Asset Management Plan

Roading 2015-2016

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Glossary

Area Wide Pavement Treatment (AWPT): maintenance of a section of pavement from kerb to kerb.

Digout: the maintenance of a particular piece of pavement, where the old pavement is removed and replaced.

Disposal: any of the activities associated with disposal of a decommissioned asset, including sale, demolition or relocation.

FAR (Financial Assistance Rate): subsidy received from the NZTA to help fund Roading maintenance and renewals. The current subsidy received is 58%.

Long Term Plan (LTP): Council's key strategic planning document. It provides the strategic and financial direction for the future 10 years within the Rangitikei District.

RAMM (Road Asset Maintenance Management system): the asset database used for roads and transportation is the Road Asset Maintenance Management (RAMM) system. This database contains all relevant information regarding the Roading network.

Routine maintenance: the regular on-going day-to-day work that is necessary to keep assets operating, including instances where portions of the asset fail and need immediate repair to make the asset operational again.

Arterial road: a major District road which is of high District importance, and is listed in the First Schedule of this bylaw and which forms links between Districts or within the District.

Grass shoulder: any uncultivated margin of a road adjacent to but not forming part of either the portion of the road used for vehicular traffic or footpath (if any) and including any drainage ditches.

Pavement: the hard surface of a road

Road: with the exception of motorways, means a road as defined in Section 315 of the Local Government Act 1974, but shall exclude any paper road.

Road reserve: all parts of the public vested land between opposite title boundaries, including pavement, drainage channels, berms and footpaths and grass shoulder.

State Highway: a State Highway declared under the Land Transport Management Act 2003

Strategic road: a primary arterial road of high regional importance, which serves as a link of importance within the regional economy and has access standards for permitted activities pursuant to the Rangitikei District Plan determined on the basis of strategic functions and traffic volumes.

Glossary

Unformed road: any road that does not have a formed carriageway (commonly referred to as a ‘paper road’).

vpd: vehicles per day

1 Introduction

1.1 Rangitikei District

The Rangitikei was one of the first Counties constituted under the Counties Act 1876 when the Provincial system of Government gave place to the County system. The first meeting of Rangitikei District Council was held in 1877.

The area was first populated by Ngati Apa - a proud and aristocratic tribe from the Aotea canoe - with a number of pa from Onepuhi down to Parewanui about 13 km from the mouth of the Rangitikei. In the early 19th century they suffered severely at the hand of Te Rauparaha of the Ngati Toa, and Ngati Ruakawa, which greatly lessened their power and influence.

Much of the Rangitikei was a gigantic stand of native bush when the first settlers arrived. During the 1840s a number of settlers made agreements with Maori owners for the settlement of the land within the Rangitikei District. In 1849 the Crown negotiated a land sale with the resident Ngati Apa tribe and Te Rauparaha (who still wielded powerful influence) for the Turakina block through the then Land Commissioner Donald McLean for resale to the settlers. At first, the settlement was along the two rivers, from the Turakina River to Bonny Glen and stretched along the Rangitikei River from Parewanui to Porewa and Rata and only later from Porewa to Tutaenui, by 1858 the District was well settled.

The Rangitikei District covers an area of 4,479 km^2 and stretches from Whangaehu Village across to the town of Bulls in the south of the District. The Rangitikei River creates a border between Rangitikei and Manawatu, with the northern section reaching beyond the town of Taihape and extending eastwards towards the District of Napier.

1.2 Natural Features

Located 2 hours north of Wellington, the Rangitikei District encompasses a trapezium-shaped block of mainly lush, rural land that includes the towns of Taihape, Bulls, Marton, Hunterville, and Mangaweka. The Rangitikei River forms the eastern boundary of the District with the Whangaehu River forming the western boundary.

The region takes its name from the Rangitikei River, one of New Zealand's longest rivers which flow from the Central Plateau south to the South Taranaki Bight at Tangimoana.

Known as a marvellous place to farm, the growing climate and soil lends itself to many different operations. Rangitikei boasts anything from game bird production to cut flowers, vineyards, asparagus, nuts, culinary and medicinal herbs, as well as meat productions and grain growing.

1.3 Economy

While the Rangitikei economy is based on farming and agriculture, it includes a variety of successful innovative industries which make the most of the strategic location. Niche manufacturing businesses are tucked away amongst the stunning scenery and several large industry businesses have based themselves in this ideal location.

Tourism and retail businesses are able to tap into the constant stream of travellers on State Highway One. These businesses, together with primary industry operations offer a wide variety of employment opportunities throughout the District.

The District is centrally located with significant regional operations nearby including Palmerston North Airport, Massey University, Ohakea Air Base Camp, Wanganui Hospital and the Universal College of Learning (‘UCOL’).

1.4 Climate

Rangitikei's climate is temperate and has few extremes compared to many parts of New Zealand. Summers are warm with average temperatures in the low 20s. The most settled weather occurs in summer and early autumn. Winters are mild near the coast and on the plains; it's colder inland and in the hill country, but often frosty, clear and calm. Snowfall occasionally settles in areas 400 m above sea level, such as Taihape. Annual hours of bright sunshine can average over 2,000.

1.5 Population

The total population of the Rangitikei District is 14,730 from the 2011 Census. This is a decrease of 420 people or 2.5 % since the 2006 Census. The following table shows the age distribution of this population.

Table 1: Population by Age

Age	Population by Year								
	2006	2011	2016	2021	2026	2031	2036	2041	2046
0-14	3,390	3,065	2,750	2,625	2,410	2,205	1,895	1,580	1,345
15-39	4,460	4,215	4,005	3,795	3,515	2,960	2,505	2,185	1,945
40-64	5,110	5,015	4,540	3,950	3,385	3,040	2,840	2,700	2,535
65-84	1,980	2,190	2,480	2,745	2,985	3,170	3,015	2,675	2,175
85+	210	245	310	355	440	505	625	710	820
All	15,150	14,730	14,085	13,470	12,735	11,880	10,880	9,850	8,820

The District population rank 48th in size out of the 67 Districts in New Zealand and contains 0.4 % of New Zealand's population. The table below shows the current number of people living in the District by age range and the predicted changes over the next 30 years.

Further information on population is given in the Growth and Demand section of this document.

1.6 Infrastructure

The District is serviced by 1365 km of sealed and unsealed roads (65 % sealed and 35 % unsealed) and has 240 bridge structures and large culverts. State Highways 1 and 3 run through the south and eastern stretches of the District.

Most towns and villages are serviced with water supply, wastewater and storm water disposal. Parks and reserves are dotted throughout the District where possible and a number of rural communities are also connected to water supplies and drainage systems.

Roading is a significant essential service for Rangitikei District Council. The Roading function represents around 18 % of Council's overall annual operating expenditure, with capital works also making up a large proportion of the Council's expenditure.

The land transport activity enabling this goal is achieved through:

- A vehicular network, comprising a network of sealed and unsealed roads, parking areas and facility roads, bridges and large culverts.
- A pedestrian network, comprising footpaths, pedestrian crossings and bollards.
- Enabling infrastructure, comprising kerb and channel, drainage sumps, culverts, road reserve including berms, and retaining walls.
- Safety infrastructure, comprising street and amenity lighting, road marking and raised pavement markers, street signs, traffic controls, including Belisha Beacons, edge marker posts, pedestrian refuges, speed humps and traffic calming islands.

Council owns and is responsible for the management of these assets. The road asset groups included in this Asset Management Plan and their estimated current replacement values are summarised in Table 1, noting that quantities are correct as at July 2013 and may vary slightly from the quantities represented in the valuation, undertaken as at 1 July 2013. This shows that the cost of replacing the entire land transport network in today's terms is around $547 million. The annual operating expenditure of this infrastructure with respect to other activities is illustrated in Chart 1.

