railings. Their function is to:

- Regulate
- Warn
- Guide
- Inform

The key issues relating to traffic services are:

- Ensuring signs and markings comply with Waka Kotahi (NZTA) guidelines and amendments to them.
- Repairing sign damage due to vandalism and/or traffic accidents

Traffic Services Current Condition, Performance and Capacity

The condition of signs and road markings is assessed in routine inspections undertaken by the maintenance contractors with the results reported to the Engineer. These inspections include day and night-time inspections for both legibility, reflectivity, vandalism and graffiti.

There is no formal condition rating system used for traffic services. Condition is assessed visually against the relevant Waka Kotahi (NZTA) standards.

The extent of deterioration of road markings depends on age, traffic volume, the materials used and the condition of the road (oil and grit reduce adhesion). Road markings are remarked each year depending on the condition this may not be a full remark which is completed under the current road maintenance contract. However, some centre line markings on rural roads have not been remarked. This reduces the remarking costs but also has had the effect, where traffic flow is light and good sight distances available, of reducing edge break as the vehicles are travelling more towards or in the centre of the road.

Most signs are replaced as a result of damage resulting from vandalism and vehicle accidents before they reach the end of their “natural” life. A number of signs in the rural area of our district are vandalised by being shot at with a firearm, the management strategy to deal with this is to leave the

sign and monitor their condition. Once the legibility has been significantly compromised to the message being difficult to read or understand then the sign is replaced at this time by the maintenance contractor. Loss of reflectivity through weathering is however the factor that determines the life of many signs in the district due to the harsh sun exposure. Some appear worse than others for instance the bright yellow fluorescent permanent warning signs.

Performance issues for signs and road marking relate to legibility, ease of comprehension, absence of too many signs, accuracy of placement, visibility and conformity with standards.

Overall, the condition of traffic services assets is considered to be good. But with traffic increases and as the district moves away from its historic rural nature it is important that improve delineation and signage quality and quantity is implemented as well as traffic calming measures. The level provided is dependent on the ONRC classification which is transitioning to the ONF.

9.7.2 Traffic Services Operations and Maintenance Plan (WC122)

All traffic services maintenance is competitively tendered through inclusion in the maintenance contract. Waka Kotahi (NZTA) specifications and standards have been adopted for maintenance work.

Maintenance Strategy

Planned inspections: The maintenance contractor is required to routinely inspect all assets and repair any defects. The contractors are required to respond to directed faults and have the necessary repairs completed within agreed timeframes:

Unplanned Maintenance: The Contractor is required to maintain an effective communication system, level of preparedness and stocks to ensure emergency works are undertaken within the specified response timeframes.

Planned Maintenance: Obsolete, damaged, sub-standard and non-conforming assets identified during routine inspections are programmed for replacement according to the following priority:

- Public safety
- Traffic volumes
- Convenience of road users

Maintenance Standards

The technical LoS required are detailed in the maintenance standards that implement these technical LoS is set out in Council specifications contained in the road maintenance contracts.

Traffic Signs

- RSMA "Standard for the Manufacture and Maintenance of Traffic Signs, Posts and Fittings".
- Waka Kotahi (NZTA) "Manual of Traffic Signs and Markings" Traffic Control Devices Manual Part 1.
- Waka Kotahi (NZTA) Specification M/14: Marker Posts
- NZS 5414: 1977 "Specification for Construction of Traffic Signs"
- Waka Kotahi (NZTA) Specification P/12: Paint Application - Signs.

Road Markings

- Waka Kotahi (NZTA) "Manual of Traffic Signs and Markings" Part 2.

- Waka Kotahi (NZTA) Specification P/22: Road Markings

Maintenance Programme

The maintenance and budget have been increased to improve the signage and delineation on our network over the life of the LTP period the primarily based on historical levels of expenditure. However, in 2021/24 funding block the total maintenance cost budgeted is \$175,000p.a., which is not significantly different from previous years funding levels. This remains due to the growth in tourism and more traffic using our roads whether that be for recreation, business, etc. demanding a higher level of service for traffic services which would not have previously been required on our predominantly rural network. The slight increase in the budget allows for inflation. It is expected that this maintenance cost requirement will carry on into the future given growth in our district with tourism and costs to install/ upgrade traffic service to be consistent with our neighbouring networks as part of the ONRC. Streetlighting maintenance costs and energy costs are likely to drop significantly with the district rollout to LED fittings from low pressure sodium fittings from the 2018/21 funding block. These cost savings are likely to be realised over the life of this plan The financial forecasts are presented in Appendix II.

9.7.3 Traffic Services Renewal/Replacement Plan (WC 222)

There is no separate Renewals Plan for Traffic Services. All renewals are funded under 'Traffic Services Maintenance'. Currently there is between \$88,000 and \$90,000p.a. for new signs and streetlights.

Traffic Services Asset Development Plan

There is ongoing development work currently being undertaken as part of the transportation strategy for our towns which includes wayfinding, changes of markings, increasing levels of service in regard to crossing points etc. All renewals and improvements are funded under 'Traffic Services Maintenance' unless directly related to a large package of works incorporating other items as a Low Cost Low Risk project.

9.8 FOOTPATHS

9.8.1 Footpaths Background Data

Footpaths Scope and Nature of Asset

The purpose of footpaths is to provide a safe and efficient network of access ways catering for the movement of pedestrians. The need to provide formed and defined footpaths is based on a combination of the traffic volume, road/seal width and pedestrian demand. Footpaths also fulfil a social function providing areas with a sense of community. The need for footpaths is increasing with tourism and development as overseas and domestic tourists wanting to explore our district on their overnight stay and with people moving or building in the area from other districts expecting and requiring a higher LoS. This has not previously been that popular in our rural towns with driving the selected form of travel. It is the same with cycling and exercise craze encouraging more people to get out there and do it which requires the infrastructure to cater for everyone, this typically now needs to have a sealed surface in the urban environment and preferably have a high amenity value in the form of Asphaltic Concrete (AC).

The key issues relating to footpath management are:

- Condition of existing asset

- Adequacy of pedestrian facilities near schools, shopping centres, residential and recreational areas
- Adequate provision of safety footpaths
- Accuracy of the footpath age profile
- Amenity (fit for purpose surfacing)
- Shared pathways

Footpath asset data is now held in the RAMM database for Council which contains all current asset data including location, type, quantity, age, and condition rating.

Sealed footpath construction dates have been recorded since 1985 but gravel footpath construction dates have not been recorded. However, an age profile for the majority of footpaths can be determined from the resurfacing records held in the spread sheet database. An analysis of this surface record shows only one section on Aorangi Crescent (Takapō/ Tekapo) that has exceeded its expected life and should be inspected with a view to surface renewal.

Footpaths Current Condition

Figure 31 shows the Remaining Useful Life (RUL) of the footpath asset as currently recorded based on a useful life of 25 years for AC and Chip Seal surfaces and 50 years for concrete or cobblestone (grass and gravel surfaces have not been considered).

Over the next 10 years 40% of the current assets will reach the end of their “useful lives”. This is probably due to similar age of ‘Twizel’ town taken over in 1985 and large area of Takapō/ Tekapo developed in the 1970’s.

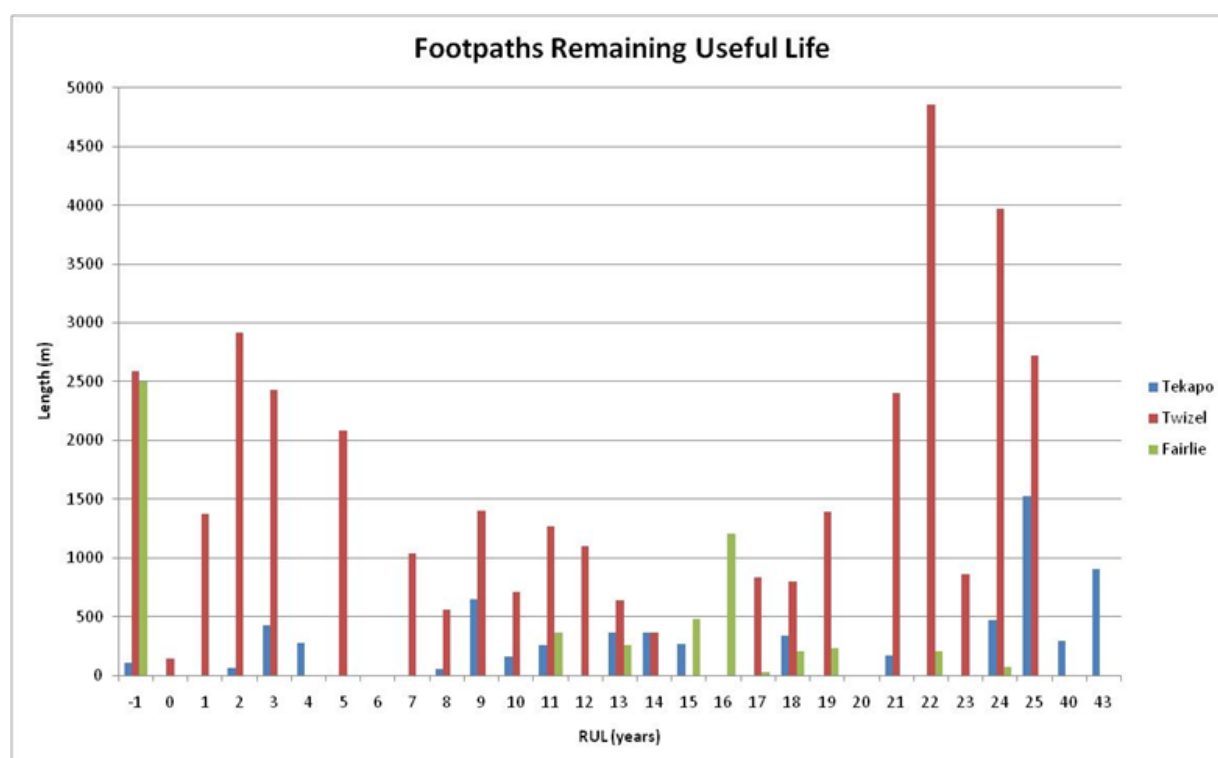


Figure 31: Footpath Remaining Useful Life (based on length)

Condition rating is carried out, every 5 years (Last survey 2016/2017 next survey Due 2021/22), for all footpaths with a condition scale of 1 to 5, 1 being excellent and 5 being very poor.

1. Excellent - is new or with no visible fault.
2. Good - acceptable surfacing with minor limited faults.
3. Average - Ok surface some increasing numbers of faults.
4. Poor - numerous faults or requiring, surfacing becoming unamenable.
5. Very poor - Unamenable surface, large areas of faults, significant faults, possible tripping hazards, a number of repairs.

Figure 32 shows the latest condition of pavements in each of the three urban areas in the District. There is a significant portion of the asset that does not have a current condition rating; however, the majority of these lengths are grass or gravel.

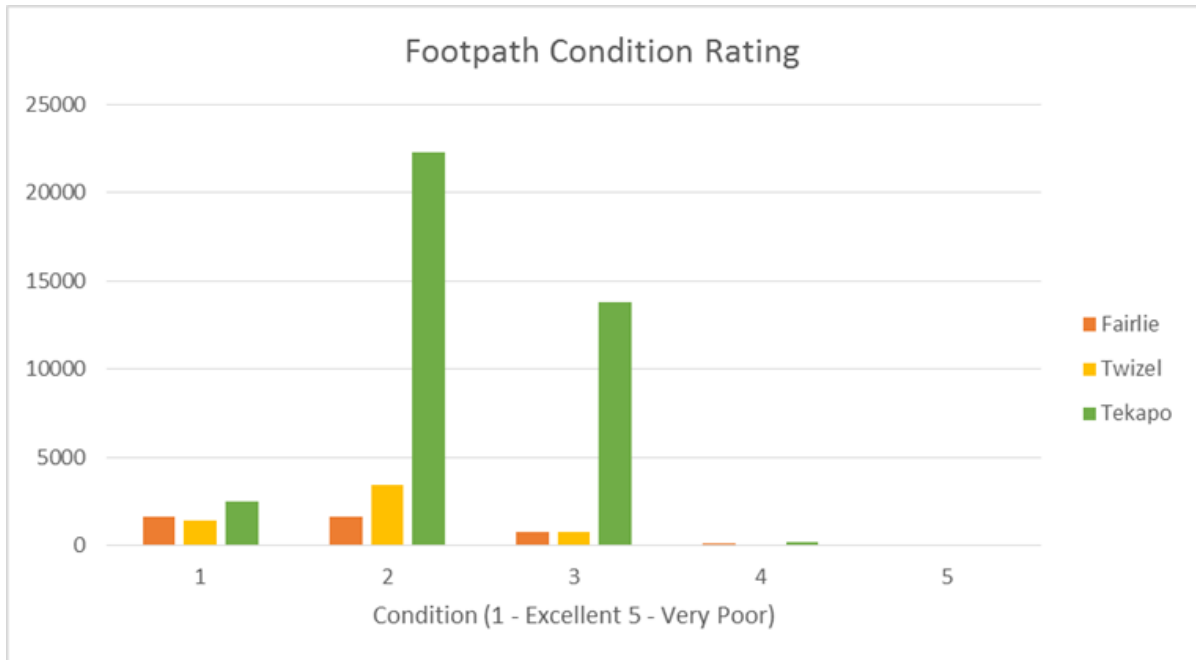


Figure 32: Footpath Condition Rating

Footpaths Current Capacity and Performance

The District Plan states that any new residential developments Mackenzie urban areas are to have footpaths on both sides of the street, 1.5m wide and be surfaced in AC as a minimum. Safety footpaths are being considered overall into the future for across the district, to ensure adequate assets are installed to cater for all users. Council have put together a draft walking and cycling strategy to ensure the correct width of pathway is provisioned for in each new development, adequate provisioning is allowed, and replacement of council assets are fit for purpose into the future given mode shift, technological advances and increased focus around safety. For all urban fringe development, peri urban or rural residential development it is seen as necessary to provide at least one sealed shared pathways depending on the size and complexity these requirements may increase. This will be included as part of the district plan review. The provision going forward is to ensure there is a sealed footpath on each of our urban roads of which a number of them are likely to shared paths to support the uptake of multi modal transport given the absence of public transport in our area. These pathways also need to be accessible and amenable for people of all abilities as technological advances have allowed further people to get out and explore that previously may not have been able to.

9.8.2 Footpath Operations and Maintenance Plan

Footpath maintenance is undertaken by our road maintenance contractor.

Footpath maintenance includes:

- Repairing damaged sections of footpath, usually broken by vehicles, tree roots or old service trenches.
- Pothole repair
- Relaying uneven pavers and removing similar tripping hazards
- Repairs around utility services
- Old trench repairs
- Removing weed or grass growth from the footpaths
- Removal of overhead tree growth etc. to retain a “passageway” for pedestrians

Maintenance Strategy

Maintenance needs are identified from observations made by staff and contractors in the course of their duties. Works are prioritised using the following criteria:

- The safety of pedestrians may be compromised (attended to immediately)
- If it is likely that the area of distress may expand or the methods of repair change such that the cost of any repair will increase
- Subsequent maintenance or renewal work depends on the completion of the maintenance repair
- Aesthetics (e.g., minor water ponding/untidy appearance)

A 24-hour customer complaints service is provided. The maintenance contracts require the contractors to maintain a suitable level of preparedness for prompt and effective response to asset failures and emergencies and specify maximum response times.

Asset failures are responded to with the initial objective of making safe as quickly as possible by the most economic method available and/or making temporary repairs if major repairs or renewals are required.

Maintenance Standards

The technical LoS required are detailed in the maintenance standards that implement these technical LoS is set out in Council specifications contained in the road maintenance contracts.

The consequences of lowering these standards are:

- Reduced safety
- Accelerated footpath deterioration and additional consequential costs
- Lower level of service (ease of use, appearance)

Maintenance Programme

Footpath maintenance has historically been funded under non-subsidised roading facilities maintenance. Late in the preparation of the 2018/ 21 LTP bid the GPS for land transport signalled that footpath and cycleway would be funded as part of the NLTP process. Meaning that 51% cofunding would be received going forward in line with our current financial assistance rate F.A.R. It is thought that shared pathways are the way to go, especially in our main towns to service cyclist and pedestrians. The reason for this is that the primary function of the footpath/shared path is to ensure the safety of the community, these vulnerable road users and visitors to get them off the road and using appropriate purpose build facilities, that support the multi modal transport initiative. Given the absence of public transport active modes are the best way for the community to deliver on mode shift reducing vehicle

movements given the districts geographical location and isolation between townships and settlements. The maintenance budget is primarily based on historical levels of expenditure and this was held at until the rollout of Ultra fast broadband (UFB2) was completed. The budget proposed for this activity is between \$40,000 and \$65,000 pa is allocated for this LTP period. The financial forecasts are presented in Appendix II.

9.8.3 Footpaths Renewal/Replacement Plan

The types of renewal work undertaken to restore footpaths to the required condition include resurfacing and reconstruction.

Resurfacing

This provides a smooth waterproof surface by overlaying with a thin layer of asphaltic concrete or chip seal coat. The existing surfacing is removed and replaced with a new surface (where the footpath profile is such that the surface level cannot be built up with an overlay).

Reconstruction

This allows for full reconstruction of the base course and surfacing layers when the footpath structure has deteriorated to an extent where resurfacing is not practical. Justification for work can be based on the condition of the kerb and channel or the condition of the carriageway rather than the footpath condition. Footpaths may be constructed on different alignments from existing to improve safety, accessibility, avoid known problems, reduce life-cycle costs and/or improve aesthetics. It is proposed in future when unlikely to affects service to use concrete surfacing in the first instance given the whole of life cost, followed by Asphaltic Concrete. Chip seal may be suitable to tracks and rural walkways etc. but where this is likely to be reasonable use or interconnection to the surround town or pathway in future use it shall match the existing or meet a higher LoS.

Renewal Strategies

Work needs are identified through inspections by staff and contractors with improvements programmed. Priorities are based on condition, pedestrian volume, and location to schools public and tourist areas.

Replacement of footpaths will proceed in commercial and shopping areas as funds are available with the priority being set by consideration of existing standards and pedestrian volumes while ensuring each road has a footpath and where they do they are formed and surfaced appropriately.

Council notifies residents in the street before any works are undertaken to confirm requirements.