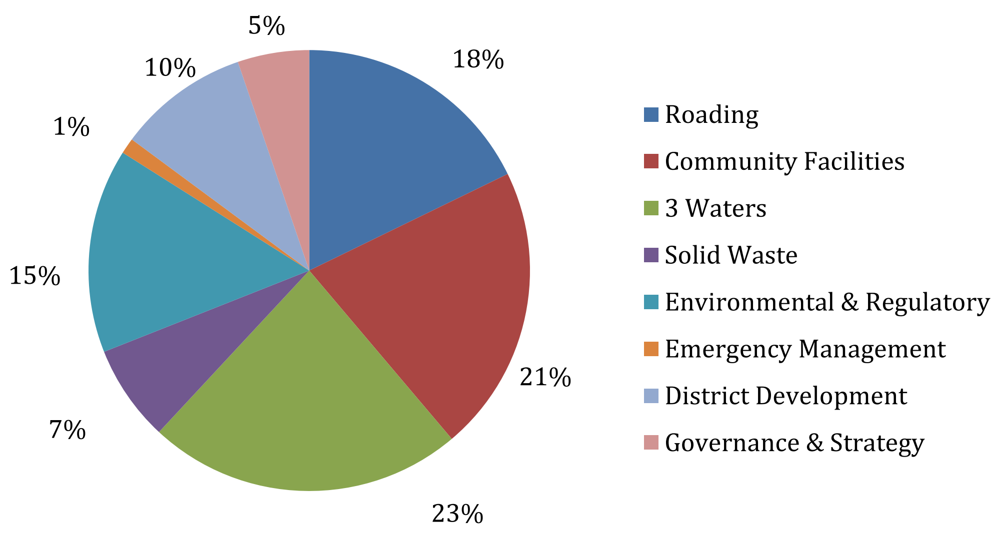
The State Highways that pass through the District are not owned or maintained by Council, but by New Zealand Transport Agency (NZTA). The rail network also falls outside of Council's area of operations and is currently owned and operated by On-track.

Table 2: Valuation by Asset Type

Asset Type	Component	Unit	Quantity	ORC ($)
Bridge	Bridge (Culvert)	m	1,276	11,155,988
	Bridge (Deck)	m²	18,802	87,383,742
Crossing	Crossing	Each	4,433	6,518,210
Drainage	Drainage	Each	1,073	1,584,358
		m	56,413	20,847,686
Footpath	Footpath	m	250	28,213
		m²	159,961	12,177,514
Land	Rural	ha	3,951	23,706,000
	Urban	ha	226	16,272,000
Marking	Marking	Each	1,517	36,101
		m	251,251	80,638
Railing	Railing	m	17,484	2,380,908
Retaining Wall	Retaining Wall	Each	3	32,640
		m	121	758,417
		m²	11,745	13,415,890
Shoulder	Shoulder	m²	109,310	138,992
Sign	Sign	Each	5,660	1,452,666
	Sign Post	Each	3,035	390,831
Street light	Street Light (Bracket)	Each	1,864	651,989
	Street Light (Light)	Each	1,651	536,710
	Street Light (Pole)	Each	281	926,226
SW Channel	Surface Water Channel	m	1,326,633	15,561,957
Treatment Length	Formation Region A	m³	1,725,753	41,450,346
	Formation Region B	m³	4,284,566	102,909,706
	Formation Region C	m³	1,855,508	44,566,875
	Pavement 1st Coat	m²	4,708,438	22,286,077

Asset Type	Component	Unit	Quantity	ORC ($)
	Pavement R k-Depth	m³	1,158,842	79,954,834
	Pavement R u-D < 2000	m³	1,643	113,369
	Pavement R u-D > 2000	m³	3,286	226,737
	Pavement U k-Depth	m³	115,490	7,968,302
	Pavement U u-D < 2000	m³	1,901	131,143
	Pavement U u-D > 2000	m³	3,801	262,286
	Pavement Unseal	m²	2,493,144	7,181,310
	Surface Structure	m²	6,300,002	24,189,152
Total				**547,277,814**

Figure 1: Operating Expenditure by Activity



1.7 Key Issues

Rangitikei is one of the largest Districts in New Zealand by area, yet has a very small dispersed population of just over 3 people per square kilometre. Some of the challenges faced by the District include:

- One thirds of network unsealed.
- Many roads only service only a few properties.
- Roads windy and narrow creating safety issues.

- Low volumes of traffic.

1.8 Asset Management Objective

In order to fulfil Community Outcomes, Vision, Goals and Objectives, Rangitikei District has adopted a systematic approach to the long-term management of its assets by preparing this Asset Management Plan.

The key objective of Asset Management is to provide a desired level of service in the most cost effective manner while demonstrating responsible stewardship for present and future customers. Asset Management Plans are a key component of the strategic planning and management of Council, with links to the LTP and service contracts

The AMP underpins the Long Term Plan (LTP) and consultative processes that have been put in place to engage the community.

The AMP delivers a range of benefits to the community as well as to the provider of the services, the main ones being:

- Maintain, replace and develop assets over the long term to meet required delivery standards and foreseeable future needs at minimal cost.
- Continually improve asset management practices and service delivery to the customers.
- Comply with Statutory Requirements.

1.9 Asset Management Levels

1.9.1 Basic

The development of an AMP is a process of continuous improvement. The entry level is what is commonly referred to as the Basic AMP – it reflects a rudimentary knowledge of the asset (such as the basic asset register and inferred age, condition and performance), associated levels of service and the long-term cash flow predictions.

1.9.2 Advanced

At the other end of the spectrum are Advanced AMPs. Movement towards the development of such plans is a continuous process of data collection, verification, higher confidence levels of outputs and a systematic iterative approach to treatment options (renewal and maintenance options), while steadily reducing the number of assumptions historically used.

Advanced AMP's aim to employ predictive modelling, risk management and optimised decision making (ODM) techniques, in order to evaluate options and to identify optimum Long Term Plans to deliver the levels of service agreed with the community to achieve outcomes.

As new condition, performance and risk assessment techniques and systems evolve, or as technologies associated with asset renewal are improved, the level of sophistication of the AMP will improve.

1.9.3 Intermediate

The Rangitikei District Council's first version of a District Land Transport Asset Management Plan (DLTAMP) was produced in 1996.

The current plan aims to successfully migrate to an intermediate level of AMP. It consists of a mixture of "bottom up" analysis (for asset inventory, age, maintenance history faults etc) as well as "top down" analysis (for condition and performance).

Having reached an intermediate level suggests there is still room for improvement and sophistication. The Improvement Plan of this plan explains how that will be achieved. The progression towards Advanced Plans will also be periodically measured / reviewed / audited by external reviewers and through revisions of this document.

1.10 Purpose

The purpose of this plan is to improve the stewardship of assets by Council on behalf of its customers and stakeholders and achieve compliance with statutory obligations. This plan specifically does that by:

- Demonstrating responsible stewardship of Land Transport assets;
- Identifying minimum lifecycle (long-term) costs to provide the agreed level of service;
- Improving understanding of service level standards and options;
- Assisting with an integrated approach to asset management throughout the organisation;
- Improving customer satisfaction and organizational image;
- Managing the risk of failure to deliver the required level of service;
- Supporting long-term financial planning of the Council;
- Clearly justifying forward works programmes; and

- Improving decision-making based on costs and benefits of alternatives.

1.11 Audience

The intended audiences for the Asset management Plan are Council Representatives, Council Staff, Consultants, Developers and those who want to find out more about the processes that Council uses to maintain the agreed level of service.

1.12 Plan Timeframe

This AMP covers a 10 year timeframe. Financial details are shown for the ten year budget from the current year (14/15) and forecasting for 15/16 through to 24/25. Actual expenditure will be from 13/14. The plan assumes that Transport assets as a whole will have an indefinite life and the main focus of the plan is on determining the strategies required for maintaining, rehabilitating and renewing components over the next 10 years.

It is intended that this plan be reviewed every year with a major update every three years prior to the LTP review process.

1.13 Assumptions

The following assumptions have been made for the growth projections:

- Statistics New Zealand predicts the URP (Usually Resident Population) is slowly decreasing.
- There were 2,203 business locations (geographic units) in Rangitikei District compared with 507,908 for all of New Zealand. This is a decrease of 3.4 % from the year ended February 2006 for Rangitikei District.
- There were 5,520 paid employees in Rangitikei District compared with 1,941,040 for all New Zealand. This is a decrease of 9.5 % from the year ended February 2006 for Rangitikei District.

The key demand assumptions are:

- Development will occur in accordance with the Growth Planning Assumptions prepared for the 2015 AMPs and the future Rangitikei Long Term Plan 2015-2025.

The key demand risk assumption is:

- Growth does not occur in accordance with the documented Growth Planning Assumptions.

1.14 Structure

The content of the document is shown in the table below.