Renewal Standards

Levels of Service requirements are for all footpaths to be a minimum of 1.5m wide and pathway widths going forward to have wider pathways depending on use and function served up to 2.4m at this stage. They pathways are no longer optional on rural residential roads, Rural roads depending on their location may not require a pathway. Within other areas pathways are required on both sides along urban streets as well as for any new development. Asphalt is the preferred surface material used for all renewals and concrete for new construction because of its longer life and superior surface. Alternative materials are used for aesthetic reasons in new developments and to match existing materials or reduce costs. The aim is to have at least one sealed footpath in each urban street going forward (which is likely to be the sunny side). Ideally to a community facility in the first instance e.g. school, sports centre, etc. the aim is to have a sealed footpath on either side of the road to the facility.

Renewal Programme

Best Practice: Council would ideally like to start the waterproofing of all the footpaths affected by the UFB rollout in Twizel beginning in 2021/22 and spreading the costs out over a 10 year timeframe. This minimises the risk of having a bow wave later on and allows for a more sustainable construction. This is likely to worsen with the rollout of the UFB in Tekapo and Fairlie which is occurring now and into year 1 of this LTP period. An initial budget of \$210 p.a. was dedicated to the renewal of footpaths.

Actual: Unfortunately, Council have had to reduce the amount of works undertaken on footpaths due to budgetary constraints. Waterproofing of footpath surfacing will not be undertaken significantly until 2024/25.

The Council have budgeted \$210,000 pa.

9.8.4 Footpaths Asset Development Plan

The addition of footpaths and pedestrian access ways occurs in one of the following ways:

- Extensions constructed by Council where no footpath previously existed to improve the level of service (particularly in relation to special treatments in high profile commercial areas)
- Taking over new footpaths constructed within sub divisional development (constructed at the developer's expense)
- Requests from Councillors, Public, and Staff
- Safety improvements
- Pedestrian demand

Where possible this work is incorporated with other development work to save on establishment costs. For example, new safety footpaths on Mt Cook Road in by Fairlie were completed during the installation of the trunk water main along Mt Cook Road in December 2010. A 400m long gravel footpath was constructed over the pipe trench concurrent with the water main work, thus saving in establishment and excavation costs. People living in the Reserve and along Mt Cook Road are now able to safely and conveniently walk into town on a footpath well clear of SH8. The same was planned and executed for the Doon St water main replacement.

Council officers plan as part of the transportation strategy for the Mackenzie District to carry out a walking and cycling strategy and finalise this as part of this LTP to support these alternative modes of transport going forward.

Best Practice: Council would like to begin work on walking and cycling projects in Year 1 of this LTP period, particularly the construction of cycleways along the highways within the district.

Actual: Unfortunately, financial constraints has pushed this work out, so it will not begin until 2024/25

9.9 STREET LIGHTING

9.9.1 Street Lighting Background Data

Street Lighting Scope and Nature of Asset

The purpose of street lighting is to provide sufficient lighting levels in streets to allow the safe and efficient movement of vehicles, cyclists and pedestrians provided that this lighting does not adversely affect on the visual amenity of the District as defined in the District Plan (Section 11 Issues 2 & 3).

Council administers the maintenance and power consumption of streetlights throughout the District including those on the state highways owned by Waka Kotahi (NZTA) whose direct costs are recovered from Waka Kotahi (NZTA).

The Council's streetlights are attached to poles either owned by the Council, Waka Kotahi (NZTA) or by Alpine Energy. The maintenance contractor (NETcon) is required to maintain the light fittings and mounting brackets and those poles belonging to both the Council and Waka Kotahi (NZTA). NETcon maintains the poles on behalf of Alpine Energy as their lead maintenance contractor. The demarcation point is the pole fuse which is the supply point to Alpine Energy's power network. Therefore, the reticulation to each pole is not the Council's or Waka Kotahi's (NZTA's) property.

Street lighting asset data is held in the RAMM database.

Street Lighting Current Condition

The asset has been developed over a number of years. The majority of the light fittings are now low-pressure sodium to meet the requirements of Council's District Plan that has provisions to protect the night sky. These fittings have been standardised to match the other makes of lights in neighbouring districts to reduce maintenance expenditure. Council has strict lighting controls in the District Plan for Takapō/ Tekapo and Twizel to protect the night sky. Low pressure sodium lights are generally required to meet this standard. The low-pressure sodium bulbs can no longer be sourced. Council has taken up Waka Kotahi's (NZTA's) offer of 85% FAR to change out our entire streetlight inventory to LED fittings. We already have a fitting, GL520 @2200k, that complies with the international dark sky reserve as Council has already changed out a number of fittings in Twizel that had failed and historical changed a number to 3000K fittings due to the number of the subdivisions to date. We are now waiting for the change out to be completed. This will provide large energy savings as well as reducing maintenance cost given that for each LED fitting, we should get twice the life compared to the LPS bulbs at a minimum.

The Council does not formally rate the condition of streetlights. There is an on-going inspection and maintenance regime under the routine maintenance contract by NETcon.

Street Lighting Current Capacity and Performance

Streetlight capacity and performance issues relate to light intensity, reliability and safety.

The District street lighting other than on the state highways has evolved from perceived need rather than being based on standard performance design requirements. Older fluorescent and mercury vapour lanterns had been upgraded over the last ten years to low pressure sodium. The change out to LED fittings will provide improved performance, resilience and energy savings.

To date the management of the street lighting asset has been largely left to the maintenance contractor (NETcon). This has generally worked well with no major issues to date.

Reliability

Most complaints are largely about light outages and are really negligible in number. The change out to LED fittings will see a significant increase in reliability, providing a better service to the community.

9.9.2 Street Lighting Operations and Maintenance Plan

Maintenance of Council streetlights is competitively contracted out. Maintenance of streetlights covers regular inspections, the replacement of failed bulbs/fittings, and repair of damage. Maintenance works are undertaken to:

- Maintain LoS
- Ensure safety to the public
- Protect the investment in assets by extending the life of the assets
- Minimise repair costs

Maintenance Strategy

The current maintenance strategy is:

- Failed assets are identified through inspections by contractors, staff observations, and customer complaints
- Repairs are carried out on demand and within the specified response timeframes. Faulty, accidently damaged or vandalised lanterns, lamps, control gear columns and associated equipment, are repaired immediately when there is a hazardous situation.
- Develop maintenance programmes from the schedules of defects identified during routine inspections. Repair options and priorities are determined by considering the effects on:
 - public safety (top priority)
 - LoS (traffic movement and pedestrian safety)
 - future costs if the work is not done

Maintenance Standards

All replacement lamps are compatible with the lantern and control gear and have illumination characteristics compatible with the original lamp and be compliant with the international dark sky reserve in Takapō/ Tekapo and Twizel.

All maintenance work must comply with the current Electricity Act and Regulations.

Maintenance Programme

The majority of streetlight maintenance is reactive therefore budgets have been based on historical costs with an allowance made for increased costs associated with an increase in the number of lighting assets on the network and inflation. Maintenance costs are included for under Traffic Service maintenance. The financial forecasts are presented in Appendix II. Council seeks to recover the cost of accident damage from those responsible.

Deferred Maintenance

Current maintenance funding levels appear adequate and there is no significant backlog of routine maintenance.

9.9.3 Street Lighting Renewal/Replacement Plan

Asset renewal is undertaken when a streetlight, or significant component of a light, has reached the end of its economic life. Renewal works involve the replacement of either the complete pole and lantern or individual components (e.g., lantern, controllers, bracket, pole, etc.).

Renewal Strategy

Renewal needs are identified from routine inspections and asset registers. The strategy relating to the renewal of streetlight assets, or components of those assets, is to:

- Replace faulty or damaged assets when replacement is more economic than repair
- Replace faulty or damaged lanterns which cannot be repaired because of obsolescence or replacement parts are unobtainable
- Replace existing assets/components that do not meet current design/safety standards
- Earlier than end of life replacement of obsolescent technology is the least cost solution.

Works are prioritised according to:

- Public safety
- Benefit/cost savings available (e.g., power efficiencies)

Guidelines

Future lighting installation will be designed to the AS/NZS 1158:2005 suite of standards adjusted to conform to the requirements of Section 11 of the District Plan.

The following gives a brief summary of each standard:

- AS/NZS 1158.0:2005 Road Lighting – Introduction: Serves as a general introduction to the AS/NZS 1158 series and provides definitions of lighting categories and technical terms essential to the understanding of other Standards in the series especially Parts 1.1, 2, 3.1 and 6.
- AS/NZS 1158.1.1:2005 Road Lighting – Vehicular Traffic (Category V) lighting – Performance and design requirements: Specifies performance and design requirements for Category V lighting schemes as described in AS/NZS 1158.0. Also specifies data needed to design for and assess compliance with those requirements.
- AS/NZS 1158.3.1:2005 Road Lighting – Pedestrian Area (Category P) lighting – Performance and design requirements: Specifies performance and design requirements for Category P lighting schemes as described in AS/NZS 1158.0. It also specifies the luminaries' data and other data that is needed to facilitate the lighting design and the assessment of compliance with the requirements of this Standard.

Renewal Programme

The required level of renewal depends on:

- The age profile of streetlights
- The condition profile of streetlights
- The level of on-going maintenance
- The economical lives of the materials and components used
- The available funding approval

The assumed average economic life for streetlights is shown in [Table 25](#),

Table 25: Assumed Average Economic Life for Lighting Components

Component	Assumed Average Economic Life
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All lanterns	20 years
Light columns	40 years
Brackets	40 years

The renewal budget is included under traffic services maintenance. The financial forecasts are presented in Appendix II.

9.9.4 Street Lighting Asset Development Plan

The installation of additional streetlights will be assessed on the basis of the objectives and policies detailed in Section 11 of the District Plan.

Streetlights are acquired or upgraded as part of:

- Power under-grounding work
- Minor improvement works
- Upgrading work to improve the level of service (e.g., spacing)
- Extensions constructed by Council where no streetlights previously existed
- Taking over new streetlights installed with sub-divisional development (constructed at the developer's expense)

Development Strategy

Candidates for minor street lighting and footpath lighting are ranked according to the criteria of:

- Night time foot traffic
- Night time vehicular traffic
- Existing night time illumination levels
- Geometry of the road or intersection
- Special features (trees, parks, bridges, lack of footpaths, social conditions)

9.10 DISPOSAL PLAN FOR ALL ASSETS

In general Council has no specific plans for disposal of components of the Roding asset. Details for specific assets are included in [Table 26](#).

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Table 26: Circumstances for Disposal of Assets Summary

Asset Description	Disposal Plan	Comments
Land	None	Areas of unformed legal road reserve, berm areas surplus to requirements or areas being informally occupied by adjoining landowners may be identified for disposal in future. However, issues of access will need to be considered in any road stopping and disposal considered.
Sealed Roads	None	Council may, when it is the lowest life-cycle cost, allow a sealed road to revert to an unsealed road.
Unsealed Roads	None	When the LoS provided by a formed public road is no longer required in that location

Asset Description	Disposal Plan	Comments
Bridges	None	See Bridge Replacement Strategy (2010-2050) Bridges that are on no-exit roads, providing property access only (not to residences) that have reached the end of their economic life and that Waka Kotahi (NZTA) share of replacement funding is in doubt will be considered for disposal. Ownership would be transferred to the main users (local property owners). Old bridges that are being replaced by Council and there is no value in that structure may be disposed of for future by private parties.
Drainage	None	
Traffic Services	None	
Footpaths	None	
Street Lighting	None	Disposal activity for streetlights relates to lanterns, controls and poles which have been replaced with new components. Components which can be used as spare parts are retained in storage. Other surplus assets have no commercial value and are disposed of.

9.11 ALPS TO OCEAN CYCLEWAY

9.11.1 Alps to Ocean Background Data

The Alps to Ocean cycle trail are 312km long beginning in the Southern Alps at Aoraki/Mt Cook National Park, descending 780m through the Mackenzie basin down the Waitaki Valley to Oamaru and the Pacific Ocean with multiple access points and options to begin or end the ride or to ride only local sections. The route traverses a unique geological glacial moraine alpine plateaus and alluvial river gravels. The route has been carefully selected to avoid major river crossings and utilises existing dam and bridge structures. The route utilises a combination of on road low volume roads and off-road shared use (1.5 metre) paths.

For the purposes of the route description and cycle trail specification, the Trail has been divided into 8 logical segments. The route sections and distances are given below:

- Section 1 — Aoraki Mount Cook National Park — Braemar/Mount Cook Station Road: 35 km
- Section 2 — Braemar/Mount Cook Station Road to Twizel: 42 km
- Section 3 — Twizel to Lake Ohau Lodge: 38 km
- Section 4 — Lake Ohau Lodge to Omarama: 45 km
- Section 5 — Omarama to Otematata: 24 km
- Section 6 — Otematata to Kurow: 40 km
- Section 7 — Kurow to Duntroon: 28 km
- Section 8 — Duntroon — Oamaru: 54 km

Council administers Sections 1, 2 and 3, located within Mackenzie District.

Section 1: Mt Cook to Braemar/Mount Cook Station Road, 35km

The Cycle Trail begins at the White Horse Hill Campground, 2km north of Aoraki Mount Cook Village. From here a 7.2km off-road trail to access the Aoraki Mount Cook Airport.

One of the major hurdles for the route has been the securing a safe and appropriate method for crossing the Tasman River. The preferred option for crossing the river is by way of helicopter from the Aoraki Mount Cook Airport. This option is preferred for its safety, reliability and minimal capital expense.

On the eastern shore of the lake, the route traverse's conservation land and legal riverbed following a combination of existing four-wheel drive tracks and newly constructed track to the Jollie River Car Park at the top of Mt Cook Station Road/ Hayman Road.

Section 2: Braemar/Mount Cook Station Road to Twizel, 42km

From Braemar/Mount Cook Station Road the trail currently continues along a combination of the Braemar/Mt Cook Station and Hayman Roads (unsealed) and lakeside trail past the Takapō/ Tekapo B Power Station through to the intersection with State Highway 8 (SH8). An off-road track follows the shoreline of the lake from the intersection to the Lake Pukaki Visitor Centre. Crossing State Highway 8, the route follows an existing gravel track through Meridian hydro land before traversing a trail through Department of Conservation tussock grasslands to SH8 on the outskirts of Twizel.

Section 3: Twizel to Lake Ohau Lodge, 38km

The trail leaves Twizel on local roads, travelling along Glen Lyon Road to the canal bridge adjacent to Loch Cameron. Cyclists follow the Meridian Canal Road to the edge of Lake Ohau. An off-road track leads to the Lake Ohau Weir. The trail will then follow the bottom of Lake Ohau. From this point a track follows the Lake Ohau Road to the Ohau Lodge.

9.11.2 Alps to Ocean Trail Standard

Grade Description

The entire cycleway within the Mackenzie District is designed as a "grade 2" track. This allows cyclists a smooth ride with gentle climbs, with riders able to ride side by side at times.

Road Condition

Sections of the cycleway are currently on unsealed road. Where the track is on unsealed road, this section of the track will only meet a Grade 2 standard immediately after maintenance grading or the application of a Wearing Course (every ten years) or when cycling in smooth wheel tracks.

Maintaining the Standard

Maintaining the standard of the cycleway on roads requires monitored as the success of this venture and the economic benefits it brings to the District will only be realised if the track is well used and maintained.

9.11.3 Alps to Ocean Renewal Plan

A business case is currently underway which seeks to identify options in order to take the whole length of the trail off-road. The key objective of the project is to improve safety and to promote the trail as a safe, family friendly and attractive activity.

Best Practice: Council has estimated that to create a fully off-road trail \$950,000 will need to be spent in year 1 and another \$200,000 in years 3 and 7. This would provide the safest outcome and meet all the project objectives

Actual: However, due to financial constraints, a reduced budget of \$465,000, will be spent in year 1. This will likely mean not all of the cycle trail will be able to go off-road. The Business Case seeks to identify the highest priority areas and the best value for money options which will lead to the safest outcomes.

10 FINANCIAL SUMMARY

10.1 INTRODUCTION

The total Mackenzie District National Land Transport Programme for 2021/22 for operations, maintenance is \$1.4M, renewals are \$2.31M and improvements are \$1.79M. The overall roading budget is \$5.99M for 2021/22. The difference is for other “direct expenses” such as administration, employment, consultancy and non-funded depreciation.

The following table summarise the budgets presented within the lifecycle management section. In addition, budgets for “Other Direct Expenses” are developed and are included within the totals. In accordance with good practise, and the procedures used so far within this AMP, the budgets are shown in today’s dollars unless noted otherwise.

10.1.1 10 Year Funding Forecast

Table 28 sets out the Council’s 10-year expenditure forecast for the Land Transport activity. This programme reflects the application for funding initially requested from Waka Kotahi (NZTA) for the 2021/24 NLTP period. This will be finalised once the NLTP programme is approved by Waka Kotahi (NZTA). Waka Kotahi (NZTA) has not yet notified Council that it will increasing the roading programme that is co-funded, for the 2021-2024 NLTP Bid. Council has decided to proceed with its proposed programme to date to LTP consultation in support.

10.1.2 Capital Works

The main capital works allowed for over the 10 years 2021-2031 is covered under Low Cost Low Risk (WC 341). Work to be completed using this funding primarily consists of Minor safety works, seal extension, seal widening, footpath formation/ construction, traffic services upgrade, road and access improvements around main centres, alignment improvements, bridges, other minor improvements works. The amount originally forecast for Capital works, under a Best Practice approach was \$1,770,000 approximately per year for the first 3 years then \$1,500,000 for the remaining 7-year period. This changed to meet budgetary constraints, and now will spend \$1,050,000 in year 1, approximately \$450,000 over the next two years, then \$850,000 over the next three years, and between \$1,200,000 and \$1,240,000 in the final four years. These changes are represented in [Table 27](#) and Table 28.

Figure 33 compares the previous ‘Best Practice’ capital works profile with the updated actual capital works profile. It shows how the Council will need to spend less in the short term and gradually increase this expenditure overtime.

Audit requires these capital works projects to be split to identify whether new capital is growth, renewal or LoS related. Generally capital projects identified are related to meeting LoS or renewal requirements.

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Table 27: Best Practice Capital Works Programme (uninflated)

ROADING (\$ thousands)	Primary Type	LTP 1 2021/22	LTP 2 2022/23	LTP 3 2023/24	LTP 4 2024/25	LTP 5 2025/26	LTP 6 2026/27	LTP 7 2027/28	LTP 8 2028/29	LTP 9 2029/30	LTP 10 2030/31
Roading Professional Services											
Plant and Equipment	Renewal	20	12	12	3	12	3	3	3	3	3
District Rooding											
Rural Seal Extensions	LOS	12	300	300	300	300	300	300	300	300	300
Unsealed Road Metalling	Renewal	822	822	822	822	822	822	822	822	822	822
Sealed Road Resurfacing	Renewal	530	530	530	530	530	530	530	630	630	630
Drainage Renewal	Renewal	110	110	110	110	110	110	110	110	110	110
Sealed Road Pavement Rehabilitation	Renewal	210	210	210	210	210	210	210	210	210	210
Structures Component replacements bridges	Renewal	68	57	68	68	57	68	68	57	68	68
Structures Component replacements cattle stops	Renewal	0	16	0	0	16	0	0	16	0	0
Bridge & Structures Renewals	Renewal	53	69	53	53	69	53	53	69	53	53
Environmental Renewals	Renewal	50	50	50	50	50	50	50	50	50	50
Cycle Path Renewal	Renewal	950	0	200	0	0	0	200	0	0	0
Footpath Renewal	Renewal	210	210	210	210	210	210	210	210	210	210
Streetlight LED Upgrade	LOS	12	12	12	12	12	12	12	12	12	12
Low Cost Low Risk Improvements	LOS	1,771	1,763	1,765	1,500	1,500	1,500	1,500	1,500	1,500	1,500
Car Parking Renewal	LOS	200	300	300	200	200	200	200	200	200	200
Urban Seals	LOS	160	160	160	160	160	160	160	160	160	160
Walking & Cycling Projects	LOS	75	75	75	75	7	75	75	75	75	75
Traffic Services Renewal	Renewal	90	90	90	90	90	90	90	90	90	90
Total Rooding Capital Expenditure (Best Practice)		5,343	4,786	4,967	4,393	4,423	4,393	4,593	4,514	4,493	4,493

Table 28 Proposed Future Capital Works Programme (uninflated)

ROADING (\$ thousands)	Primary Type	LTP 1 2021/22	LTP 2 2022/23	LTP 3 2023/24	LTP 4 2024/25	LTP 5 2025/26	LTP 6 2026/27	LTP 7 2027/28	LTP 8 2028/29	LTP 9 2029/30	LTP 10 2030/31
Roading Professional Services											
Plant and Equipment	Renewal	20	12	12	3	12	3	3	3	3	3
District Roading			0	0	0	0	0	0	0	0	0
Rural Seal Extensions	LOS	12	0	0	0	0	0	0	0	0	0
Unsealed Road Metalling	Renewal	700	700	700	822	822	822	822	822	822	822
Sealed Road Resurfacing	Renewal	500	500	500	530	530	530	530	630	630	630
Drainage Renewal	Renewal	90	90	90	110	110	110	110	110	110	110
Sealed Road Pavement Rehabilitation	Renewal	130	130	130	210	210	210	210	210	210	210
Structures Component replacements bridges	Renewal	30	30	30	68	57	68	68	57	68	68
Structures Component replacements cattle stops	Renewal	0	0	0	0	16	0	0	16	0	0
Bridge & Structures Renewals	Renewal	52	52	52	53	69	53	53	69	53	53
Environmental Renewals	Renewal	25	25	25	0	0	0	0	0	0	0
Cycle Path Renewal	Renewal	466	0	0	0	0	0	0	0	0	0
Footpath Renewal	Renewal	210	210	210	210	210	210	210	210	210	210
Streetlight LED Upgrade	LOS	727	12	12	12	12	12	12	12	12	12
Low Cost Low Risk Improvements	LOS	1,053	450	435	868	842	844	1,246	1,231	1,208	1,241
Car Parking Renewal	LOS	0	0	0	200	200	200	200	200	200	200
Urban Seals	LOS	0	0	0	0	0	0	0	0	0	0
Walking & Cycling Projects	LOS	0	0	0	75	75	75	75	75	75	75
Traffic Services Renewal	Renewal	88	88	88	90	90	90	90	90	90	90
Total Roading Capital Expenditure (Actual)		4,102	2,299	2,284	3,251	3,255	3,227	3,629	3,735	3,691	3,724

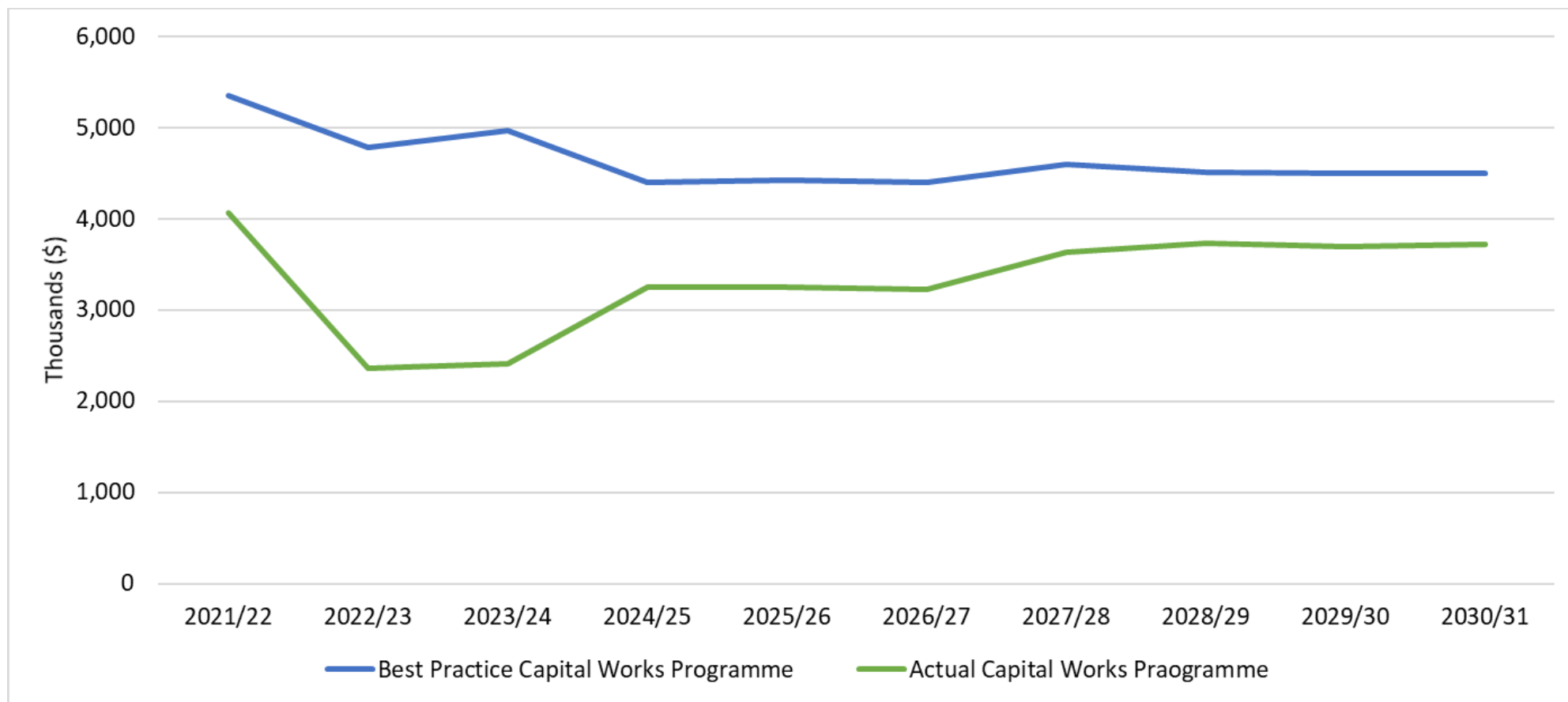


Figure 33 Best Practice verse Actual Capital expenditure profile

Table 29 Proposed Future Capital Works Programme (Inflated)

ROADING (\$ thousands)	Primary Type	LTP 1 2021/22	LTP 2 2022/23	LTP 3 2023/24	LTP 4 2024/25	LTP 5 2025/26	LTP 6 2026/27	LTP 7 2027/28	LTP 8 2028/29	LTP 9 2029/30	LTP 10 2030/31
Roading Professional Services											
Plant and Equipment	Renewal	20	12	13	3	13	3	3	4	4	4
District Rooding											
Rural Seal Extensions	LOS	12	0	0	0	0	0	0	0	0	0
Unsealed Road Metalling	Renewal	700	722	743	898	924	951	979	1007	1036	1066
Sealed Road Resurfacing	Renewal	500	516	531	579	596	613	631	772	794	817
Drainage Renewal	Renewal	90	93	96	120	124	127	131	135	139	143
Sealed Road Pavement Rehabilitation	Renewal	130	134	138	229	236	243	250	257	265	272
Structures Component replacements bridges	Renewal	30	31	32	74	64	79	81	70	86	88
Structures Component replacements cattle stops	Renewal	0	0	0	0	18	0	0	20	0	0
Bridge & Structures Renewals	Renewal	52	54	55	58	78	61	63	85	67	69
Environmental Renewals	Renewal	25	25	26	0	0	0	0	0	0	0
Cycle Path Renewal	Renewal	466	0	0	0	0	0	0	0	0	0
Footpath Renewal	Renewal	210	217	223	229	236	243	250	257	265	272
Streetlight LED Upgrade	LOS	727	12	13	13	13	14	14	15	15	16
Low Cost Low Risk Improvements	LOS	1053	464	462	948	947	976	1484	1509	1523	1610
Car Parking Renewal	LOS	0	0	0	219	225	231	238	245	252	259
Urban Seals	LOS	0	0	0	0	0	0	0	0	0	0
Walking & Cycling Projects	LOS	0	0	0	82	84	87	89	92	95	97
Traffic Services Renewal	Renewal	88	91	93	98	101	104	107	110	113	117
Total Rooding Capital Expenditure (Actual)		4,102	2,370	2,425	3,552	3,659	3,733	4,321	4,576	4,653	4,831

10.1.3 Operation and Maintenance programme

The following table provides an overview of the proposed expenditure for operations and maintenance activities for all roading assets within the district.

Table 30 Proposed Operation and maintenance programme (uninflated) –excludes non funded depreciation.

ROADING	LTP Budget Yr 1 2021/22	LTP Budget Yr 2 2022/23	LTP Budget Yr 3 2023/24	LTP Budget Yr 4 2024/25	LTP Budget Yr 5 2025/26	LTP Budget Yr 6 2026/27	LTP Budget Yr 7 2027/28	LTP Budget Yr 8 2028/29	LTP Budget Yr 9 2029/30	LTP Budget Yr 10 2030/31
	(thousands)									
Roadings										
111 Sealed Pavement Mtce	226	226	226	232	232	232	232	232	232	232
112 Unsealed Pavement Mtce	400	400	400	410	410	410	410	410	410	410
113 Routine Drainage Mtce	146	146	146	177	177	177	177	177	177	177
114 Structures Maintenance Bridges	110	110	110	115	115	115	115	115	115	115
121 Environmental Mtce	160	160	160	180	180	180	180	180	180	180
122 Traffic Services	175	175	175	180	180	180	180	180	180	180
124 Cycle path maintenance	0	0	0	20	20	20	20	20	20	20
125 Footpath Maintenance	40	40	40	65	65	65	65	65	65	65
140 Minor Events	40	40	40	55	55	55	55	55	55	55
16 Parking Maintenance	50	50	50	50	50	50	50	50	50	50
301 Street Lighting - Maintenance	13	13	13	13	13	13	13	13	13	13
302 Street Lighting – Electricity	15	15	15	15	15	15	15	15	15	15
303 Drainage Mtce - St Cleaning	12	12	12	12	12	12	12	12	12	12
305 Local Share (70%) Street Cleaning	14	14	14	14	14	14	14	14	14	14
151 All other expenses (includes 151)	496	504	523	793	831	858	830	857	876	829
Total Maintenance & Operations Expenditure	1,896	1,903	1,923	2,330	2,368	2,395	2,367	2,393	2,413	2,366

Please refer to Appendix II for inflated total values for operational and maintenance costs

10.2 FUNDING STRATEGY

The first priority is to maintain and operate the existing network in its current condition, at the lowest lifecycle cost, then allow for renewal expenditure that revitalises a component of the network that has worn out. In the 2021/22 year \$1.4M of budgeted expenditure is to be spent on physical maintenance and operation with \$2.31M to be spent on renewals and \$1.1M to be spent on Low Cost Low Risk projects (i.e. improvements) which will address predominantly safety issues. The remaining allocation, as defined in the draft 2021-2031 LTP, is used to fund administration costs and also accounts for non-funded depreciation.

Funding for the management, maintenance, renewals and improvements of the road network is provided from the District roading rate and co-investment received from Waka Kotahi (NZTA).

In determining the larger improvement projects to be undertaken Waka Kotahi (NZTA) requires a full better business case be developed to justify the request for funding. Preference is given to projects which can be shown to be economically justified, attract subsidy, and have the necessary Council funding available.

10.2.1 Financial Assistance

To fund roading maintenance, operating, and renewals (capital) expenditure, Council receives a percentage of the cost as a subsidy from Waka Kotahi (New Zealand Transport Agency). The level of subsidy, or co-investment, is the Financial Assistance Rate (FAR), the level of which is review tri-annually by Waka Kotahi. Councils FAR rate is 51%. In association with this, through the National Land Transport Plan (NLTP), Waka Kotahi requests from Council a three-year work program and supports, or otherwise, the requested investment level by funding 51% of the costs.

A recent funding announcement from Waka Kotahi lowered their level of investment into the Councils submitted roading programme for the next 3 years. This has seen Council received 51% funding for a substantially smaller program (in 21/22 the roading programme applied for totalled 5.7m – NZTA only approved a programme of \$3.3 m) that it deems is required to manage the roading asset appropriately. The funding Assistance rate is still 51% for most categories (except LED which attracts a funding assistance rate of 85%).

Council is supporting continuing the increased local funding share in 21/22 the total roading programme notwithstanding Waka Kotahi's reduced support (an additional cost of \$823,000) meaning that ratepayers now fund a higher portion of the overall roading programme. We deem this necessary to ensure we maintain our roading network to meet expected levels of service. This trend is likely to continue in 22/22 and 22/24.

Staff are working with Waka Kothi to understand the reduction in funds in the Asset Management area, where Council earlier signalled and increased investment was required and which was formally endorsed (increase in 2.5 FTE's). Council will continue to lobby Waka Kotahi (NZTA) into the future for the FAR rate to be reviewed with the intention of an increase. This may be accepted more if Councils full bid submission to the NLTP was accepted in full but with a small population of around 5,000 (normally resident). This equates to seven people funding each kilometre of local road, nationally sixty people fund each km. Council have adjusted budgets and programmes at this stabilised rate even though we disagree with the reduction now sitting on par with a lot of the large metro centres (e.g., Christchurch CC, Wellington CC, Auckland CC (AT)) with the benefits these receive around public

transport, cycleways, intersection controls, streetscapes, etc. We also sit on par with the majority of our neighbouring Councils (e.g., Timaru, Ashburton, Waitaki). We consider ourselves to others in our peer group there is a substantial variance in FAR rates between a number of authorities at this level with similar populations, transport network length, larger expenditure, etc. The benefit of this current rate is that it isn't reducing and through years of diligent management, Mackenzie has maintained its network to a high standard at a cost lower than many of its peers.

The table below outlines the financial impact statement. This includes key funding sources and all capital expenditure for the 10 year LTP period.

Table 31: Annual Net Cost – Funding Impact Statement (inflated)

Roading Supply	Annual Plan 2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/2030	2030/31
	(thousands)										
General rates, uniform annual general charges, rates penalties	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	1021	1108	1427	1732	2468	2934	3299	3612	4034	4122	4129
Subsidies and grants for operating purposes	953	943	970	998	1009	1036	1065	1094	1130	1155	1187
Fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal charges and overheads recovered	0	0	0	0	0	0	0	0	0	0	0
Local authorities fuel tax, fines, infringement fees, and other receipts	0	95	98	101	103	106	109	112	116	119	122
Total Operating Funding (A)	1974	2146	2495	2831	3580	4076	4473	4818	5280	5396	5438
Applications of Operating Funding											
Payments to staff and suppliers	1723	1854	1896	1958	2405	2494	2579	2592	2687	2779	2796
Finance costs	0	11	39	49	68	83	91	115	119	119	119
Internal charges and overheads applied	22	35	36	36	54	55	56	57	58	60	61
Other operating funding applications	0	0	0	0	0	0	0	0	0	0	0
Total applications of operating funding (B)	1745	1900	1971	2043	2527	2632	2726	2764	2864	2958	2976
Surplus (deficit) of operating funding (A-B)	229	246	524	788	1053	1444	1747	2054	2416	2438	2462
Sources of capital funding											
Subsidies and grants for capital expenditure	1530	1826	1188	1211	1685	1728	1762	2052	2175	2211	2291
Development and financial contributions	0	0	0	0	0	0	0	0	0	0	0
increase (decrease) in debt	0	1949	657	426	815	486	225	215	-14	4	77
Gross proceeds from sale of assets	0	0	0	0	0	0	0	0	0	0	0
Lump sum contributions	0	0	0	0	0	0	0	0	0	0	0
Other dedicated capital funding	0	0	0	0	0	0	0	0	0	0	0

Total sources of capital funding (C)	1530	3775	1845	1637	2500	2214	1987	2267	2161	2215	2368
Capital expenditure											
- to meet additional demand	0	0	0	0	0	0	0	0	0	0	0
- to improve the level of service	1445	1792	476	475	1262	1269	1308	1825	1860	1885	1982
- to replace existing assets	1759	2310	1893	1950	2290	2390	2425	2495	2716	2768	2848
Increase (decrease) in reserves	-1445	-81	0	0	1	-1	1	1	1	0	0
Increase (decrease) of investments	0	0	0	0	0	0	0	0	0	0	0
Total applications of capital funding (D)	1759	4021	2369	2425	3553	3658	3734	4321	4577	4653	4830
Surplus (deficit) of capital funding (C-D)	-229	-246	-524	-788	-1053	-1444	-1747	-2054	-2416	-2438	-2462
Funding Balance ((A-B)+(C-D))	0	0	0	0	0	0	0	0	0	0	0

10.3 ROAD ASSET VALUATION

The last valuation of the roading infrastructural network and associated assets was undertaken as of 30 June 2019 and is summarised in the [Table 32](#). The valuation is updated 3 yearly to take into account capital works and additions to the road network.

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The valuation consists of an assessment of the replacement cost, depreciated replacement cost and the annual depreciation or decline in service potential of the network. The annual depreciation or decline in service potential is the amount the asset declines in value over a year as a result of the remaining life of the asset reducing. Provision is required to be made to fund this depreciation so as to make suitable allowance for the future replacement or renewal of the asset.

Depreciation is provided on a straight-line basis on all physical assets at rates which write off the cost of the asset to the estimated residual value at the end of its assumed effective life.

Expenditure on renewing or improving the capacity of the asset is capitalised annually as are assets which are vested in Council by developers. Capital work in progress is not depreciated. The total cost of this work is capitalised at the end of the financial year in which it is completed and depreciated from then onwards.