Table 3: Document Structure

Section	Content
Introduction	Sets out the purpose of this Asset Management (AM) Plan and describes the asset management progress over the recent years by describing the plan framework.
Strategic Environment	Aims to describe Council's vision for the future, Council and community outcomes, and key stakeholders involved with this process and Council's involvement with other organisations.
Description of Assets	Covers the rationale for ownership of the Roading assets and the description of assets covered under this plan. Also highlights the critical assets within the individual services.
Levels of Service	The Levels of Service for the Roading activities are defined and the performance measures by which the service levels will be assessed.
Growth and Demand	Provides details of growth forecasts and demand drivers, which effect the management and utilisation of the Roading assets.
Environmental Management	This section describes the environmental legislative obligations that Council has in undertaking the Transport activity including requirements specified as conditions of resource consents.
Lifecycle Management	Outlines what is planned to manage and operate the assets at the agreed levels of service while optimizing lifecycle costs.
Risk Management Plan	Details the Risk Management Processes utilized by RDC for assessing and managing risk within the Roading assets.
Financial Summary	Long-term financial forecast for implementing the Roading assets work programme.
Monitoring and Improvement Plan	This section details the improvements to Asset Management within Council that will lead to an increase in confidence in the management of the assets.
Asset Management Practices	Outlines the information available on the assets, information systems used and process used to make decisions on how the asset will be managed. It also provides details on planning for monitoring the performance of the AMP.

2 Strategic Environment

2.1 Overview

The Rangitikei District Council aims to provide safe, convenient and orderly transportation in the District.

Council has statutory obligations under the Land Transport Management Act 2003 to maintain a Roading network within the District. An effective Roading network is also essential to ensuring economic and social wellbeing of the community through the provision of access and mobility for people, goods and services.

In previous years the community outcomes were shaped by the community. However, amendments to the Local Government Act in 2010 changed the definition of community outcomes from outcomes belonging to and achieved by the community, to "outcomes that a local authority aims to achieve". This is a significant change in emphasis from a community wish-list to a set of outcomes owned – and actively worked towards – by Council. Council believes it is also helpful for the public to understand what Council does and why, and for other stakeholders, including the private sector who both benefit from and contribute to Council activity.

2.2 Council Outcomes

A set of outcomes was developed, which show the priorities Council is working towards.

- Rangitikei District will improve the natural environment, stewarding the District in a practice aligned to the concept of Kaitiakitanga.
- The Rangitikei District will attract and retain residents.
- Rangitikei District develops a broad economic base from its solid foundation in the primary sector.
- Rangitikei and its people are connected via quality infrastructure and technology.
- The Rangitikei built environment is safe, reliable and attractive.
- Rangitikei District Council is an agile and effective organisation.

Rangitikei District's Roading network is important for meeting these outcomes. The network provides essential links around the District and to other areas, ensuring the efficient transportation of goods and services. These links also ensure the District's communities are linked via high quality Roading.

Strategic Environment

The Roading network is an integral part of Rangitikei built environment. Ongoing maintenance, inspections and audits ensure it remains safe for residents and businesses to use.

2.3 Community Outcomes

Council aims to provide safe, convenient and orderly transportation in the District.

Council has statutory obligations under the Land Transport Management Act 2003 to maintain a Roading network within the District. An effective Roading network is also essential to ensuring the economic and social wellbeing of the community through the provision of access and mobility for people, goods and services.

The following outcomes are particularly relevant to the Roading network:

- Rangitikei District develops a broad economic base from its solid foundation in the primary sector.
- Rangitikei and its people are connected via quality infrastructure and technology.
- Rangitikei's built environment is safe, reliable and attractive.

To enable specific linkage between the Outcomes and the Levels of Service, specific 'fit for purpose' outcomes have being developed. These are described as key customer values below.

2.4 Customer Values

The customer values that underpin the Roading group of activities are:

- ***Accessibility:*** "How easily I can get to where I want to go".
- ***Amenity:*** "My journey is a pleasant experience".
- ***Resilience:*** "I can reach my destination regardless of weather or other incidents".
- ***Safety:*** "I can get there safely".
- ***Travel Time Reliability:*** "I know how long it will take".

2.5 Rationale

Council regards the land transport activity, which enables communities to travel safely, easily and efficiently through the District while maintaining good access to properties, businesses and other areas of interest, as an essential service for the public good. Roading assets are critical infrastructure to growth of the economy and connectivity of diverse communities.

Council ownership and management of these assets is the most affordable means of achieving these activity outcomes. Council staff has the experience and skills to oversee the consulting and contracting service providers.

2.6 Significance Policy

The land transport network is significant as defined in Council's Significance Policy, due to its complexity, asset value and risk to the community. This service is expected to deliver this essential service in perpetuity and the asset is maintained and replaced as required to enable this. For significant services, the Office of the Auditor General defines a higher level of customer consultation.

This includes evaluating level of service options and undertaking consultation on level of service options with the community and other relevant stakeholders. Customer consultation is undertaken as detailed in the Levels of Service section of this AMP.

2.7 Strategic Assets

The Local Government Act 2002 (Section 97) requires that the Significance Policy shall identify all of the assets the Council considers to be strategic, as defined in Section 5 of the Local Government Act 2002.

For the purpose of Section 90(2) of the Act, the Council has made the following determination for strategic transportation assets.

2.8 Key Stakeholders

Key stakeholders are those who have significant specific involvement with the assets and/or the service facilitated by the assets and describes their particular main interest and is limited to the main issues for the key stakeholder groups. In particular 'Public Service providers' include schools, military organisations, correction facilities, hospitals, and other government organisations. 'Asset Managers' are those District Council staff (engineers and others) whose responsibility it is to manage the services made possible by the assets covered in this AMP.

The key stakeholders and the outcomes that they require for the Roading activity are detailed in the following table:

Table 4: Stakeholder Engagement

Stakeholder	Main Interests	Engagement Range	Engagement Methods
Accident Compensation Commission		Limited	Correspondence
Audit NZ	Transport Sector groups	Limited	Correspondence
Automobile Association	Transport Sector groups	Limited	
Department of Conservation	Enhance conservation values	Limited	
Energy Conservation Authority	Transport Sector groups	Limited	Correspondence
Federated Farmers	Transport Sector groups	Limited	Correspondence
Local Government New Zealand	Ensure that Local Government Act is complied with	Limited	
Ministry of Education	Safety for school children	Limited	Correspondence
Ministry for the Environment		Limited	
Ministry of Health		Limited	
Ministry of Transport		Moderate	
New Zealand Police	Road Safety Partner	Limited	On-going liaison and appropriate formal contact where required.
New Zealand Transport Agency	Legislative responsibilities as defined in Legislation, Funding Partner	Moderate	Continual and frequent contact where required
Central Transport Federation/Heavy Haulage Association	Transport Sector groups	Limited	Correspondence
OnTrack (NZ Railway corporation)	Transport system provider	Limited	Liaison with OnTrack on leveling crossing maintenance.
Telecom and other telecommunications companies	Utility operator	Limited	Liaison
The Forestry Owners Association	Transport Sector groups	Limited	Correspondence

<table>
<tr><th>Stakeholder</th><th>Main Interests</th><th>Engagement Range</th><th>Engagement Methods</th></tr>
<tr><td>Neighbouring Authorities with road connections
Wanganui District Council
Ruapehu District Council
Manawatu District Council
Hastings District Council</td><td>Neighbouring Road Controlling Authorities
Wanganui City and RDC are connected with a number of boundary roads and share one bridge called Wyley's Bridge that straddles the boundary river.
Ruapehu District and Rangitikei District border at the very northern peak of the District.
Rangitikei District and Manawatu District share a number of boundary bridges over the Rangitikei River.
Hastings District and RDC share the Taihape Napier Road as a boundary road and a bridge spanning the Tararua River.</td><td>Moderate</td><td>On-going contact with relevant staff. Formal liaison of elected representatives at CE levels.
A formal agreement has been reached with Wanganui District Council for maintenance and management of the boundary bridge.
A formal agreement has been reached with MDC for maintenance and management of the boundary bridges as follows:
Ruahine Road Bridge
Otara Road Bridge
Mangarere Road Bridge
Halcombe Road Bridge</td></tr>
<tr><td>Neighbouring Authorities with no road connections
Palmerston North City Council</td><td>Neighbouring Road Controlling Authorities</td><td>Limited</td><td>Regular contact with relevant staff</td></tr>
<tr><td>Mid Central Health Board</td><td>Community Health</td><td>Limited</td><td>Correspondence</td></tr>
<tr><td>Horizons Regional Council</td><td>Resource use is sustainable as directed in the RMA 1991</td><td>Moderate</td><td></td></tr>
<tr><td>Horizons Regional Land Transport Committee</td><td>LTMA 2003 role</td><td>Moderate</td><td>Correspondence, Transport programme submission</td></tr>
<tr><td>New Zealand Transport Agency – highways division</td><td>The state highway division of the NZTA is the State Highway Authority. There are four State Highways in the District, SH1, SH3, SH54 and SH56.</td><td>Moderate</td><td>Regular communication and correspondence where required.