Table 32: Roding Infrastructure Valuation

Summary	ORC 30 June 2019 (\$)	ODRC 30 June 2019 (\$)	Depreciation to Date (\$)	Annual Depreciation (\$)
Pavement	96,359,787	76,356,505	20,003,282	1,338,031
Footpath	6,778,574	4,127,990	2,650,584	144,520
Structures	35,373,534	16,175,342	19,198,192	404,153
Drainage	10,696,842	8,202,339	2,494,502	107,043
SWC	13,333,520	10,273,444	3,060,077	136,031
Signs	886,718	199,919	686,799	51,039
Lights	3,473,179	1,225,859	2,247,319	123,443
TOTAL	\$166,902,154	\$116,561,399	\$50,340,755	\$2,304,260

The total optimised replacement cost of the Roding Infrastructure was assessed to be \$166,902,154 as of 30 June 2019. The total optimised depreciated replacement cost was assessed to be \$116,561,399.

10.3.1 Valuation Methodology

All assets are valued using depreciated replacement cost (DRC). A DRC valuation requires:

- Determination of quantities of assets optimised to relate to those required for current service delivery and foreseeable demand
- Unit rates for replacement with modern engineering equivalent assets
- Effective lives that take account of local influences

- Depreciation that defines current value given a definable remaining life.

The NZ Infrastructure Asset Valuation and Depreciation Guidelines 2006 give direction as to the overall methodology applicable to a DRC valuation for roading assets. This has been applied in this case to achieve a suitable valuation for Council Improvements and Infrastructure Asset Valuation.

Borrowing costs are excluded from the valuation.

Update from Valuation Report

The primary data source for this revaluation was Council's RAMM database. For a number of assets RAMM was not populated or fully up to date at the time of re-valuation, therefore secondary sources were used as follows:

- Bridges: RAMM database
- Cattle stops: all data in RAMM except construction dates, which were based on data from the previous valuation
- Footpaths: Council inventory data supplied in form of excel spread sheet supplemented by RAMM data base
- Streetlights: RAMM database

10.4 ESTIMATED REQUIRED ASSET EXPENDITURE

When assessing the expected annual renewal expenditure an indication of the appropriate level of expenditure required can be gauged by comparing the estimated renewal requirement against the Annual Depreciation for each asset component in light of the average age of that asset component. If the asset is "young" then an amount less than the Annual Depreciation (AD) would be a likely requirement and as the asset ages a larger amount, probably greater than the AD would be likely. The 2019 Council Valuation report is summarised in [Table 21](#). Networks with relatively evenly spreads of asset ages and expiry dates should approach a balance between these amounts. However, when Council needs to defer maintenance to achieve Waka Kotahi (NZTA) budgetary constraints it will take longer to realise that balance.

The AD is an amount of money which represents the estimated annual renewal needs of the asset. It does not include the amount required to cover maintenance or running costs such as electricity for streetlights.

In considering the above it is possible to identify whether the current renewal expenditure is:

- Approximately matching the theoretical renewal requirement
- Less than the theoretical renewal requirement
- Greater than the theoretical renewal requirement

Each Road Asset component has been looked at to determine the outcome in relation to its budgeted expenditure. A comparison between forecast expenditure for 2021/22 and the Annual Depreciation for each asset type is shown in [Table 33](#).

Table 33: Comparison between Forecast Expenditure and Annual Depreciation

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Asset Type	Component Description	2021/22 Renewals Forecast	AD Cost (% renewals vs. AD)
Pavement	Total Estimated Annual Need (AD)		\$1,338,031
	Unsealed Road Metalling	\$822,000	(117%)
	Sealed road Resurfacing	\$530,000	
	Pavement Rehabilitation	\$210,000	
	Total Renewals	\$1,562,000	
Footpaths	Total Estimated Annual Need (AD)		\$144,520
	Footpaths - Surfacing	\$210,000	(145%)
	Total Renewals	\$210,000	
Structures	Total Estimated Annual Need (AD)		\$404,153
	Structures component replacements (including bridges cattle stops and fords)	\$68,000	(17%)
	Total Renewals	\$68,000	
Drainage	Total Estimated Annual Need (AD)		\$243,074
	Culverts, catch pits, soak pits, side drains and all surface water channel (SWC) (including all concrete K&C, dish channel, mountable kerbs, earth surface water channels)	\$110,000	(45%)
	Total Renewals	\$110,000	
Traffic Services	Total Estimated Annual Need (AD)		\$174,482
	Signs	\$90,000	(58%)
	Lights (Subject to LED replacement completed)	\$12,000	
	Total Renewals	\$102,000	

From the comparison shown in [Table 22](#), it can be seen that expenditure is probably appropriate for most assets in relation to the Annual Depreciation. However, underinvestment is indicated for Structures and Drainage assets. Council and roading staff will be required to continue to assess the budgeted expenditure level on an ongoing basis taking in to account the current use, age and condition of the network components.

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10.4.1 Low Cost Low Risk Projects

Council understand Waka Kotahi (NZTA) take the importance of road safety improvements seriously and that they can be funded with co-investment at a rate of 51% (FAR). Council going forward are

likely to apply for more of this funding with the increases in tourism and the development in our District. To support this funding request further information/evidence will be required. The works that qualify for this expenditure include but are not limited to:

- Bridge Replacements
- Small isolated geometric improvements
- Intersection improvements
- Lighting improvements for safety
- Provision of guard railing
- Sight benching to improve visibility
- Safety footpaths that conform to Waka Kotahi (NZTA) policy

Council has allowed in its 2021/22 budget funding of \$443,000 for Low Cost Low Risk projects of local roads. It is anticipated that this application to Waka Kotahi (NZTA) will be approved in full and it has been supported by the bridge replacement programme.

10.5 KEY FACTORS ASSUMED

Key factors assumed in the financial forecasts are as follows:

- Waka Kotahi (NZTA) will continue to provide financial support to Council for the road network
- The Council will continue to fund the level of service currently set out in this AMP and set out in the 2021-31 LTP
- The dollar values shown in this Plan are December 2020 dollars
- Renewal costs are best available estimates, based on current network needs, some especially very long-term estimates (greater than five years), are rough order of cost estimates that need to be further researched and refined
- The effects of known very likely or future developments are included.
- Assumptions made on Total Useful Lives and Residual Useful Lives of the assets in relation to the asset valuation.
- The asset data is considered to be reliable and fit for the purpose for developing the long-term financial forecasts.
- A static Waka Kotahi (NZTA) Funding Assistance Rate (FAR) of 51% (first year of the LTP 2021)
- No account has been made for potential change in level of service and resultant co-investment as direct result of implementing One Network Road Classification.
- The current level of development will slow down by about a third but continue at that rate for the duration of this plan.

11 ACTIVITY MANAGEMENT IMPROVEMENT PLAN

11.1 STATUS OF AM PRACTICES

This section provides details of how Council plans to improve its transportation asset management practises, included in the Transportation AMP.

This AMP has previously been reviewed and updates incorporated including improvements to ensure “Core+” level Asset Management is met. Council is committed to a continual improvement as outlined in this section of the AMP. A key objective is to dovetail the activity management planning process with the other key planning processes particularly the Community Plan (LTP).

11.2 IMPROVEMENT PROGRAMME

The review and improvement of this AMP requires resource and budget in order to complete the selected improvement tasks. The table below outlines the items for improvement, relative urgency, resource, priority, budget and the authority sought to give approval to complete each item.

11.3 MONITORING AND REVIEW PROCEDURES

11.3.1 3 Year Review

This AMP is to be reviewed on a 3-yearly basis, with the next full review taking place in 2022. During the three-year period leading up to this review, the items in the Improvement Programme will be addressed within the timeframes indicated. These improvements can then be incorporated into the next review of the AMP.

This AMP is also audited externally with the review including process, data integrity and Levels of Service. The last external audit was completed by Waka Kotahi (New Zealand Transport Agency) in 2017.

11.3.2 Annual Review

At the completion of each annual budgeting period the financial forecasts are to be updated to include the new Yr. 10 figures and any changes made to the intervening budgets by the Council.

By the end of July each year asset inventory data to be updated in RAMM to reflect the previous financial year’s maintenance and renewal activities. Data accuracy is to be verified by completing a random 10% network audit.

11.3.3 Improvement Plan

The following table outlines the general improvement plan which Council will undertake over the next 2021-2024 LTP funding block. This shows both the current status of the project and the action to be undertaken.

Item	Status (2018 - 21)	Action (2021 - 24)
Further analysis of seal lives through the installation of calibration sites document and recommendations	From 2018	Continue
	Incomplete	
Carry out falling weight deflectometer (FWD) testing to assess pavement strength given we know they are limited from historic dig outs that have been completed as well as see in the form of frost heave in winter months	MSD Testing Carried out instead over a snapshot of the district 2020.	Complete. Analysis of the data required 2020 – 21 LTP
Complete test pits to confirm pavement depths to add to our knowledge of the network	From 2018	Continue programme
	Partially done as limited dig outs completed.	
Investigate the cost high speed data (HSD) capture, road-roid, laser profile meter testing and other apps that may be developed to gather evidence	From 2018	Completed
	Completed, determined to be not cost effective for MDC network. As above MSD proceeded with as above.	
Improve traffic count data and create traffic model to build an entire, reliable traffic flow model of the network	From 2018	Continue programme
	Partially done. Recollecting data begun.	
Plot sealed pavement repairs on a network map to view any trends and areas that may require further pavement rehabilitation	From 2018	Continue
	Completed, this functionality is now available in RAMM	
Write up and publish a formal maintenance intervention strategy document to outline intervention for various levels and types of faults	From 2018	Continue programme
	Partially done, part of maintenance contract review, Draft document formed with ARC.	
Review grading schedules	From 2018	Completed

Item	Status (2018 - 21)	Action (2021 - 24)
	Completed, determined to be effective in combination with modified material strategy	
Continue to monitor gravel loss surveys on various network locations and conditions to build a picture of performance on wearing course longevity and to better understand the wear	From 2018	Continuing programme
	Partially done	
		Add project to undertake rigorous data assessment and analysis.
Continue to trial and improve granular metaling material from different sources trying to improve performance on our unsealed roads by reducing grading, improved environmental performance and greater resilience	From 2018	Ongoing trials to refine. Continue looking for further resources and to further enhance metalling properties.
	Completed, determined to be effective	
Forward Works Programme for unsealed metaling going forward	From 2018	Completed. Could be constructed for longer life using the previous learnings.
	Completed, determined to be effective in combination with modified material strategy	
Carry out further traffic counts with additional equipment to provide a better understanding of use and interconnection of areas.	New	
Assess the most effective way of completing drainage maintenance works.	From 2018	Complete
	Complete	
Culverts that can't currently handle the flows under peak discharge, assess the catchment area and calculate the peak discharge vs the time of concentration to see if the existing culvert is sized correctly or is insufficient and requires replacement.	From 2018	Continuing
	Incomplete	
Assess culvert types and materials to ensure best value for money is being achieved for the whole of life.	From 2018	Complete

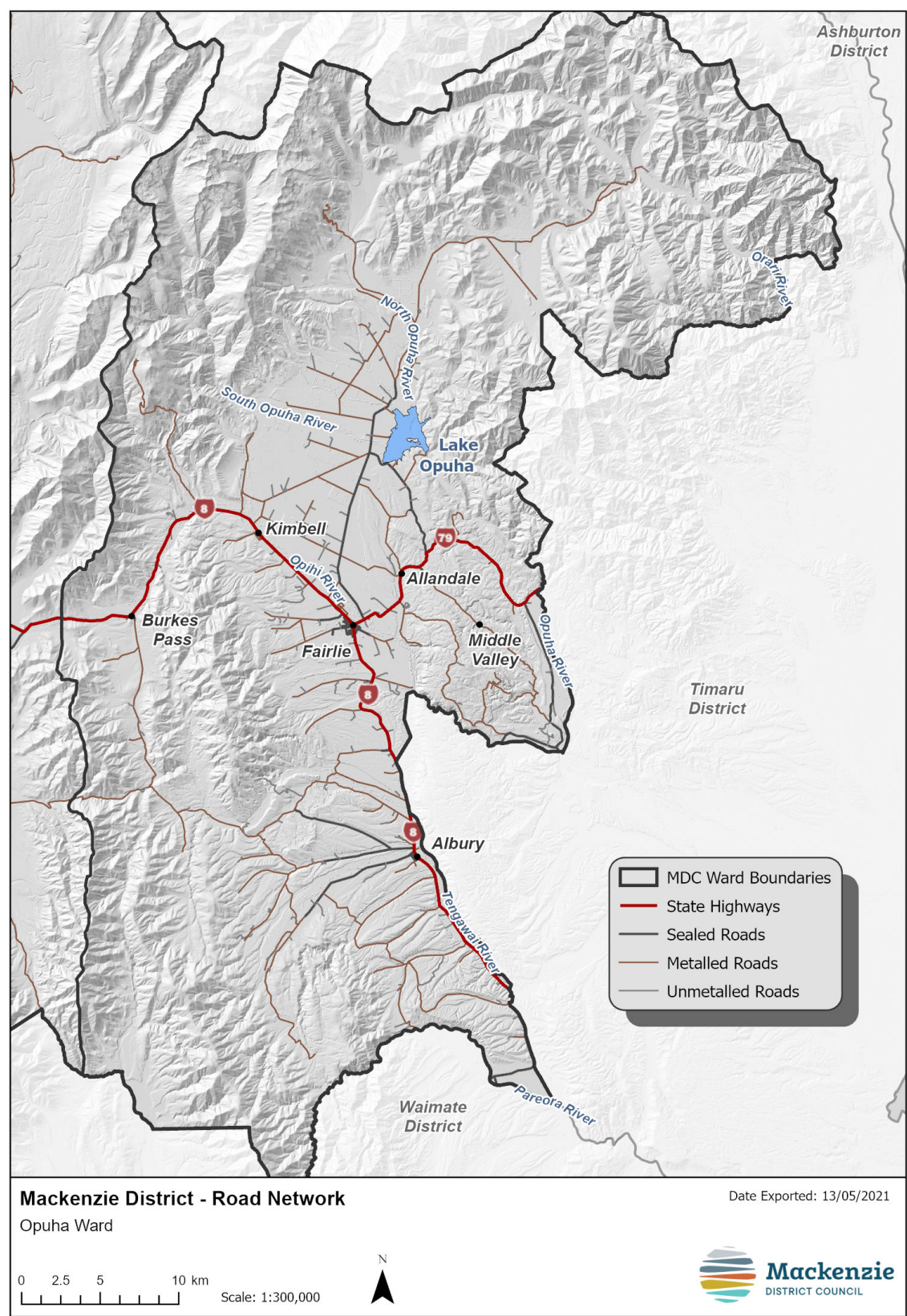
Item	Status (2018 - 21)	Action (2021 - 24)
	Complete	
Assess if with change in product there are cost savings on cartage/ installation.	From 2018	Completed
	Completed, determined to be not cost effective for MDC network	
Try to remove high shoulder, detritus material or vegetation that may impede or block flow of water into or alone water way.	From 2018	Continue programme
	Partially done, proven to work well as part of modified materials strategy for unsealed roads (adds clay/fines)	
Create a list of essential drainage to maintain on an annual basis	From 2018	Continue. Form FWP for drainage
	Incomplete	
Assess if drainage maintenance is under invested given lowest in peer group for this work category	From 2018	Continue
	Incomplete	
Assess overweight permits and determine heavy vehicle requirements across network.	New	
Look into the impacts of 50 Max operating on our network and consider risks of opening certain areas.	New	
Assess HPMV requirements and work out how many are non-compliant on important routes.	New	
Consider lifeline routes and structures the are key to the delivery of essential services in district for resilience purposes in the case of a natural disaster/ event.	New	
Exploring the options of connectivity and interconnection within our towns and the interlinking opportunities to interconnect our towns through active modes in future to reduce risk on the highway network by providing a suitable safe alternative rather than having modes mixing.	New	

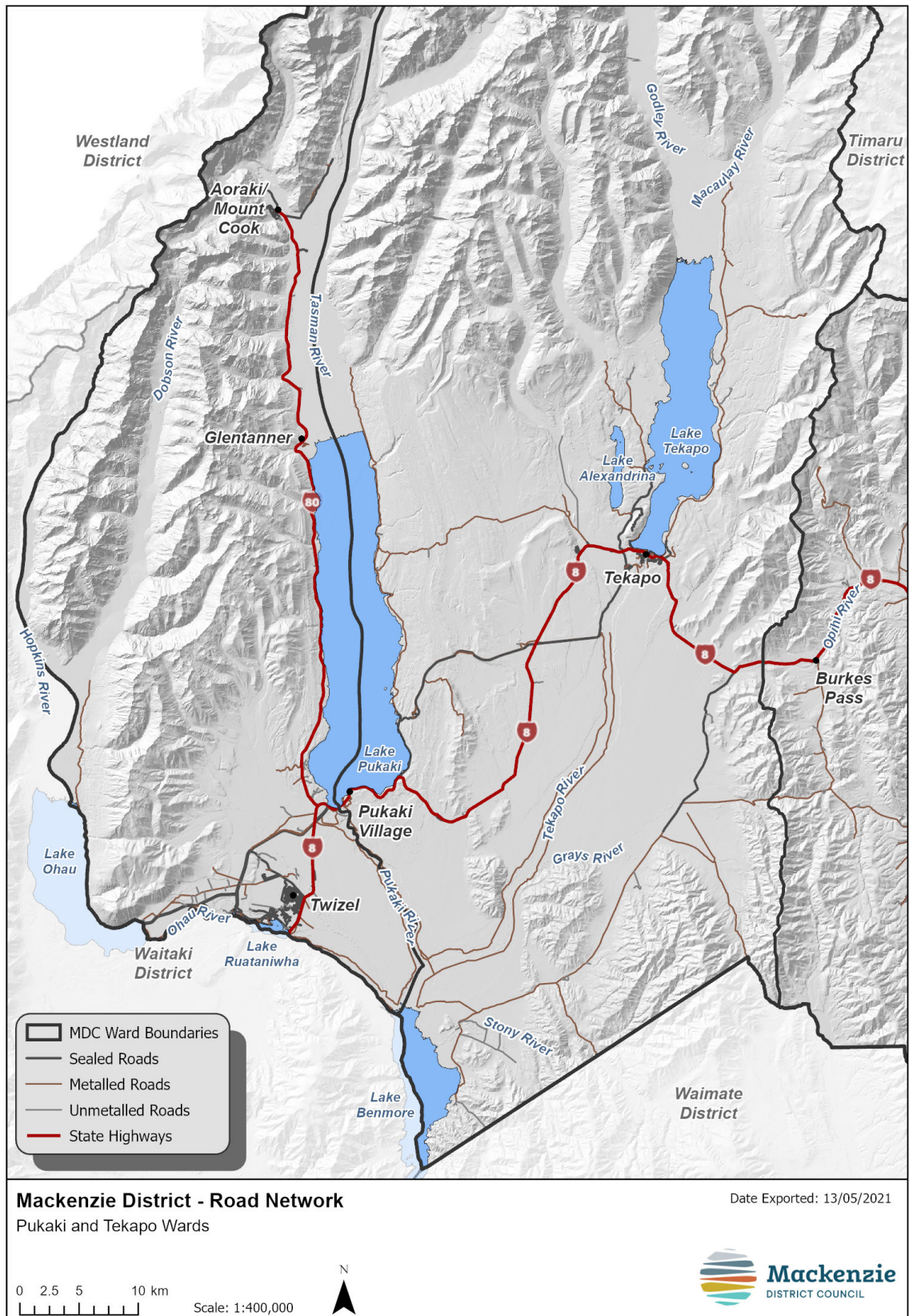
Item	Status (2018 - 21)	Action (2021 - 24)
Data capture of pedestrian use and monitoring this over time in a more strategic way to provide a better understanding of the network complexities	New	
Recording a list of seasonal signage and keeping it up to date.	Complete	Continue to update as new seasonal signage is installed
Keeping similar levels of service across tourism routes.	Progressing	Continue to work on delineation strategy with ARC partners and adopt and implement
Ensure a similar message is communicated across ONRC classifications.	Progressing	Continue to work on delineation strategy with ARC partners and adopt and implement
Optimise signage to limit the costs but provide an adequate level of service.	Actioned	WIP - requires some formal policy and procedure
Develop a signage strategy	New	
Implement the wayfinding strategy	New	
Investigate treatments for urbanisation and traffic control device interventions to address problems and ensure safety of the network is maintained to an appropriate standard	New	
Further analysis of seal lives through the installation of calibration sites document and recommendations	From 2018	Continue
	Incomplete	
Carry out falling weight deflectometer (FWD) testing to assess pavement strength given we know they are limited from historic dig outs that have been completed as well as see in the form of frost heave in winter months.	From 2018	Continue
	Incomplete	
Complete test pits to confirm pavement depths to add to our knowledge of the network.	From 2018	Continue programme