Delegations – street lights, street sweeping on urban State Highway sections</td></tr>
<tr><td>PowerCo/Chorus</td><td>Utility Operators</td><td>Limited</td><td>Correspondence</td></tr>
</table>

Strategic Environment

Stakeholder	**Main Interests**	**Engagement Range**	**Engagement Methods**
Rangitikei District Council customers and resident population	Reliable transportation services at an affordable cost	Broad	
All commercial and private road users including: Pedestrians Cyclists Motorists Heavy-vehicle operators Equestrians	Reliable transportation services at an affordable cost	Broad	
Local Businesses/Industries	Reliable transportation services at an affordable cost	Moderate	
Local Iwi	Cultural and spiritual values	Limited	Formal liaison of elected representatives at CE levels.
Schools	Safety for school children	Limited	Correspondence
Rangitikei District Council	Maximise the purpose of local government through provision of the Roading activity	Broad	
Asset Managers	As above plus policy, planning and implementation of infrastructure and service management activities.	Limited	
Project Managers	Responsible for implementation of infrastructure and service management activities	Moderate	
Chief Financial Officer	Accounting for assets and for services consumed by asset management activities	Moderate	

Stakeholder	Main Interests	Engagement Range	Engagement Methods
Customer Services	Systems which minimise and resolve complaints/enquiries about service	Limited	
Elected Officials	Owner of assets, responsible for sustainable service levels under the LGA 2002	Broad	
Executive Management Team/Group Managers	Compliance with regulations, service reliability and quality	Broad	
Planners	AMP support for Long-term Plans.		

2.9 External Organisations

2.9.1 Ministry of Transport

The Ministry of Transport is the government's principal transport adviser. The majority of their work is in providing policy advice and support to Ministers.

Through their advice we aim to:

- Improve the overall performance of the transport system.
- Improve the performance of transport crown entities.
- Achieve better value for money for the government from its investment in the transport system.

The Ministry of Transport help the government give effect to its policy by supporting the development of legislation, regulations and rules. We also manage and account for funds invested in transport. The delivery of the transport functions is by the New Zealand Transport Agency.

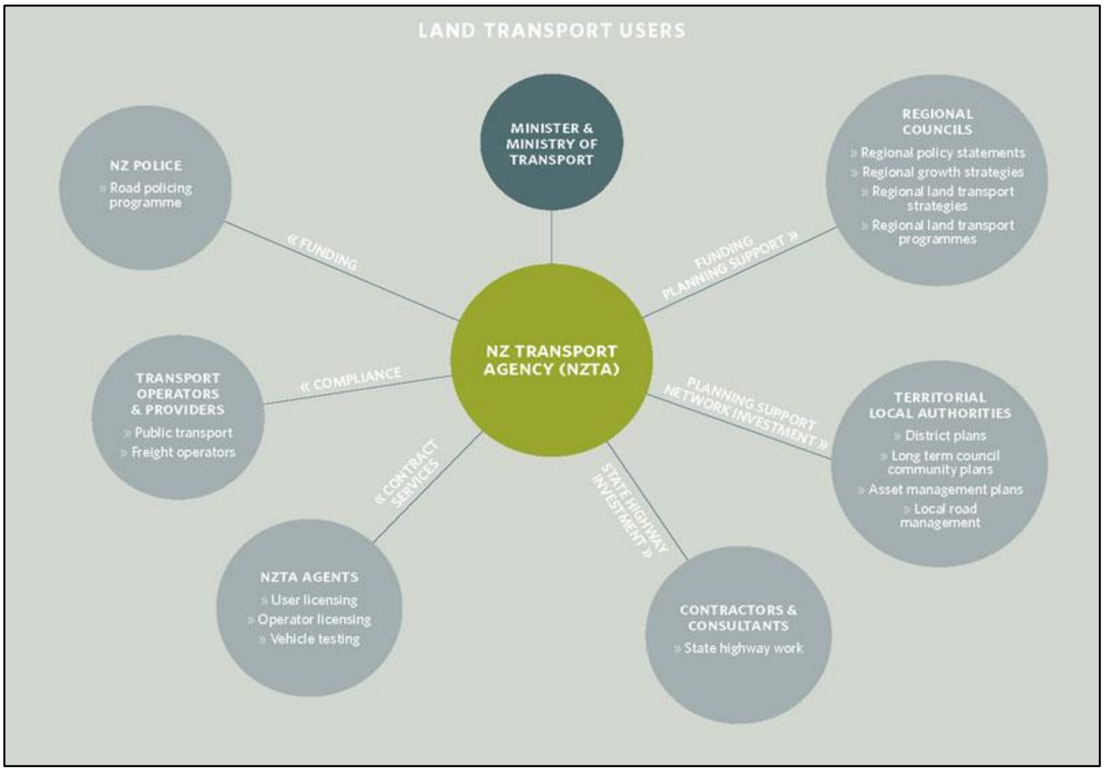
2.9.2 New Zealand Transport Agency (NZTA)

A new central government agency, the New Zealand Transport Agency (NZTA), was established on 18 July 2008. It incorporated Land Transport NZ and Transit NZ, along with other functions. NZTA is both a co-investor and manages the state highway operations.

The Council, together with other approved road controlling authorities, has a very important ongoing relationship with the NZTA, which is a funding partner to the majority of land transport activities across New Zealand. The NZTA ensures that equitable and nationally consistent Levels of Service are achieved over the network and this is funded in a sustainable manner. On average NZTA funds, through a subsidy, 50 % of the cost of the Land Transport Programme for all Road Controlling Authorities in New Zealand.

An example of the central function that New Zealand Transport Agency provides to Land Transport Activities is shown below:

Figure 2: Land Transport Functions



2.9.3 Horizons

Changes to the Land Transport Management Act 2003 have given a lead role to regional Councils in regional transport planning and the Regional Land Transport Programme (RLTP) contains all land transport activities of the District Councils in our Region (Wanganui, Manawatu, Rangitikei, Horowhenua, Ruapehu and Tararua) and Palmerston North City Council, the New Zealand Transport Agency (state highway division) and Horizons itself.

This sets out the transport activities the Region for the purposes of obtaining funding from Central Government.

The programme is made up of prioritized activities and encompasses:

- Maintenance and operation of local roads and State Highways;
- Roading improvements (local roads and State Highways);

- Public transport services and infrastructure;
- Road safety activities;
- Walking and cycling facilities; and
- Transport planning.

The Regional Council also provides the natural resource management functions across the region. Horizons Regional Council develops policies to guide the way we manage our Region's environmental resources – land, air, water, and coast.

These policies set out the things that need to be done to achieve the environmental outcomes we want as a Region. We use both regulatory and non-regulatory methods to meet the objectives in our policies - regulatory management requires users of environmental resources to apply for resource consent; non-regulatory management involves providing advice, information, education, and funding assistance.

They also monitor the effectiveness of these methods and carry out research into existing and emerging environmental issues.

2.9.4 Road Controlling Authority

This term describes the Council, as an organization that manages and controls activities associated with roads. The term derives from the Land Transport Management Act 2003 and is used throughout the country, it includes District Councils, the NZTA state highway division, and the Department of Conservation. The NZTA's Planning, Programming and Funding Manual 2008, also uses another definition from the Land Transport Management Act 2003 that refers to such organisations are defined as "Approved Organisations". These are defined by the Act as:

> *A regional Council, a territorial authority and approved public organization.*

The Rangitikei District Council is responsible for all roads in the District, but excludes the state highways which NZTA is responsible for.

2.9.5 Neighbours

Rangitikei District Council borders with Wanganui District, Ruapehu District, Hastings District and Manawatu District Councils as neighbouring Road Controlling Authorities. Agreements exist with these authorities which outlines who has specific responsibilities to maintain assets on various boundary roads.

NZTA is responsible for the State Highways 1 and 3 that traverse through the District. A Memorandum of Understanding exists with NZTA over responsibilities and obligations.

2.9.6 Land Transport Programme

This describes the general terms the Council's programme of works for which it seeks NZTA subsidy through the National Land Transport Programme in accordance with NZTA's Planning, Programming and Funding Manual 2008.

With the advent of the Land Transport Management Amendment act 2008, RCAs prepare programmes that contribute to three yearly Regional Land Transport Programmes for approval and incorporation into a National Land Transport Programmes.

2.10 Strategies and Plans

Central Government provide a high level of direction and regulation into the transportation sector through Strategies, Plans, Policy Statements and Legislation. A large proportion of these documents are delivered through the New Zealand Transport Agency (NZTA).

Regionally there is a suite of Plans and Strategies, many of which link with the Horizons Land Transport Strategy.

Rangitikei District Council has developed a broad range of documents including strategies to define the broad scope and direction of its activities. Once adopted by Council, no process or action should be inconsistent with it.

2.11 National Strategies and Plans

2.11.1 New Zealand Transport Strategy (NZTS)

The New Zealand Transport Strategy (NZTS) was first published in 2002, and updated in 2008. It provides the Government's over-arching strategic vision for transport in 2040 as follows:

People and freight in New Zealand have access to an affordable, integrated, safe responsive and sustainable transport system.

It is supported by five principle transport objectives:

- Ensuring environmental sustainability.
- Assisting economic development.
- Assisting safety and personal security.
- Improving access and mobility.
- Protecting and promoting public health.

To deliver the vision and targets of the Strategy, key components have been identified for government intervention and facilitation by regulation, enforcement, economic incentives, investment, and education as follows:

- Integrated land use and transport planning.
- Making best use of existing networks and infrastructure.
- Investing in critical infrastructure and the transport sector.
- Increasing the availability and use of public transport, cycling, walking and other shared and active modes.

This is the first time specific targets have been set for the whole transport sector. The NZTS and the first Government Policy Statement (GPS) on land transport funding are part of a raft of changes to the transport sector set out in the recently commenced Land Transport Management Amendment Act 2008 and are the driving force behind achieving an affordable, integrated, safe, responsive and sustainable transport system.

2.11.2 Government Policy Statement (GPS)

This is a high level government statement on desired outcomes and funding priorities for transportation activities to achieve national and regional targets, for example to increase the use of walking and cycling and public transport.
The GPS (July 2011) states:

> *The government's overarching goal for transport is: an effective, efficient, safe, secure, accessible and resilient transport system that supports the growth of our country's economy in order to deliver greater prosperity, security and opportunities for all New Zealanders.*

The government has three focus areas that are the priorities for this GPS:

- Economic growth and productivity.
- Value for money.
- Road safety.

2.11.3 National Land Transport Programme (NLTP)

The National Land Transport programme (NLTP) contains all the land transport activities, such as public transport services and road construction and maintenance, which are expected to receive funding from the NZ Transport Agency.

The NLTP is compiled from the proposed Regional Land Transport Programmes in accordance with available funding.

2.11.4 National Infrastructure Plan (NIP)

The National Infrastructure Plan (NIP) details the Government's view of the challenges and priorities for infrastructure. The 2011 NIP describes the view to 2030.

A Vision for New Zealand's Infrastructure in the NIP is:

> *New Zealand's infrastructure is resilient and coordinated and contributes to economic growth and increased quality of life.*

More specifically the vision for the Transport Sector is:

> *A transport sector that supports economic growth by achieving efficient and safe movement of freight and people.*

The National Infrastructure Plan sets out seven specific goals for transport infrastructure, all of which have relevance for the National Land Transport Fund investment in land transport. These goals are to achieve:

- A long-term strategic approach to transport planning which maximises the potential synergies between regional planning and central government strategies.
- A flexible and resilient transport system that offers greater accessibility and can respond to changing patterns in demand by maintaining and developing the capacity of the network. Improved operational management practice and the use of demand management tools especially in urban areas experiencing significant growth.
- A network of priority roads that will improve journey time and reliability, and ease severe congestion, boosting the growth potential of key economic areas and improving transport efficiency, road safety and access to markets.
- A continued reduction in deaths and serious injuries that occur on the network.
- A public transport system that is robust and effective and offers a range of user options that will attract a greater percentage of long-term users.
- A rail system that enables the efficient movement of freight and complements other modes of passenger transport and freight movement.
- Sea and air ports that are linked to the overall transport network to support efficient nationwide movement of passengers, domestic goods and exports and imports and are able to respond to technological changes and changing international safety and security standards.

The National Infrastructure Plan defines "What Will Success Look Like" as follows:

> *The transport sector is well served by a range of indicators.*

However, at a national level, the following indicators are most relevant to the critical issues identified in this plan:

- Reduced incidents of severe urban congestion.
- More efficient freight supply chains.
- A reduction in deaths and serious injuries.
- Better use of existing transport capacity.
- Resilient and secure transport network.
- More transport mode choices.

2.11.5 Safer Journeys

Safer Journeys is a 2010 Ministry of Transport strategy to guide improvements in road safety over the period 2010–2020. The long-term goal for road safety in New Zealand is set out in their vision:

A safe road system increasingly free of death and serious injury.

To support the vision, Safer Journeys takes a Safe System approach to road safety. This approach means working across all elements of the road system (roads, speeds, vehicles and road use) and recognises that everybody has responsibility for road safety. It has also identified the issues that are of most concern and are the priorities for road safety in New Zealand.

Safer Journeys describes the actions we will take to address these issues, using a Safe System approach that works across all elements of the road system.

2.11.6 Connecting New Zealand

The purpose of Connecting New Zealand is to summarise the government's broad policy direction for the transport sector over the next decade. It will assist stakeholders to better understand how the government sees the transport system developing over that period.

Connecting New Zealand draws together the policy direction set out in a number of other guidance documents, including the National Infrastructure Plan and the Government Policy Statement on Land Transport Funding 2012/13–2021/22 (GPS 2012).

To deliver on its transport objective, the government is focusing on three key areas:

1. ***Economic growth and productivity*** — transport has an important role to play in enabling the government's overall goal to grow the New Zealand economy to deliver greater prosperity, security and opportunities for all New Zealanders. The transport

system provides connections — both domestically and internationally — for our communities and businesses, and meets the travel needs of our international tourists.

2. ***Value for money*** — improving the performance of the transport system is critical. The government needs to be confident that the transport sector (central and local government in particular) is delivering the right infrastructure and services to the right level, and for the best possible price.

3. ***Road safety*** — implementing the Safer Journeys road safety strategy and its new Safe System approach, so we have a sustained reduction in deaths and serious injuries on our roads over time.

2.11.7 High-risk Roads Guide

The High-Risk Rural Roads Guide (HRRRG) was prepared by NZTA in 2011 to provide guidance on the government's Safer Journeys 2020 Strategy initiative to focus efforts on high-risk rural roads.

The objective of the guide is to provide practitioners with best practice guidance to identify, target and address key road safety issues on high-risk rural roads. The guide provides links to a number of road safety resources and guidance for planning, funding and evaluating safety projects and programmes.

The guide focuses on the Safer Journeys actions. However, roads that have crash problems but do not meet the criteria for a high-risk rural road may still warrant investigation and the use of suggested countermeasures but may not be prioritised in terms of funding.

To be classified as a high-risk rural road, the road will need a history of three or more fatal and serious crashes within five years, or five or more within 10 years. An equivalent number of potential crashes can also be used. Potential crashes are estimated using a risk assessment procedure such as the KiwiRAP analysis tool or RISA for local roads. The minimum crash criteria will exclude sections of road with only one or two maybe random crashes from being classed as high risk.

The NZTA Investment and Revenue Strategy (IRS) now recognise 'high risk rural roads' as a high priority for funding. The IRS 'high strategic fit' assessment now includes "potential to significantly reduce the number of crashes involving death and serious injuries in line with Safer Journeys on a high risk rural road". However, for a 'high strategic fit' the IRS requires us to address high risk roads identified from actual crash records only. A potential crash rate, based on risk assessment only, will be assigned a 'medium strategic fit'.

2.11.8 High-risk Intersection Guide

In 2010 the government released the road safety strategy Safer Journeys, which highlights the need for a stronger focus on high-risk intersections. The 2013-2015 safer journeys action plan states:

We will use the High-risk intersection guide to identify and target the 100 highest-risk intersections to address by 2020. A programme will be developed to improve at least 20 intersections in the course of this plan. Improving urban intersections will benefit pedestrians and cyclists. Planning will also commence for accelerated improvements during the 2015–2018 National Land Transport Programme, using the Safe System interventions from the guide.