Item	Status (2018 - 21)	Action (2021 - 24)
	Partially done	
Investigate the cost high speed data (HSD) capture, road-roid, laser profile meter testing and other apps that may be developed to gather evidence.	From 2018	Completed
	Completed, determined to be not cost effective for MDC network	
Improve traffic count data and create traffic model to build an entire, reliable traffic flow model of the network.	From 2018	Continue programme
	Partially done	
Plot sealed pavement repairs on a network map to view any trends and areas that may require further pavement rehabilitation.	From 2018	Continue
	Completed, this functionality is now available in RAMM	
Write up and publish a formal maintenance intervention strategy document to outline intervention for various levels and types of faults.	From 2018	Continue programme
	Partially done, part of maintenance contract review	
Further analysis of seal lives through the installation of calibration sites document and recommendations	From 2018	Continue
	Incomplete	
Carry out falling weight deflectometer (FWD) testing to assess pavement strength given we know they are limited from historic dig outs that have been completed as well as see in the form of frost heave in winter months	From 2018	Continue
	Incomplete	
Complete test pits to confirm pavement depths to add to our knowledge of the network	From 2018	Continue programme
	Partially done	
Investigate the cost high speed data (HSD) capture, road-roid, laser profile meter testing and other apps that may be developed to gather evidence	From 2018	Completed
	Completed, determined to be not cost effective for MDC network	
Improve traffic count data and create traffic model to build an entire, reliable traffic flow model of the network	From 2018	Continue programme
	Partially done	
	From 2018	Continue

Item	Status (2018 - 21)	Action (2021 - 24)
Plot sealed pavement repairs on a network map to view any trends and areas that may require further pavement rehabilitation	Completed, this functionality is now available in RAMM	
Write up and publish a formal maintenance intervention strategy document to outline intervention for various levels and types of faults	From 2018	Continue programme
	Partially done, part of maintenance contract review	
Further analysis of seal lives through the installation of calibration sites document and recommendations	From 2018	Continue
	Incomplete	
Carry out falling weight deflectometer (FWD) testing to assess pavement strength given we know they are limited from historic dig outs that have been completed as well as see in the form of frost heave in winter months	From 2018	Continue
	Incomplete	
Complete test pits to confirm pavement depths to add to our knowledge of the network	From 2018	Continue programme
	Partially done	
Investigate the cost high speed data (HSD) capture, roadroid, laser profile meter testing and other apps that may be developed to gather evidence	From 2018	Completed
	Completed, determined to be not cost effective for MDC network	
Improve traffic count data and create traffic model to build an entire, reliable traffic flow model of the network	From 2018	Continue programme
	Partially done	
Plot sealed pavement repairs on a network map to view any trends and areas that may require further pavement rehabilitation	From 2018	Continue
	Completed, this functionality is now available in RAMM	
Write up and publish a formal maintenance intervention strategy document to outline intervention for various levels and types of faults	From 2018	Continue programme
	Partially done, part of maintenance contract review	

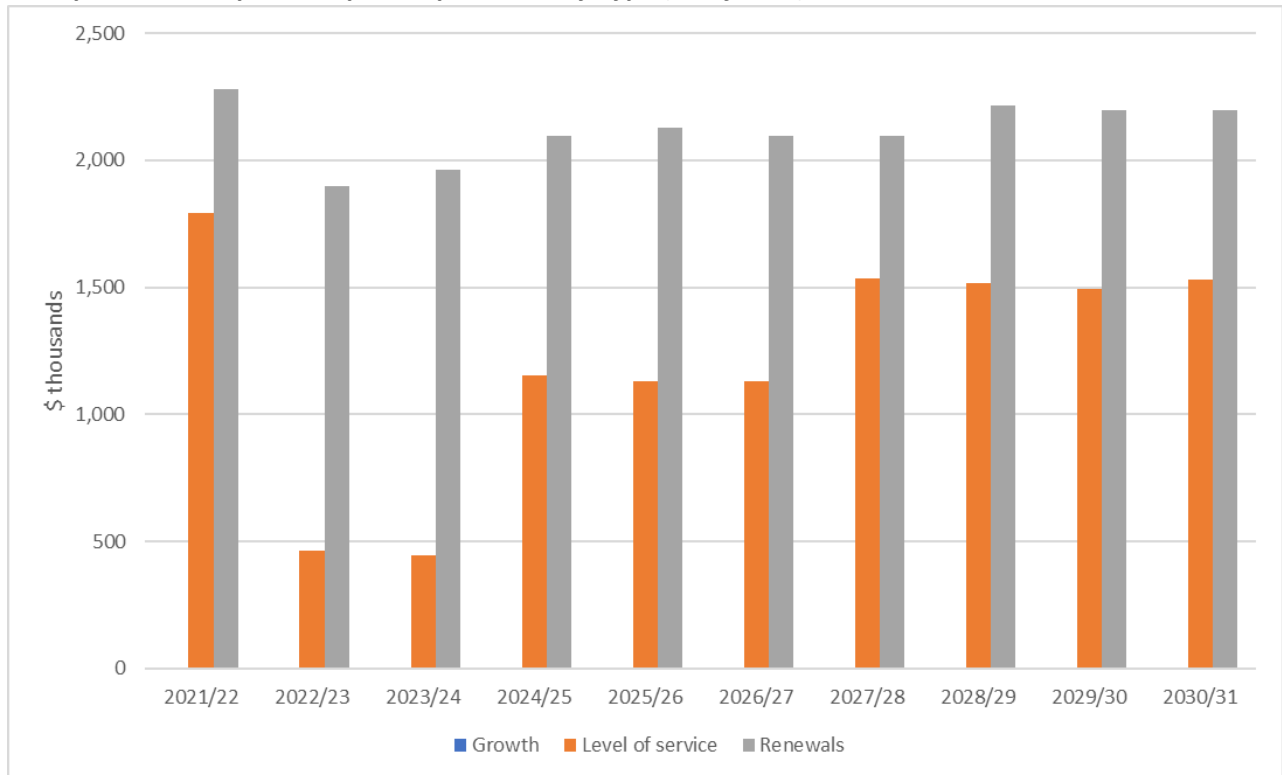
APPENDIX I. DISTRICT MAP



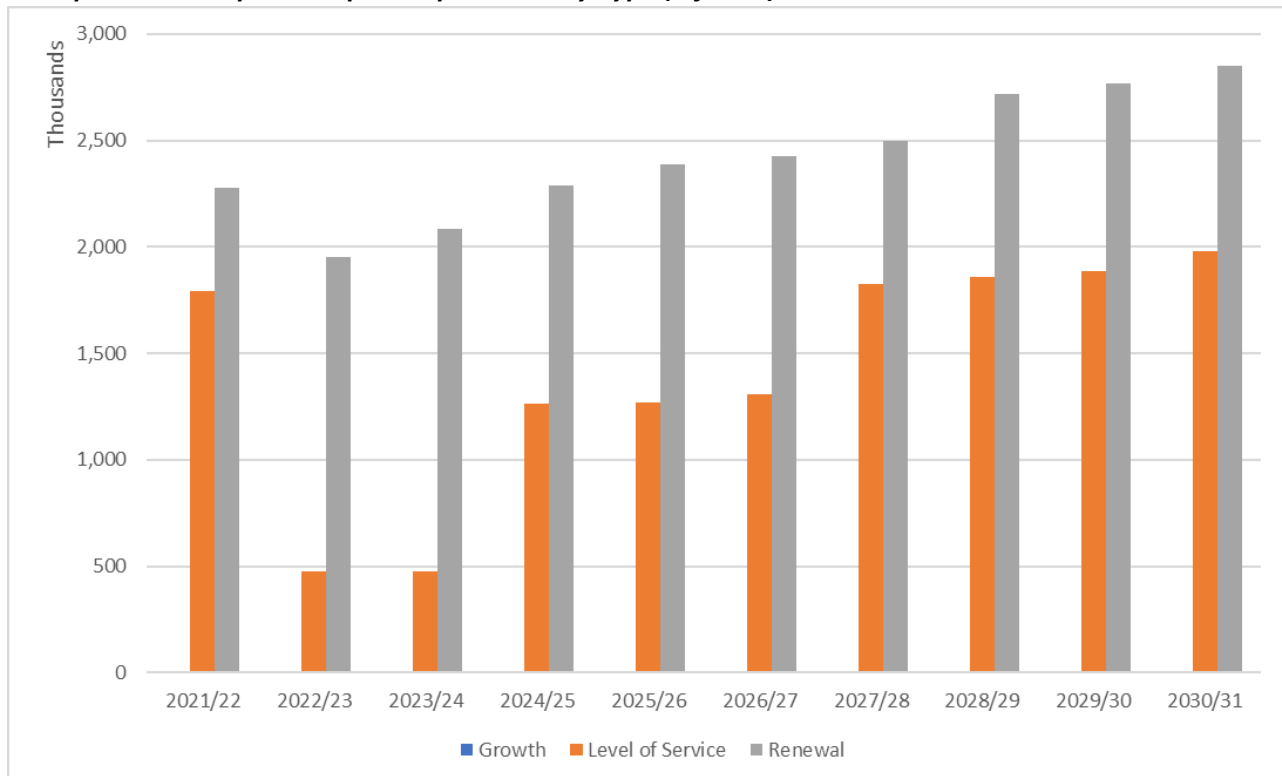


APPENDIX II. FINANCIAL FORECASTS

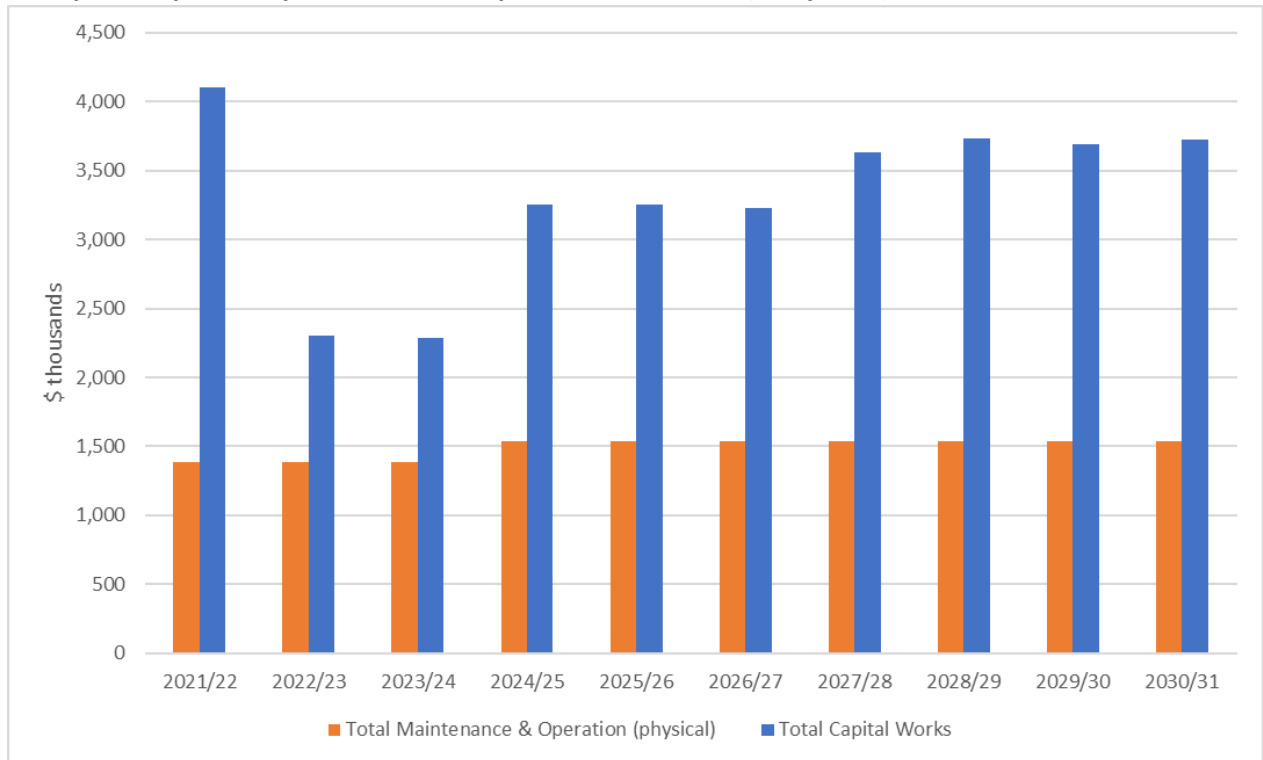
Transportation Proposed Capital Expenditure by Type (uninflated)



Transportation Proposed Capital Expenditure by Type (Inflated)



Transport Proposed Capital and M&O Expenditure over time (uninflated)



Transport Proposed Capital and M&O Expenditure over time (Inflated)

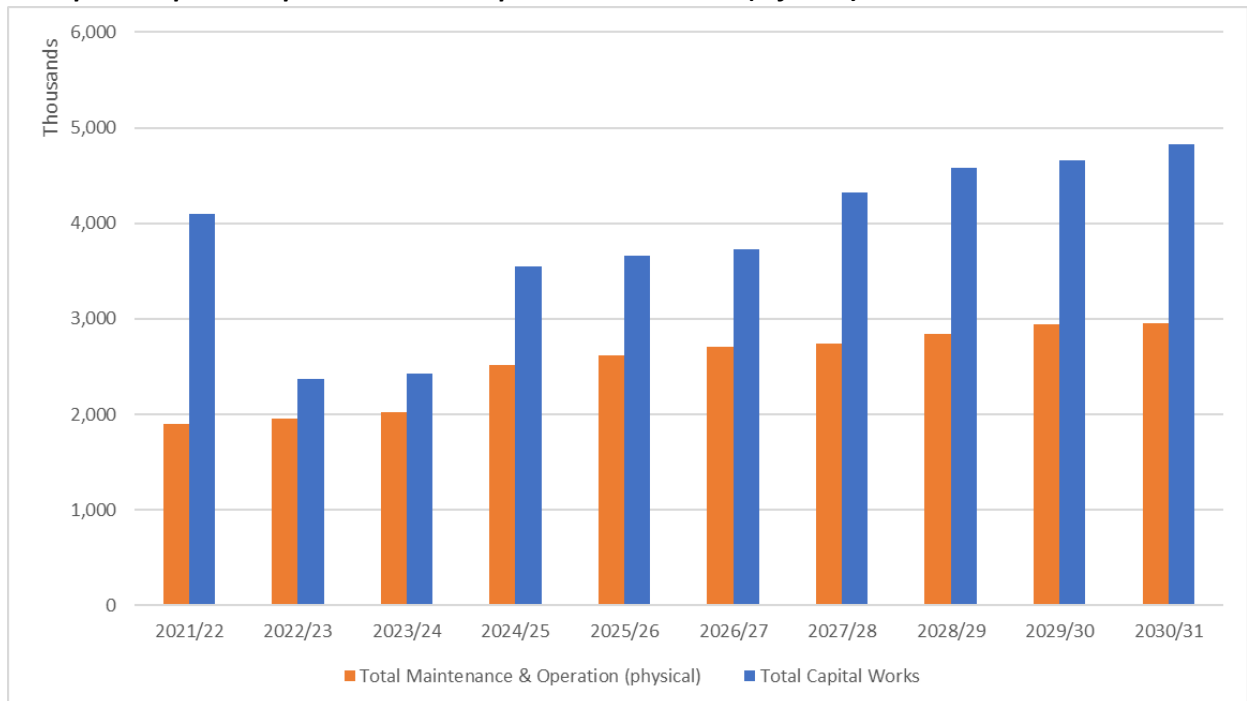


Table 34 Uninflated Transportation Costs

ROADING (\$ thousands - Uninflated)	LTP	LTP	LTP	LTP	LTP	LTP	LTP	LTP	LTP	LTP
	1	2	3	4	5	6	7	8	9	10
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Growth	0	0	0	0	0	0	0	0	0	0
Level of service	1,792	462	447	1,155	1,129	1,131	1,533	1,518	1,495	1,528
Renewals	2,310	1,837	1,837	2,096	2,126	2,096	2,096	2,217	2,196	2,196
Total Capital Works	4,102	2,299	2,284	3,251	3,255	3,227	3,629	3,735	3,691	3,724
Total Maintenance & Operation	1,896	1,903	1,923	2,330	2,368	2,395	2,367	2,393	2,413	2,366

Table 35 Inflated Transportation Costs

ROADING (\$ thousands - Inflated)	LTP	LTP	LTP	LTP	LTP	LTP	LTP	LTP	LTP	LTP
	1	2	3	4	5	6	7	8	9	10
	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Growth	0	0	0	0	0	0	0	0	0	0
Level of service	1,792	476	475	1,262	1,269	1,308	1,825	1,860	1,885	1,982
Renewals	2,310	1,893	1,950	2,290	2,390	2,425	2,495	2,716	2,768	2,848
Total Capital Works	4,102	2,370	2,425	3,552	3,659	3,733	4,321	4,576	4,653	4,831
Total Maintenance & Operation	1,896	1,956	2,028	2,512	2,616	2,710	2,745	2,844	2,937	2,955

Table 36: Annual Net Cost – Funding Impact Statement (inflated)

Roading Supply	Annual Plan 2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/2030	2030/31
	(thousands)										
General rates, uniform annual general charges, rates penalties	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	1021	1108	1427	1732	2468	2934	3299	3612	4034	4122	4129
Subsidies and grants for operating purposes	953	943	970	998	1009	1036	1065	1094	1130	1155	1187
Fees and charges	0	0	0	0	0	0	0	0	0	0	0
Internal charges and overheads recovered	0	0	0	0	0	0	0	0	0	0	0
Local authorities fuel tax, fines, infringement fees, and other receipts	0	95	98	101	103	106	109	112	116	119	122
Total Operating Funding (A)	1974	2146	2495	2831	3580	4076	4473	4818	5280	5396	5438
Applications of Operating Funding											
Payments to staff and suppliers	1723	1854	1896	1958	2405	2494	2579	2592	2687	2779	2796
Finance costs	0	11	39	49	68	83	91	115	119	119	119
Internal charges and overheads applied	22	35	36	36	54	55	56	57	58	60	61
Other operating funding applications	0	0	0	0	0	0	0	0	0	0	0
Total applications of operating funding (B)	1745	1900	1971	2043	2527	2632	2726	2764	2864	2958	2976
Surplus (deficit) of operating funding (A-B)	229	246	524	788	1053	1444	1747	2054	2416	2438	2462
Sources of capital funding											
Subsidies and grants for capital expenditure	1530	1826	1188	1211	1685	1728	1762	2052	2175	2211	2291
Development and financial contributions	0	0	0	0	0	0	0	0	0	0	0
increase (decrease) in debt	0	1949	657	426	815	486	225	215	-14	4	77
Gross proceeds from sale of assets	0	0	0	0	0	0	0	0	0	0	0
Lump sum contributions	0	0	0	0	0	0	0	0	0	0	0
Other dedicated capital funding	0	0	0	0	0	0	0	0	0	0	0

Total sources of capital funding (C)	1530	3775	1845	1637	2500	2214	1987	2267	2161	2215	2368
Capital expenditure											
- to meet additional demand	0	0	0	0	0	0	0	0	0	0	0
- to improve the level of service	1445	1792	476	475	1262	1269	1308	1825	1860	1885	1982
- to replace existing assets	1759	2310	1893	1950	2290	2390	2425	2495	2716	2768	2848
Increase (decrease) in reserves	-1445	-81	0	0	1	-1	1	1	1	0	0
Increase (decrease) of investments	0	0	0	0	0	0	0	0	0	0	0
Total applications of capital funding (D)	1759	4021	2369	2425	3553	3658	3734	4321	4577	4653	4830
Surplus (deficit) of capital funding (C-D)	-229	-246	-524	-788	-1053	-1444	-1747	-2054	-2416	-2438	-2462
Funding Balance ((A-B)+(C-D))	0	0	0	0	0	0	0	0	0	0	0

APPENDIX III. BRIDGES - RESTRICTED

Bridge id	Hierarchy	Bridge name	Waterway	Displ (m)	Type	Restricted	No. Of lanes	Span length	Deck width	Bridge area
5	Local	Rocky Gully Bridge	Rocky Gully	17057	CBS	SPEED	1	24.6	4	98.4
9	Local	Fraser's Road Bridge No 2	Delamain Stream	1044	TMB	SPEED	1	7	3	21
13	Local	Coal Pit Road No 2	Little Opawa Stream	1730	TMB	WEIGHT	1	12	4.59	55.08
25	Local	Goodmans Bridge	Wellshot Stream	5200	TMB	WEIGHT	1	17	2.05	34.85
28	Local	Oldfields Road Bridge	Wellshot Stream North Branch	560	TMB	WEIGHT	1	7.5	2.85	21.375
41 ¹	Local	Clayton Settlement Bridge	North Opuha	502	JBT	SPEED	1	66	3.15	207.9
53	Collector	Lockharts Stream Bridge	Lockharts Stream	530	SBS	WEIGHT	1	14	2.9	40.6
58	Local	Single Hill Bridge		200	TMB	WEIGHT	1	12	2.75	33
70	Local	Grampians Bridge		1375	TMB	WEIGHT	1	5.6	2.25	12.6
72	Local	Stoney Creek Bridge	Stoney Creek	41340	SBS	WEIGHT	1	20.6	3.25	66.95
73 ²	Local	Stoney River Road Bridge	Stoney River	7360	TMB	WEIGHT	1	5	2.3	11.5
75	Collector	Washdyke Stream Bridge	Washdyke Stream	17175	SBS	WEIGHT	1	11	3.7	40.7
78	Local	Cass River Bridge	Cass River	16560	TMB	WEIGHT	1	124	3	372
84	Local	Jollie River Bridge	Jollie River	15520	SBS	WEIGHT	1	78	4.2	327.6
87	Local	Black Birch Stream	Black Birch Stream		TMB	WEIGHT	1			
89	Local	Mowbray Road Bridge	unknown	2670	TMB	WEIGHT	1	6.3	3.12	19.656
92 ²	Local	Stoney River Road Ford Bridge	Moffat Stream	6280	TMB	WEIGHT	1	5.8	2.28	13.224
None	Local	Fox Peak Ski Field			TMB	WEIGHT	1			

APPENDIX IV.MAINTENANCE PROCEDURE CHARTS

Road Maintenance

MACKENZIE DISTRICT COUNCIL

Road Maintenance

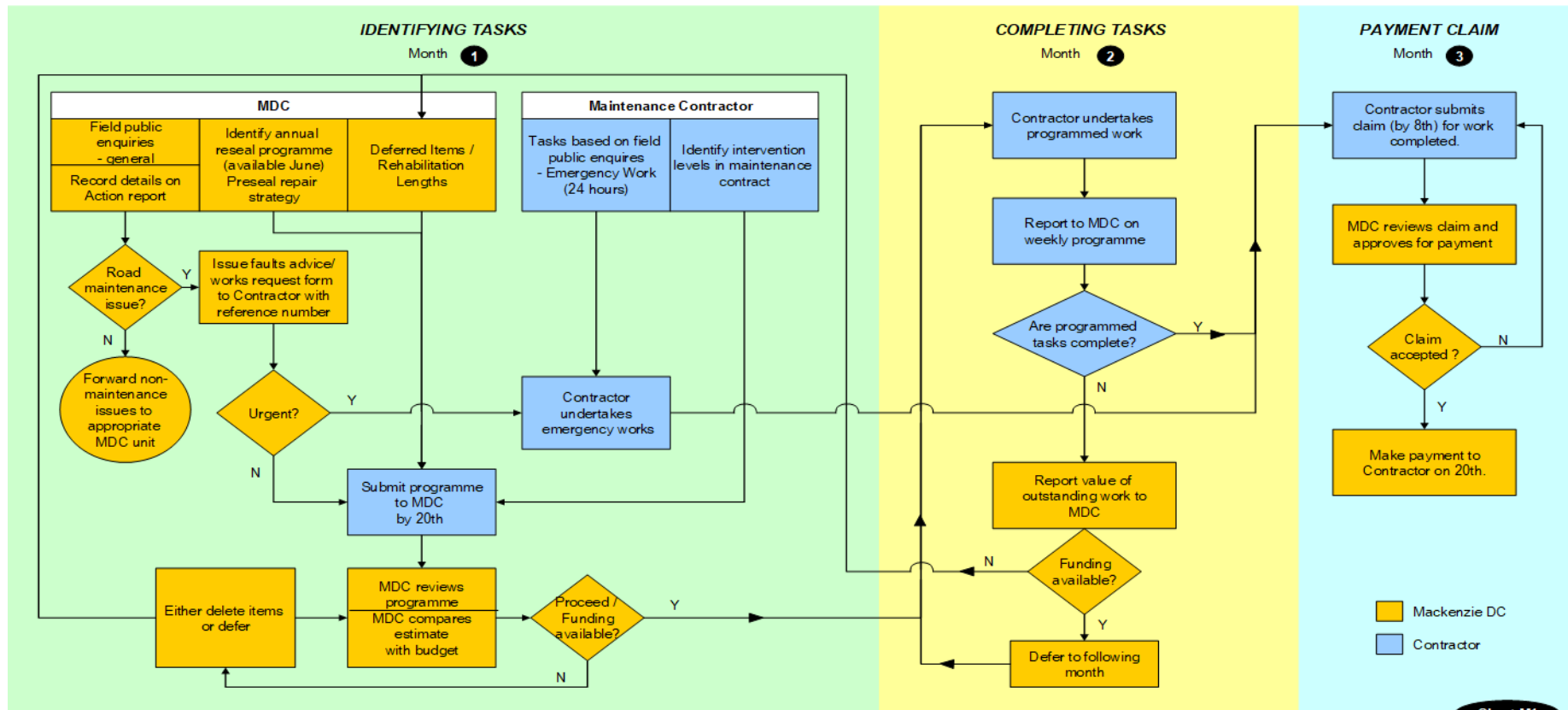
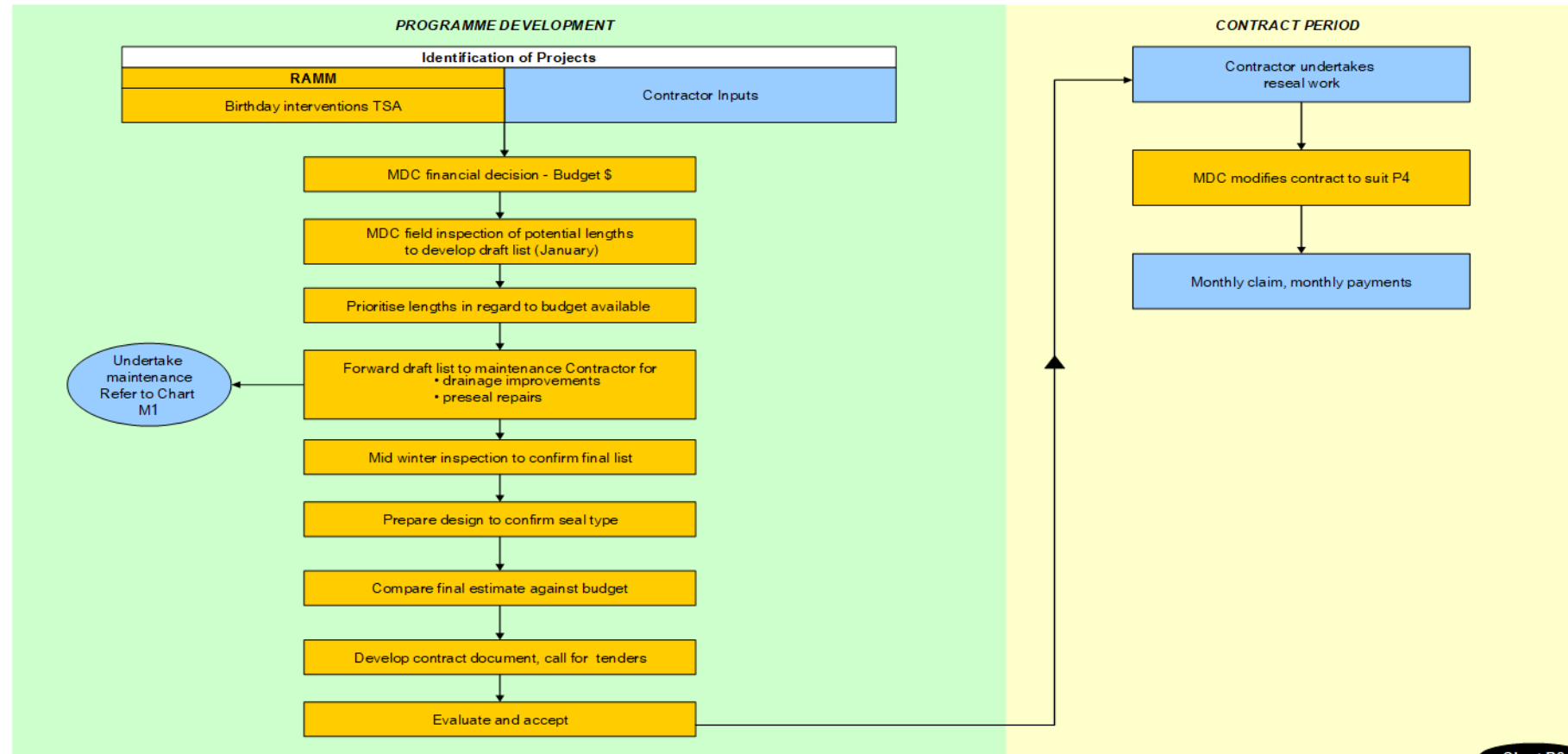


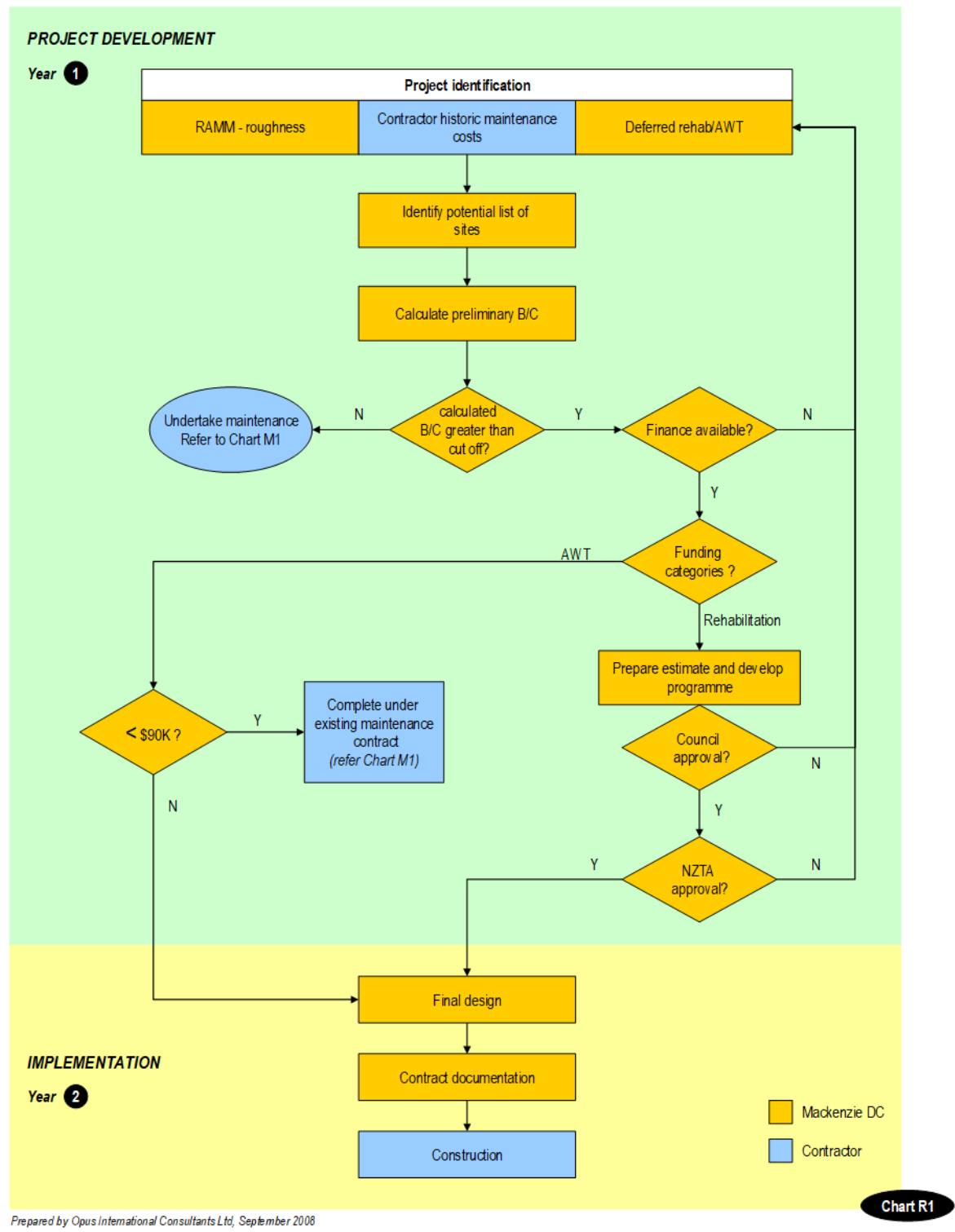
Chart M1

Prepared by Opus International Consultants Ltd, September 2008



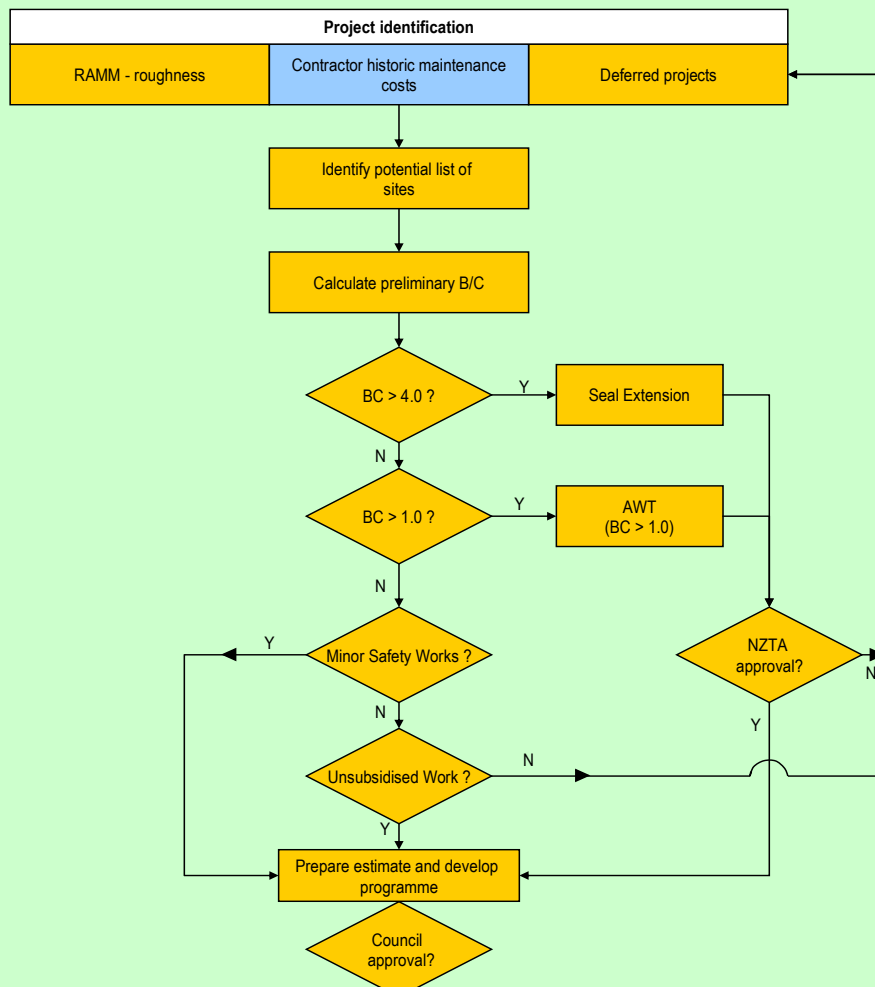
Prepared by Opus International Consultants Ltd, September 2008