The guide has been developed to assist road controlling authorities (RCAs) in targeting intersection safety improvements to the highest risk intersections, and providing a nationally consistent application of proven countermeasures.

RCAs can use the guide to identify their high-risk intersections and then to prioritise them by examining the crash histories and site characteristics to identify risk factors for which there are effective countermeasures. The results may be useful when developing the safety activities in the National Land Transport Programme.

2.11.9 KiwiRAP

KiwiRAP provides a systematic and internationally recognised way of measuring what constitutes a safe road. By giving New Zealand's roads a safety rating, KiwiRAP will be able to communicate the risk of death and injury more meaningfully. It will help drivers understand how risk can vary according to changes in the road environment. A risk-aware driver will be more likely to adapt their driving to reduce their risk of being involved in a crash. Currently KiwiRAP assessments apply only to State Highways.

2.11.10 Other References

The following documents influence management of the Roading activity:

- ***NZTAs Our Strategic Direction 2013-2016*** – reinforce the priorities around supporting economic development.
- ***NZ Transport Agency Rules, Policies and Guidelines (including published manuals)*** – provide guidance to programming planning and funding.

2.11.11 Legislation

2.11.11.1 Key Legislation

Legislation is established by Central Government and must be complied with at Local Government Level. Significant legislation and regulations affecting the Roading activities are provided in Table 4.

Different legislation has differing levels of impact on the Roading activity; this is indicated under Impact Range.

Table 5: Relevant Legislation

Legislation	Impact Range[1]
Building Act 2004	*
Civil Defence Emergency Management Act 2002	**
Climate Change (Emissions Trading and Renewable Preference) Act 2008	*
Climate Change Response Act 2002 (and amendments)	*
Electricity Act 1992.	*
Health and Safety in Employment Act 1992	***
Land Drainage Act 1908	*
Land Transport Management Act 2003	***
Land Transport Act 1989	**
Local Government Act 2002	***
Local Government Rating Act 2002	*
Local Government Rating Act 1974	**
Ngai Tahu Claims Settlement Act 1998	*
Public Works Act 1981 (and amendments)	*
Railway and Corridor Management and Safety Act 1992.	*

[1] * Limited, ** Moderate, *** Broad

Legislation	Impact Range[1]
Reserves Act 1977 (and amendments)	*
Resource Management Act 1991 (and amendments)	**
Summary Offences Act 1991.	*
Telecommunications Act 1987	*
Transit New Zealand Act 1989.	*
Utilities Access Act 2010	***
Water Conservation (Te Waihora/Lake Ellesmere) Order 2011	*

2.11.11.2 Civil Defence Emergency Management Act 2002

The expectations under the CDEM Act 2002 is that Council's services will function at the fullest possible extent during and after an emergency, even though this may be at a reduced level. In addition, Council has established planning and operational relationships with regional CDEM groups to deliver emergency management within our boundaries.

Roading is regarded as a critical service and is given special consideration within Council emergency management procedures. Every effort will be given to restore services immediately after an event to at least provide limited access.

2.11.11.3 Health and Safety in Employment Act 1992

The Health and Safety in Employment Act's object is to promote the prevention of harm to all persons at work and other persons in, or in the vicinity of, a place of work.

Section 5 of the Act sets out the object, and lists various means contained in the Act to achieve it, including by:

- Promoting excellence in health and safety management, in particular through being systematic.
- Defining hazards and harm in a comprehensive way so that all hazards and harm are covered, including harm caused by work-related stress and hazardous behaviour caused by certain temporary conditions.
- Imposing duties to ensure that people are not harmed as a result of work activities.
- Setting requirements that relate to the taking of all practicable steps to ensure health and safety, and are flexible to cover different circumstances.
- Encouraging the health and safety of volunteers.

- Requiring employee participation in the improvement of health and safety and encouraging good faith co-operation in places of work.
- Providing a range of enforcement methods in response to failure to comply with the Act.

The Act imposes duties on a wide range of working relationships in nearly all places of work.

This guide describes duties as set out in the Act and affecting different parties in the workplace:

- Employers.
- Persons who control places of work.
- Persons who sell or supply plant for use in places of work.
- Self-employed people.
- Principals to contracts.
- Employees.
- Volunteers.
- People receiving on the job training or gaining work experience.

2.11.11.4 Land Transport Management Act 2003

The Land Transport Management Act contains particular requirements for content, development of and consultation on the District's Land Transport Programme prior to its adoption by the Council.

The original Act was amended in 2008 by the Land Transport Management Amendment Act which introduced the requirement for a Regional Transport Committee (RTC) to develop a three year Regional Land Transport Programme (RLTP). The programme is required to detail at least the first three financial year's activities, relating to road maintenance, renewals, improvements and public transport services, identified by approved organisations (road controlling authorities) in the region. The regional programme is then submitted to the NZTA for incorporation into the National Land Transport Programme; 10-year forecasts are also required.

Under the 2003 version of the Act road controlling authorities were only required to develop detailed individual annual Land Transport Programmes for the submission to NZTA. The new requirements are covered in Section 12 of the Act as follows:

(1) A regional land transport programme allows approved organisations and the Agency to recommend funding for land transport activities or combinations of activities from the national land transport fund that will contribute to—

(a) a region's outcomes that are identified in the relevant regional land transport strategy; and

(b) any outcomes, objectives and impacts identified by the Crown in any national land transport strategy or the relevant GPS.

(2) Regional land transport programmes, which are prepared by regional transport committees (or, in the case of the Auckland region, ARTA), include—

(a) proposed activities and combinations of activities for 3 financial years; and

(b) an indication of significant activities for the following 3 financial years; and

(c) a 10-year financial forecast.

(3) This section is intended by way of explanation only, and if this section is inconsistent with another provision of this Act or any other Act, then the other provision prevails.

Under the Act, the RTC is responsible for assessing and prioritising proposed transportation activities across the region in relation to both national and regional outcomes and funding priorities. These include, in relation to Rangitikei District:

- Government Policy Statement (GPS).
- Regional Transport Strategies.

2.11.11.5 Local Government Act 2002

Significant requirements affecting this Plan are:

- Part 6 – Planning, Decision-Making, and Accountability.
- The consultation and community outcomes sections of this part are particularly relevant. Appendix T to this plan contains fuller details on consultation. The community outcomes requirements for this Asset Management Plan are met through the Council's Long Term Plan process.
- Part 7 – Specific Obligations and Restrictions on Local Authorities and Other Persons.
- Schedule 10 – Council Plans and Reports.
- The requirement to consider all options and to assess the benefits and costs of each option (see Appendix 'F').

2.8.8.6 Local Government Act 2002 — Schedule 10

Schedule 10 details the information to be included in long-term Council community plans (LTP). As one of the principal functions of this Asset Management Plan is to detail the asset management information required by the LTP, it is relevant to repeat some of Schedule 10’s requirements here. Section 2 of the schedule contains requirements that are particularly relevant to this Lifecycle Management Plan. It states:

> *(1) A long-term community plan must, in relation to each group of activities of the local authority*
>
> *(a) identify the activities within the group of activities:*
>
> *(b) identify the rationale for delivery of the group of activities (including the community outcomes to which the group of activities primarily contributes):*
>
> *(c) outline any significant negative effects that any activity within the group of activities may have on the social, economic, environmental, or cultural well-being of the local community:*
>
> *(d) identify the assets or groups of assets required by the group of activities and identify, in relation to those assets or groups of assets;*
>
> *(i) how the local authority will assess and manage the asset management implications of changes to—*
>
> *(A) demand for, or consumption of, relevant services; and*
>
> *(B) service provision levels and standards:*
>
> *(ii) what additional asset capacity is estimated to be required in respect of changes to each of the matters described in subparagraph (i):*
>
> *(iii) how the provision of additional asset capacity will be undertaken:*
>
> *(iv) the estimated costs of the provision of additional asset capacity identified under subparagraph (ii), and the division of those costs between each of the matters in respect of which additional capacity is required:*
>
> *(v) how the costs of the provision of additional asset capacity will be met:*
>
> *(vi) how the maintenance, renewal, and replacement of assets will be undertaken:*
>
> *(vii) how the costs of the maintenance, renewal, and replacement of assets will be met*

(e) include the information specified in sub clause (2)

(i) in detail in relation to each of the first 3 financial years covered by the plan; and

(ii) in outline in relation to each of the subsequent financial years covered by the plan.