Chart R2



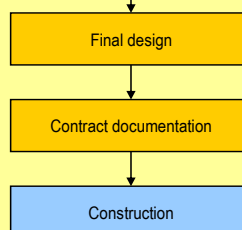
PROJECT DEVELOPMENT

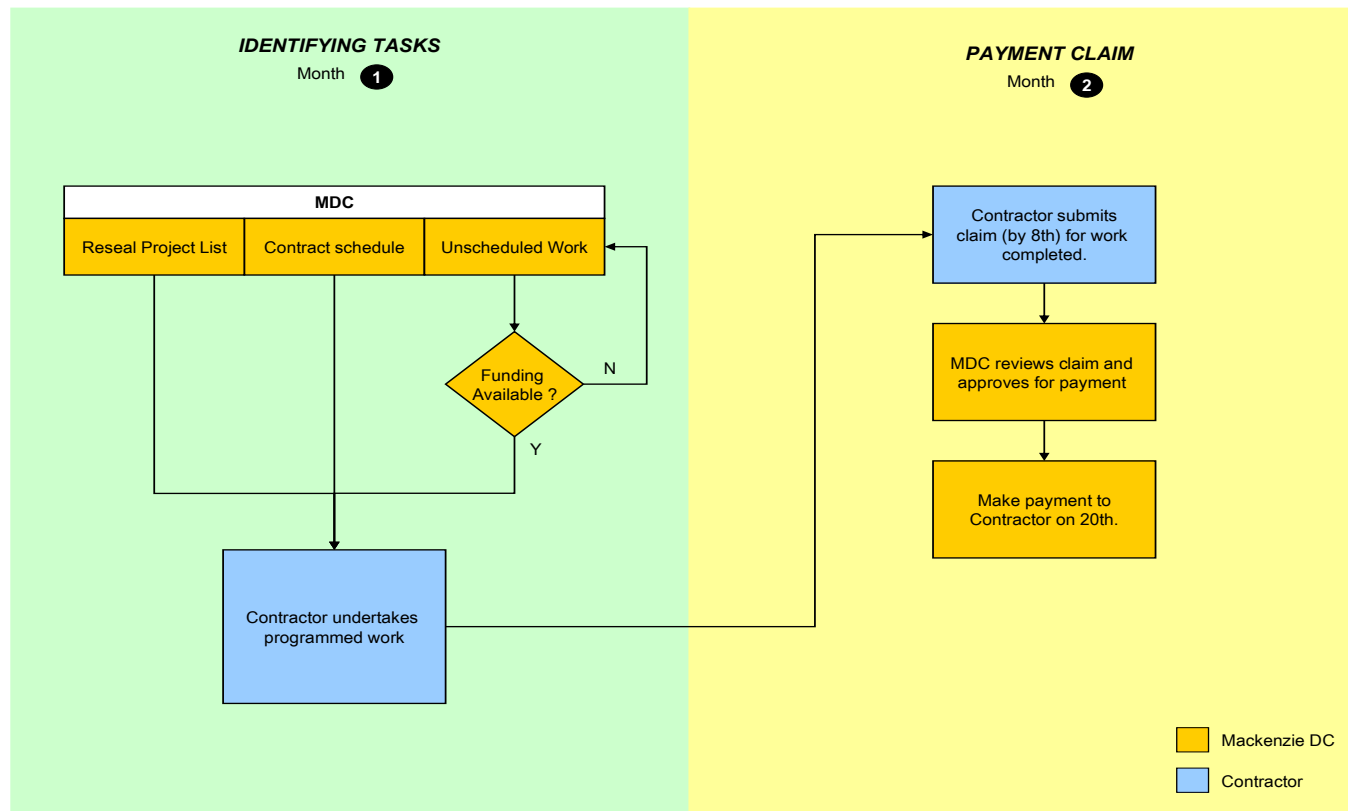
Year 1

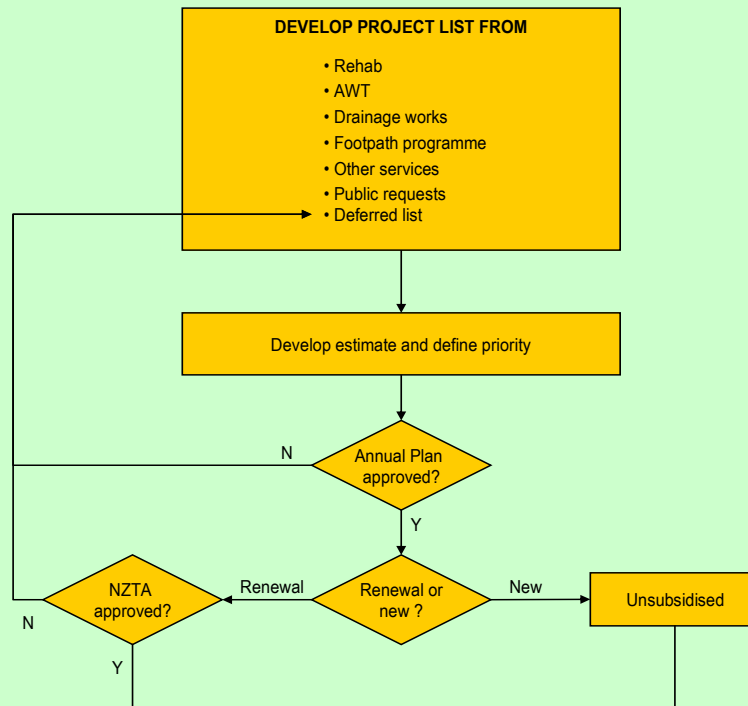
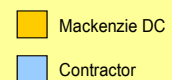
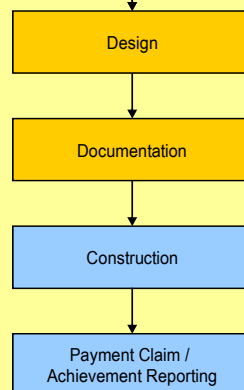


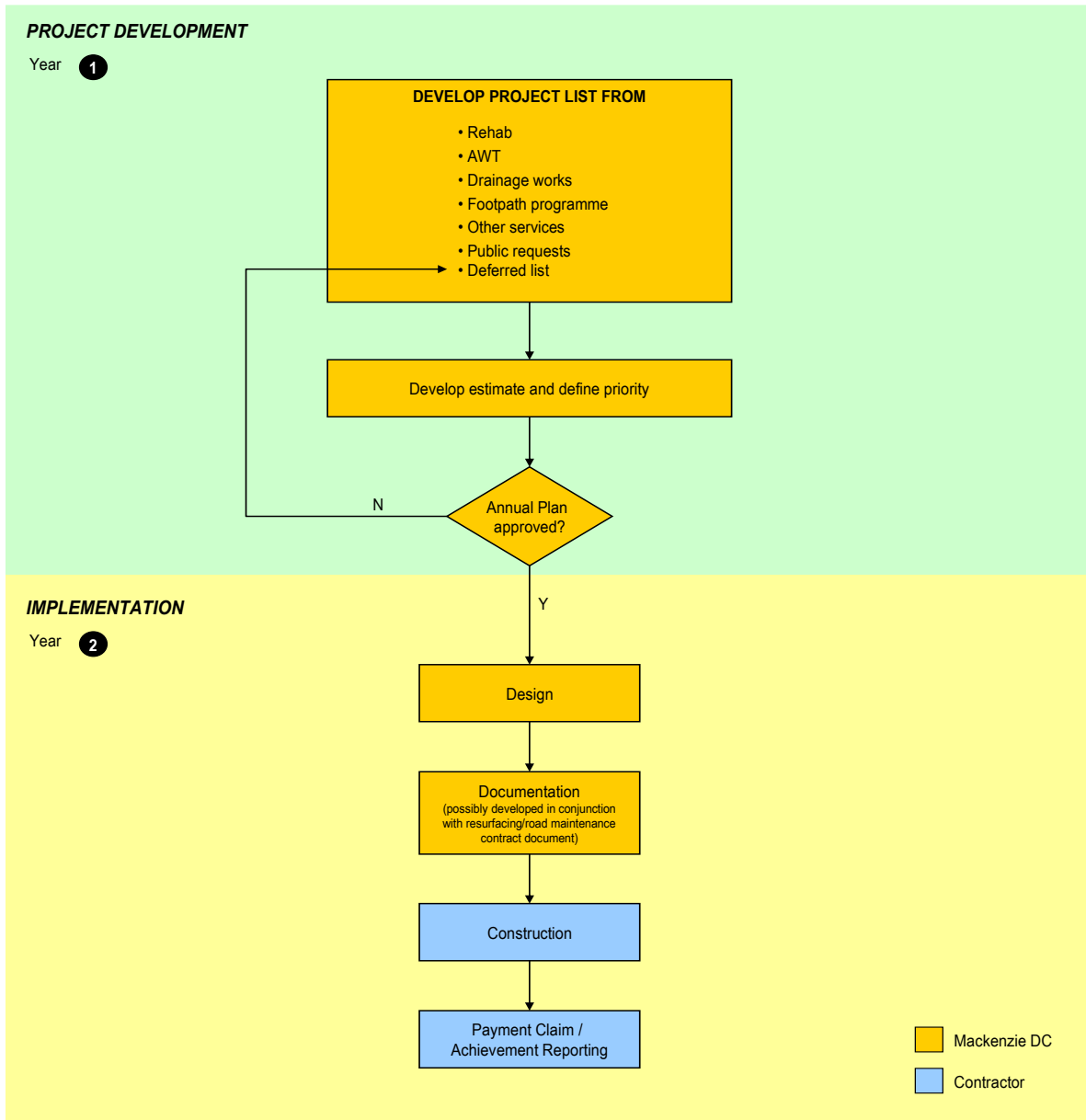
IMPLEMENTATION

Year 2





PROJECT DEVELOPMENTYear **1****IMPLEMENTATION**Year **2**



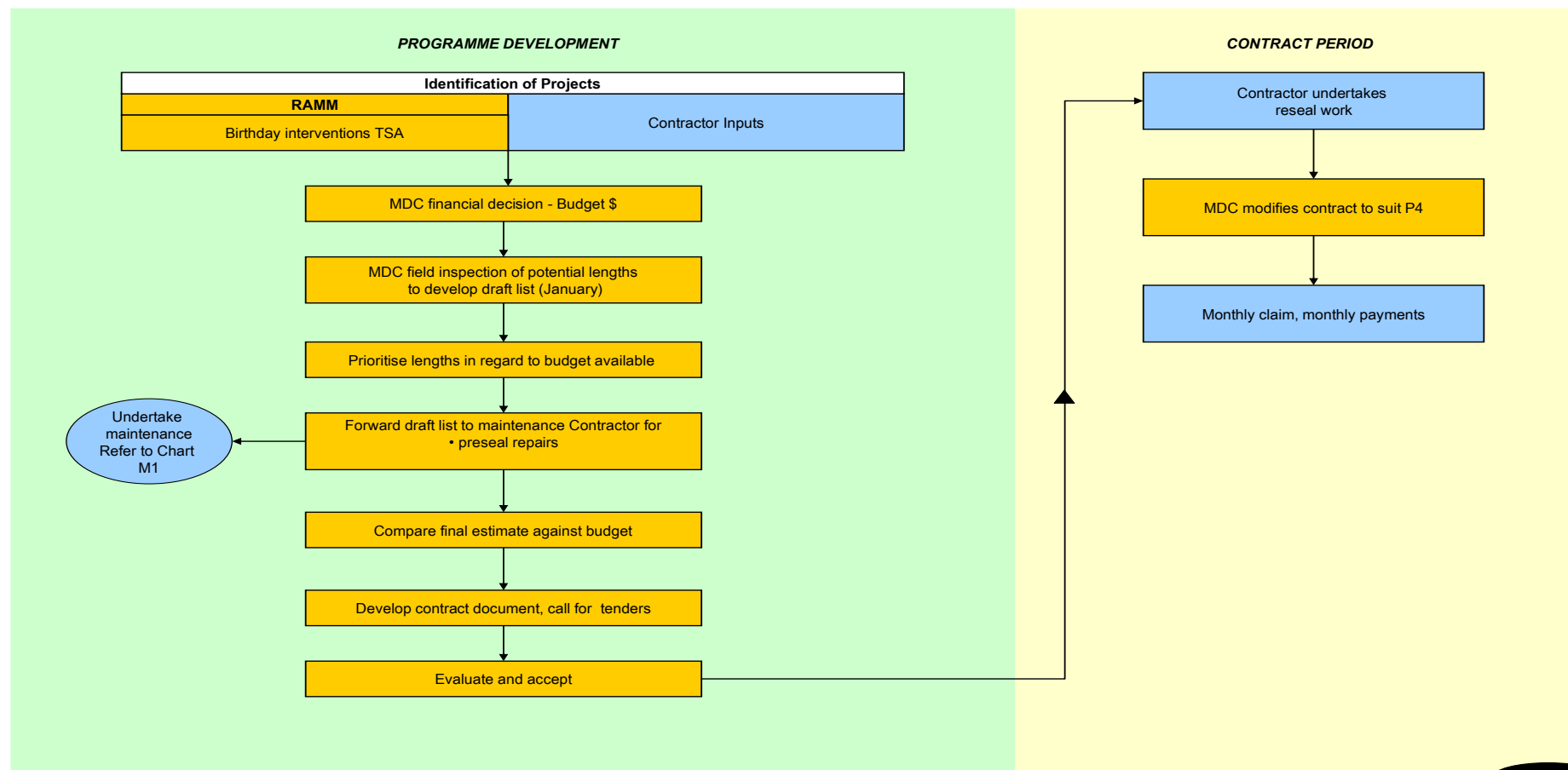
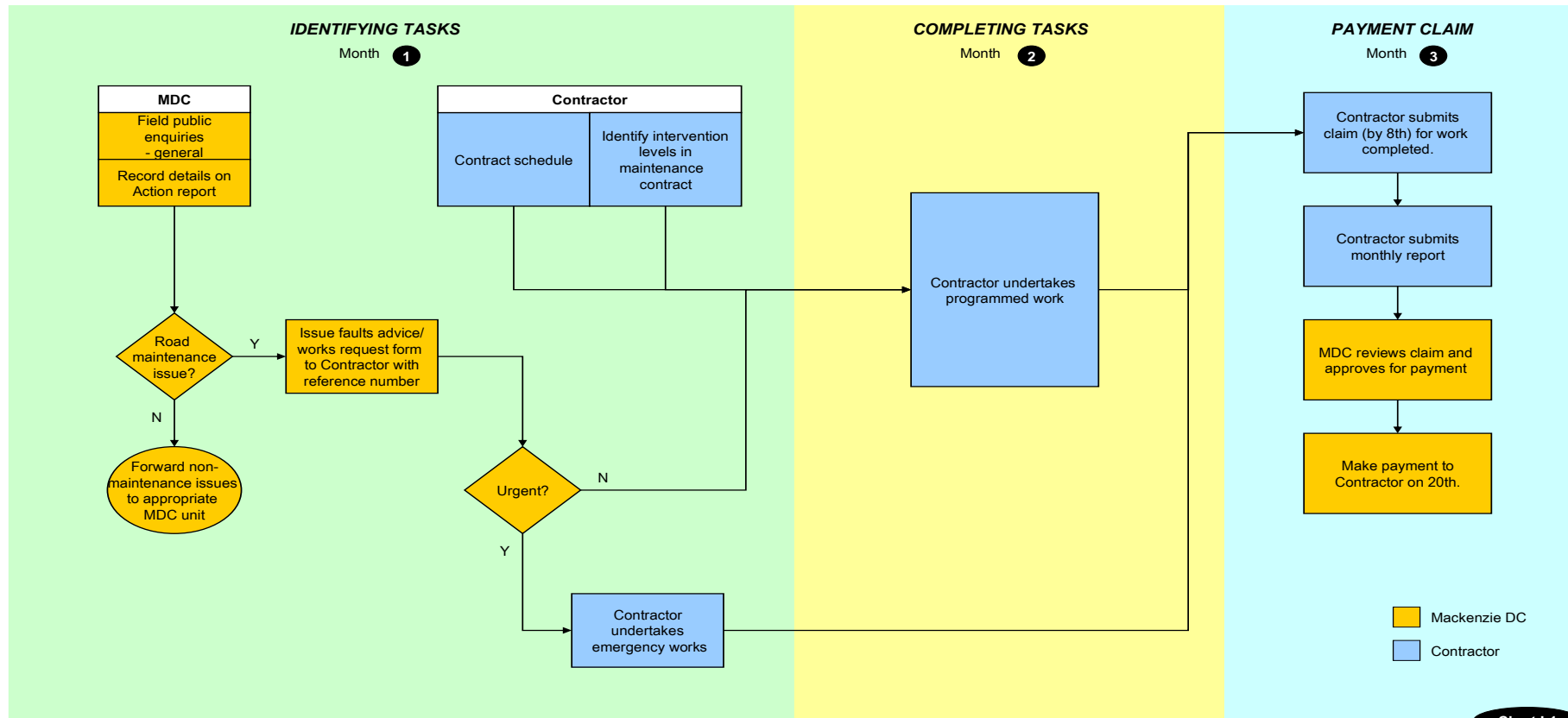
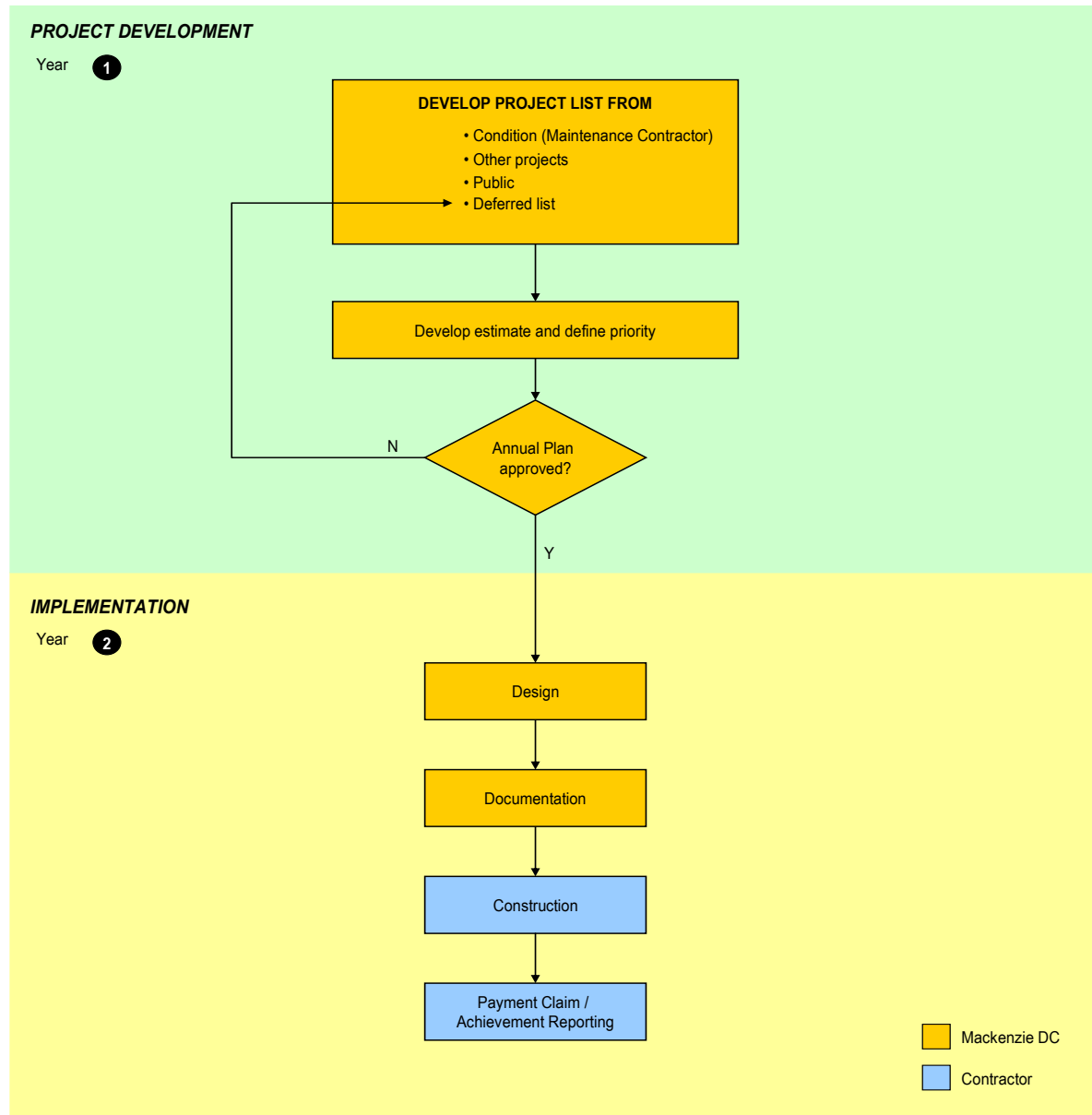