(2) The information referred to in sub clause (1)(e) is:

(a) a statement of the intended levels of service provision for the group of activities, including the performance targets and other measures by which actual levels of service provision may meaningfully be assessed:

(b) the estimated expenses of achieving and maintaining the identified levels of service provision, including the estimated expenses associated with maintaining the service capacity and integrity of assets:

(c) a statement of how the expenses are to be met:

(d) a statement of the estimated revenue levels, the other sources of funds, and the rationale for their selection in terms of section 101(3).

Information that answers these requirements is principally contained in sections covering Maintenance, Renewals and New Improvements for each of the principal asset components.

2.11.11.6 Local Government Act 1974

Section 319 of this act essentially empowers the Council to maintain its roads to the standard it sees fit. This section states:

319. General powers of Councils in respect of roads:

The Council shall have power in respect of roads to do the following things:

(a) To construct, upgrade and repair all roads with such materials and in such manner as the Council thinks fit

(b) Repealed.

(c) To lay out new roads

(d) To divert or alter the course of any road

(e) To increase or diminish the width of any road subject to and in accordance with the provisions of the [District plan], if any, and to this Act and any other Act

(f) To determine what part of a road shall be a carriageway, and what part a footpath or cycle track only

(g) To alter the level of any road or any part of any road

(h) To stop or close any road or part thereof in the manner and upon the conditions set out in Section 342 and Schedule 10 to this Act

(i) To make and use a temporary road upon any unoccupied land while any road adjacent thereto is being constructed or repaired

(j) To name and to alter the name of any road and to place on any building or erection on or abutting on any road a plate bearing the name of the road

(k) To sell the surplus spoil of roads

(l) For the purpose of providing access from one road to another, or from one part of a road to another part of the same road, to construct on any road, or on land adjacent to any road, elevators, moving platforms, machinery, and overhead bridges for passengers or other traffic, and such subways, tunnels, shafts, and approaches as are required in connection therewith.

However, this general power is constrained by a number of other sections of the same Act, principally Section 353 which requires:

353. General safety provisions as to roads:

The Council shall take all sufficient precautions for the general safety of the public and traffic and workmen employed on or near any road and, in particular, shall;

(a) Take all reasonable precautions to prevent accidents during the construction or repair by the Council of any road, or when any opening is made therein by the Council for the repair of drains or gas pipes or for any other purpose, and require other persons doing such work to take such precautions, by erecting barriers, devices to cause traffic to slow down, or fences across any such road or around any dangerous place therein, or otherwise, and shall cause, and require other persons doing such work to cause, any such dangerous place to be sufficiently lighted by night; and any person removing any such protective work, or removing or extinguishing any such light without the authority of the Council, commits an offence:

(b) Require the owner or occupier of any land upon which there is any hole, well, excavation, or other place dangerous to persons passing along any road forthwith to fill in, cover, or enclose the same.

(c) Whenever the public safety or convenience renders it expedient, require the owner or occupier of any land not separated from a road by a sufficient fence to enclose the same by a fence to the satisfaction of the Council.

2.11.11.7 Resource Management Act 1991

The RMA 1991 provides an environmentally conscious framework for Local and Regional Authorities to administer powers with regard to development and the management of natural resources. The RMA 1991 focuses on the effects of activities rather than on the activities themselves. RDC's District Plan provides the rules that apply to subdivision, land use consent and development in conjunction (where necessary) with Horizon's regional plans that also provide for discharges to the environment.

2.11.11.8 Utilities Access Act 2010

The Utilities Access Act 2010 provides for a coordinated approach to management of the road corridor. The Act requires the Corridor Managers to undertake a planning and access management role and Utility operators to comply with an approved code of practice.

The purpose of this Act is to:

a) require utility operators and corridor managers to comply with a national code of practice that regulates access to transport corridors; and

b) provide for the making and administration of that code.

In November 2011 the Minister of Infrastructure approved the Code of Practice for Utilities Access to the Transport Corridor developed by the New Zealand Utilities Access Group. This code now has similar effect to a Regulation and will require implementation.

The roll-out of broadband as part of Central Government's Ultra-Fast Broadband (UFB) may introduce another set of processes will need to be implemented.

The Implementation of processes for Utilities Access to the Transport Corridor and UFB rollout is an operational matter, but is identified as an Improvement Plan item.

2.12 Standards & Regulations

2.12.1 National Planning Documents and Standards

- Government's Sustainable Development Action Plan.
- New Zealand Standard SNZHB 4360:2000 'Risk Management for Local Government'.
- The National Land Transport Strategy.

- National Energy Efficiency and Conservation Strategy.
- The NZ Transport Agency (NZTA) Maintenance Guidelines for Local Roads.
- The New Zealand Coastal Policy Statement 1994.
- The (proposed) National Environmental Standard relating to land transport noise from major roads.
- NZS 4404: 2004 Land Development and Subdivision Engineering.
- SNZ HB 2002:2003 Code of Practice for Working in the Road (NZUAG Roadshare).
- National Land Transport Programme.
- National Infrastructure Plan 2011.

2.12.2 Regulations

- The Building Regulations 1992.
- The Heavy Motor Vehicle Regulations 1974.
- Land Transport Rule: Setting of Speed Limits 2003 (Rule 54001).
- Land Transport Rule: Traffic Control Devices 2004 (Rule 54002).

2.12.3 Regional Strategies, Policies and Plans

2.12.3.1 Horizons Regional Land Transport Strategy (2010-2040)

Section 75 of the Land Transport Management Act 2003 requires a Regional Transport Committee to produce a Regional Land Transport Strategy (RLTS); it states:

> *75. Core requirements for regional land transport strategies. A regional transport committee must, when preparing a regional land transport strategy on behalf of a regional the Council;*
>
> *(a) ensure that the regional land transport strategy*
>
> *(i) contributes to the aim of achieving an affordable, integrated, safe, responsive, and sustainable land transport system; and*
>
> *(ii) contributes to each of the following:*
>
> *(A) assisting economic development:*
>
> *(B) assisting safety and personal security:*

(C) improving access and mobility:

(D) protecting and promoting public health:

(E) ensuring environmental sustainability; and

(iii) is consistent with any

(A) national land transport strategy; and

(B) relevant national policy statement or any relevant regional policy statement or regional plan that is for the time being in force under the Resource Management Act 1991; and

(iv) avoids, to the extent reasonable in the circumstances, adverse effects on the Environment and

(b) take into account

(i) the relevant GPS; and

(ii) any national energy efficiency and conservation strategy; and

(iii) any relevant District plans.

The 2010-2040 Horizons Regional Land Transport Strategy is closely aligned with the objectives of the NZTS and LTMA, tailored for the Rangitikei region. It includes strategies to accommodate projected growth in the region and the resulting traffic growth or demands for further transport services e.g. Regional Land Transport Strategy (RLTS). Furthermore, it reinforces the direction of the 2008 RLTS, as well as giving a greater emphasis to resilience.

The vision of the strategy is:

A safe, sustainable and resilient transport system that supports economic development and lifestyle choices, with strong connections to national corridors.

The objectives for transport in Rangitikei are:

- Resilient and effective transport system that supports economic growth.
- A multi-modal transport system that provides access to work, education, social and health opportunities for all sectors of the community.
- A safe transport system.
- A transport system that protects and promotes public health.
- A transport system that protects cultural values.

- A transport system that ensures good environmental outcomes.

The regional transport outcomes align with these objectives and are a priority for NZTA and the District Councils within the region.

2.12.4 District Strategies, Plans and Policies

2.12.4.1 Policy Manual

The Rangitikei District Council Policy Manual contains policies that provide guidance to all activities that Council carries out. The five policy intents are:

- Promoting economic development.
- Sustaining the natural environment.
- Supporting recreational, creative and cultural pursuits.
- Providing opportunities for participation and social cohesion.
- Contributing to personal and public safety.

The manual provides detail under each of these headings. It seeks to give effect to the purpose of local government as defined in the amended Local Government Act 2002:

> *"to meet the current and future needs of communities for good-quality local infrastructure, local public services, and performance of regulatory functions in a way that is most cost-effective for households and businesses."*

2.12.4.2 Procurement Policy

Rangitikei District Council is committed to open, transparent and competitive procurement that:

- Delivers best value for money (which isn't necessarily the cheapest price).
- Supports the local economy where appropriate while maintaining the need to deliver value for money to the ratepayers of the Rangitikei District.
- Meets agreed OAG standards.