Chart F2



Prepared by Opus International Consultants Ltd, September 2008

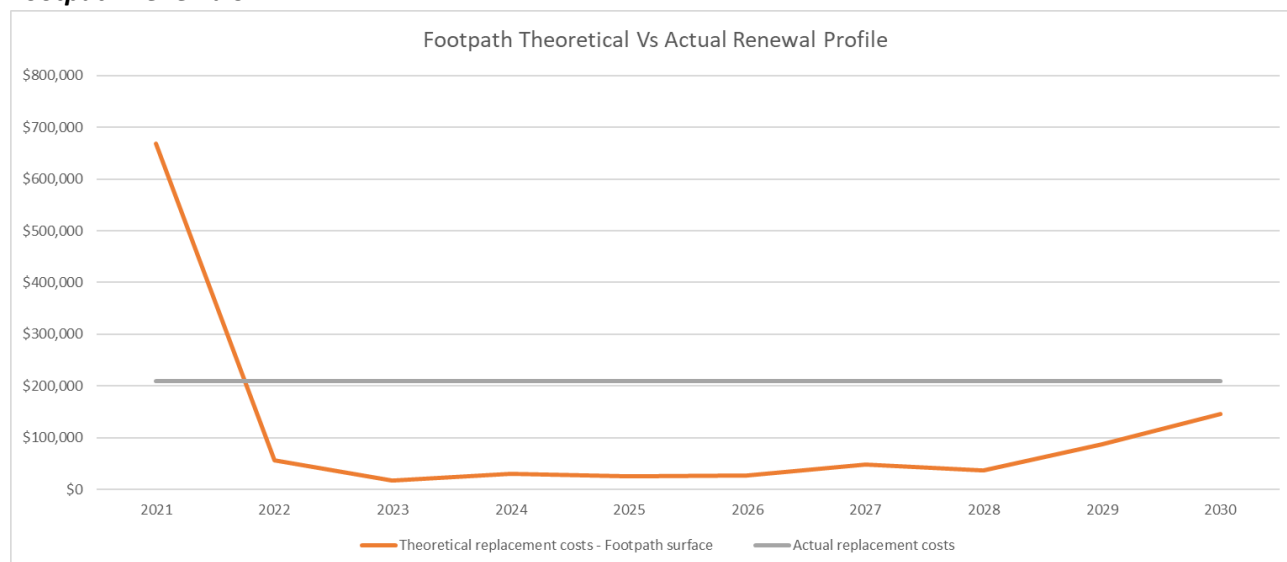
Chart L1



APPENDIX V. THEORETICAL RENEWAL PROFILES

The following theoretical renewal profiles were developed for Footpath assets and traffic services (lights and signs). Theoretical renewal profiles could not be developed for other assets due to a lack of sufficient data relating the current age of the asset. However, in some cases an average theoretical renewal cost could be estimated.

Footpath Renewals



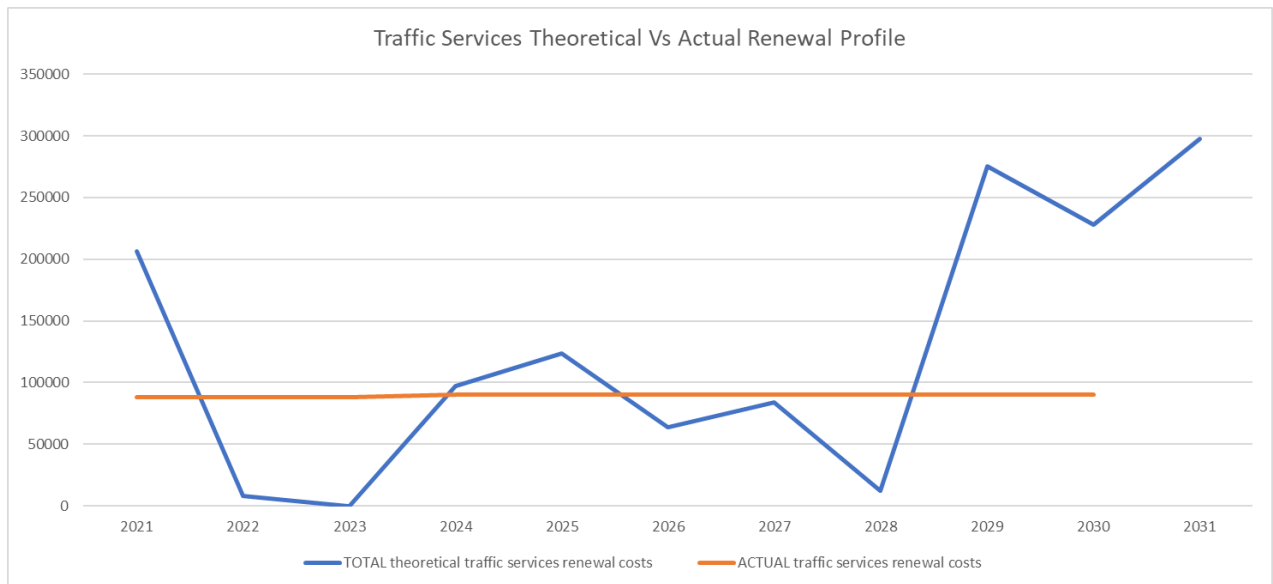
The above renewal profile was developed based on a number of assumptions:

- Assets which do not have a construction date or age were assumed to need replacing in year 1 of LTP period (i.e. 2021).
- 50% of the Metal footpaths will be replaced with Asphaltic material when renewed (therefore replacement costs are higher for 50% of the metal footpaths)
- Unit costs per material were sourced from the 2019/20 valuation report
- All costs which are presented are uninflated values

Currently the council are able to budget \$210,000 pa for this LTP period. Based on the theoretical renewals profile, this budget will likely be able to deliver the appropriate level of service without the risk of bow waves in the future.

Traffic Services Renewals

Traffic services include both lights and signage. A high-level estimation has been undertaken to determine a theoretical renewal profile which was then compared against the actual investment. It showed that the average theoretical cost of replacing these assets was slightly higher than actual over the next 10 years. However, it should be noted that the actual life span of these assets is expected to be longer than it's theoretical design life.



The above renewal profile was developed based on a number of assumptions:

- All lightbulbs were replaced this year - these are not currently within the RAMM data system and therefore are not considered within the theoretical renewal profile considered here
- The unit costs per pole were based on the unit costs (by length) sourced from 2019/20 valuation report
- The unit cost per lamp were based on the unit costs presented within 2019/20 valuation report.
- For assets with no recorded lamp installation date - the light installation date has been used as a proxy
- All values are presented as uninflated costs
- All signs which did not have an installation date were assumed to be replacing in year 1 of LTP (2021)

The Council are currently in the process of changing out our entire street light stock to LED. Once the renewals are complete and all the data is received, this will be inputted into RAMM and the streetlight renewal profile will change. The LED boards will last a lot longer than the previous bulbs 10yrs + from 3 years and in the majority of cases the fitting/housing of the light has also been replaced

Drainage renewals

The current LTP budgets between \$90,000 and \$110,000 pa (uninflated) on its drainage assets. The theoretical average annual renewal cost was estimated to be \$176,000 pa. However, this makes a conservative assumption that the average lifespan of the existing drainage assets is between 50 and 75 years when drainage assets can last to up to 100 years. It is assumed that this budget will be adequate to provide the appropriate level of service without causing a bow wave in the future.

Pavement Rehabilitation renewals:

The majority of council roads and assets have evolved over time meaning; the pavement was never 'properly' constructed in the first instance and also that data wasn't sufficiently recorded. Because of the general lack of information regarding the pavement condition, it has been assumed that the pavement acts like dirt or subgrade rather than a pavement. Some pavement testing has been undertaken this financial year and some work is still to be completed on the analysis of this data. This will help Council understand the relative condition of the pavement. Until there is enough data to

understand the condition of pavements, a provisional cost of \$130,000 per year has been budgeted for the pavement renewal in 2021/22. This increases to \$210,00 per year by 2024/25.

Bridges

The following bridge renewals have been deferred over this LTP due to funding limitations:

- o Otama Road
- o Coal Pit Rd No 2
- o Clayton Settlement
- o Single Hill
- o Cass River
- o Black Birch Stream

Council has also commenced a process to determine which of the above bridges can potentially be divested back to the owner or alternatively which bridges can be replaced with a ford, or culvert. At this stage Goodman's Bridge fits into this category. Otama Road and Mowbray Road could also be replaced with a box culvert, which current funding can facilitate, if necessary.

Council will still have budget within this LTP period for both maintenance and renewals activities for bridges. The council will seek to maintain the safe and appropriate level of service by maintaining and replacing structural components when necessary (e.g. running boards, wheel guards, side rails, etc.). It also allows for the clearance of gravel and debris build-up under the bridge to reinstate the design flow carrying capacity. Approximately \$200K per year is budgeted for renewal and maintenance activities for bridges (and structure components of bridges) over the next 10 years.

Sealed road resurfacing renewals:

The theoretical renewal profile estimated an average expenditure of \$435,000 pa over 2021-2031 and then increases to \$1,174,020 from 2031-51. Currently the LTP budget has a stepped up approach to sealed road resurfacing starting at approximately \$500,000 in year 1 and \$630,000 by year 10. The theoretical renewals profile is based on an expected design life between 10 and 18 years (depending on whether a second coat has been applied). However, in reality it is likely that the surface will be able to see a design life of between 20 and 25 years. This reduces the risk of a bow wave occurring in the future.

Minor structures renewals

RAMM records the data for 'minor structures' which includes cattlestops and fords. Please note that the budget for cattlestop renewals is located withing 'Structural Component replacement cattlestops' and the budget for ford renewals is located with 'Bridges and structures'. The theoretical average annual renewal cost was estimated to be approximately \$22,000 for all minor structures. This assumes a design life of 100 years for both cattlestops and fords. The LTP budgets an average of \$60,000 per year for these structures. This provides additional allowances for climate change and natural disaster impacts.

The table below provides a summary of the 'theoretical average renewal cost' and compares this against the budget average annual cost for this LTP period.

Transport AMP	Theoretical Renewal Average cost per year (2021-2031)	Actual Average cost per year (2021-2031)
Unsealed Road Metalling	Unknown - insufficient data	\$785,000
	Actual annual costs have been based on historical values. There is no age data available in RAMM to create theoretical cost profiles for unsealed road metalling. For these reasons programmes are normally co designed in collaboration with our Maintenance Contractor and grader operator(s) based on a rolling two to three yearly base and are amended where required due to failure or increased damage due to traffic wear.	
Sealed Road Resurfacing	\$435,500	\$551,000
	The theoretical renewal profile estimated an average expenditure of \$435,000 pa over 2021-2031 and then increases to \$1,174,020 from 2031-51. Currently the LTP budget has a stepped up approach to sealed road resurfacing starting at approximately \$515,000 in year 1 and \$630,000 by year 10. The theoretical renewals profile is based on an expected design life between 10 and 18 years (depending on whether a second coat has been applied). However, in reality it is likely that the surface will be able to see a design life of between 20 and 25 years. This reduces the risk of a bow wave occurring in the future.	
Drainage Renewal	\$176,000	\$104,000
	The current LTP budgets between \$90,000 and \$110,000 pa (uninflated) on its drainage assets. The theoretical average annual renewal cost was estimated to be \$176,000 pa. However, this makes a conservative assumption that the average lifespan of the existing drainage assets is between 50 and 75 years when drainage assets can last to up to 100 years. It is assumed that this budget will be adequate to provide the appropriate level of service without causing a bow wave in the future.	
Sealed Road Pavement rehabilitation	Unknown - insufficient data	\$186,000
	The majority of council roads and assets have evolved over time meaning; the pavement was never 'properly' constructed in the first instance and also that data wasn't sufficiently recorded. Because of the general lack of information regarding the pavement condition, it has been assumed that the pavement acts like dirt or subgrade rather than a pavement. Some pavement testing has been undertaken this financial year and some work is still to be completed on the analysis of this data. This will help Council understand the relative condition of the pavement. Until there is enough data to understand the condition of pavements, a provisional cost of \$186,000 per year has been budgeted for the pavement renewal of 1km of pavement in 2021/22. This increases to \$210,00 per year by 2024/25.	
Structures Component replacement bridges	See bridges below	\$54,000
	The structural components of bridges are replaced based on the condition of the bridge component. This is a strategy used by Council to prolong the life of their bridges. This means the theoretical design life of a bridge is likely to be less than the actual life span of the bridge.	
	\$7,900	\$3,200

Structures Component replacement cattlestops	The existing data set does not have construction dates or an age of the asset. Therefore the total replacement cost was estimated and then divided by a design life of 100 years. It should be noted that the actual life span of these assets is expected to be longer than its theoretical design life. The replacement of cattlestops is based on the condition of the asset, not the age of the asset.	
Bridge & Structures renewals	\$15,000	\$56,000
	A theoretical average annual renewal cost of \$15,000 was estimated for 'Bridges and Structures'. This only investigates ford structures, bridges are catered for under "structural component replacement bridges" and is further detailed below.	
Traffic services renewals	\$110,000	\$89,000
	Traffic services include both lights and signage. A high-level estimation has been undertaken to determine a theoretical renewal profile which was then compared against the actual investment. It showed that the average theoretical cost of replacing these assets was slightly higher than actual over the next 10 years. However, it should be noted that the actual life span of these assets is expected to be longer than its theoretical design life.	
Footpath Renewal	\$114,000	\$210,000
	Currently the council are able to budget up to \$210,000 pa (uninflated) for this LTP period. Based on the theoretical renewals profile, this budget will likely be able to deliver the appropriate level of service without the risk of bow waves in the future.	
Bridge replacement (Typically is part of the low cost low risk line item)	\$207,000	\$0*
	<p>The theoretical renewals profile for Bridge renewals, show that there are seven bridge replacements which should technically be occurring within the next 10 years (which would cost an average of \$207,000 per year). However as noted within this Transportation AMP, the Council will not replace these bridges, but will instead undertake regular annual inspections and assess their condition to ensure the level of service is maintained. Council has also commenced a process to determine which bridges can potentially be divested back to the owner or alternatively which bridges can be replaced with a ford, or culvert. At this stage Goodman's Bridge fits into this category. Otama Road and Mowbray Road could also be replaced with a box culvert, which current funding can facilitate, if necessary.</p> <p>Between 2031 and 2051, there is an increase in bridge replacement costs. Future forecasts must budget between \$500,000 and \$900,000 to cater for the deferred replacements and additional bridge replacements 'theoretically' scheduled for this timeframe. It should be noted that the theoretical design life of some of the bridges may be much less than their actual lifespan and therefore future costs associated with bridge renewals may change depending on the condition of the bridge</p>	

*Note that an average cost of \$54,000 is allocated per year for the replacement of bridge components

All values presented above are uninflated and rounded to the nearest thousand

Note that 'footpath – surface' is already a part of footpath renewal

Note that cycling line item refers to the Alps 2 Ocean trail only - this is one off cost associated with the development of the business case. No renewal profile