2.12.5 District Planning Documents

2.12.5.1 Long Term Plan

The Long Term Plan (LTP) is a document that sets out what Council plans to do over the next ten years and how it plans to fund these activities. The first three years are discussed in detail and the following seven years are outlined more briefly.

The purpose of a LTP is prescribed by the Local Government Act 2002 to:

A. Describe the activities of the local authority;

B. Describe the community outcomes of the local authority's District or region;

C. Provide integrated decision-making and coordination of the resources of the local authority;

D. Provide a long-term focus for the decisions and activities of the local authority;

E. Provide a basis for accountability of the local authority to the community;

F. Provide an opportunity for participation by the public in decision-making processes on activities to be undertaken by the local authority.

Each local authority is required to have an LTP and to review it every three years. Recent changes to the Local Government Act 2002 has affected some parts of the way that Council's must prepare and present their LTP to their community, particularly the adoption of a Financial Strategy and changes to the process for community outcomes.

2.12.5.2 District Plan

The District Plan is detailed and completed under guidance from the Resource Management Act 1991 (the Act) for the Rangitikei District.

The District Plan is one of a suite of major plans which sets out the Council's vision for the District; others include the Long Term Plan, the Financial Strategy, Asset Management Plans, parks and reserves management plans and the Regional Civil Defence and Emergency Management Plan. Collectively, these are the building blocks that ensure the Council integrates its planning for community wellbeing.

The District Plan is developed from issues advised to Council (through staff advice, the State of the Environment Report, and the Plan Efficiency and Effectiveness Report), the Long Term Plan utilises asset and Asset Management Plans to drive its efforts and budgets.

A review of the District Plan provides an opportunity to enhance the plan, to address issues likely to arise in the next 10 years, and to provide better recognition of some of Rangitikei's natural and physical resources, such as landscapes. The review also provides the opportunity to integrate knowledge gained as a result of the 2004 and 2006 flood events in the District.

2.13 Asset Management Implementation

2.13.1 Development of an Asset Management Culture

The on-going development and successful implementation of asset management requires an organisational culture of asset management. To be successful the asset management culture needs to be consistently modelled and supported by the Chief Executive and senior managers in conjunction with the elected Council.

2.13.2 Roles and Responsibilities

The roles and responsibilities of Council staff as they relate to the Asset Management Plan enactment have been defined in respect to the on-going use of the plan as this will enable the Plan to remain relevant and current. The following table details how this is and will be carried out within RDC.

Table 6: Asset Management Roles and Responsibilities

Item		Method
1	Organisational culture of asset management developed.	Asset Management policy developed and adopted in 2009. Workshop sessions with Councillors introducing Asset Management generally and activity specific.
2	Council Staff understand the reasons for the plans and the implications for the long-term use of them.	On department basis.
3	The Asset Management Plans are adopted/accepted by staff.	Adopted by Council.
4	Council Staff understand what is in the plans and how it could affect their day to day work including their responsibilities and reporting requirements as detailed in the different sections within the AMP.	Training Programme.
5	Understand all the reporting requirements for Levels of Service and Internal Benchmarking.	Training Programme and implementation of LGA 2002 amendments.

Item		Method
6	Training required in the use of the Plan (what's in it, how work is done, on-going requirements for monitoring, review and updating).	Plan presented to all staff involved in the Roading activity.
7	Instigation of processes to encourage Council Staff to use the Plan.	Improvement Plan.

2.13.3 Resourcing

To be effective, Asset management programmes must be adequately resourced, and therefore require on-going budget to deliver identified improvements and keep plans and processes current with evolving practice. For asset management to be successful in Rangitikei District there must be a commitment recognised across the organisation. This commitment must translate into budget, human resources, and management accountability.

2.13.4 Implementation

This AMP includes improvement and expenditure programmes that will be actioned by the Roading Asset Manager implemented by the RDC Service Delivery Group and other providers with the objective of achieving community outcomes and delivering the stated levels of service for this Activity.

2.14 Asset Management Policy

2.14.1 Objective

The objective of the Rangitikei District Council's Asset Management policy for the Roading activity is to ensure that Council's for the Roading activity is to ensure that Council's service delivery is optimized to deliver the purpose of local government (as defined in the Local Government Act 2002), agreed community outcomes and levels of service, manage related risks, and optimize expenditure over the entire lifecycle of the service delivery, using appropriate assets as required.

2.14.2 Principles

The following principles will be used by Council to guide asset management planning and decision making:

- Effective consultation to determine appropriate Levels of Service.
- Ensuring service delivery needs form the basis of asset management.

- Integration of asset management with corporate, financial, business and budgetary planning using asset/Asset Management Plans and Council's LTP to demonstrate this.
- Integration with neighbouring authorities and other agencies including NZ Transport Strategy, National Land Transport Programme, and the Regional Land Transport Strategy, and shared services agreements.
- Integration of asset management within Council's strategic, tactical and operational planning frameworks.
- Informed decision making taking a lifecycle management and inter-generational approach to asset planning.
- Transparent and accountable asset management decision making.
- Sustainable management providing for present needs whilst sustaining resources for future generations.

2.14.3 Linkages

This Asset Management Policy links to Council's LTP, the Horizons Regional Land Transport Strategy, and Roading Asset Management Plan. New Zealand Transport Agency asset management requirements form this Policy's minimum asset management practice requirements.

2.14.4 Structured Assessment

Council has undertaken a structured assessment of the appropriate level of asset management practice for the Roading Assets. This structured assessment follows the guidance provided in Section 2.1.3 of the International Infrastructure Management Manual. The results of this assessment were that the appropriate operating level for the Roading activity was considered Intermediate.

2.14.5 Implementation and Review

This Asset Management Policy has been implemented in conjunction with the 2015 Asset Management Plans and 2015 LTP.

The next full review of this Asset Management Policy shall be completed in June 2017 prior to completing asset management plan updates to support the 2018 LTP.

2.14.6 Implementation Strategy

Council staff has completed a detailed analysis of appropriate asset management practice within the guidance offered by this Policy. This analysis has examined asset description, levels of service, managing growth, risk management, asset lifecycle decision making, financial forecasts, planning assumptions and confidence levels, improvement programmes, use of qualified persons and Council commitment to asset managing planning.

2.14.7 Roading AMP Compliance Status

Roads and footpaths are vital network for RDC and the tourist, agricultural and forestry economies of the District rely on this service.

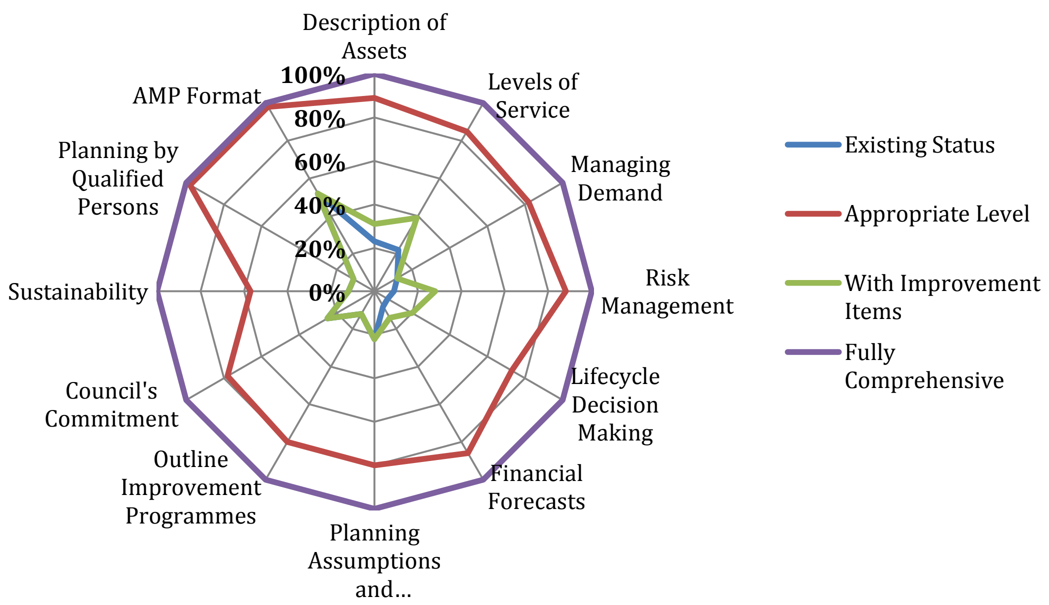
There are a range of issues affecting the network, particularly changes in demand due to land use, traffic composition and demographics. These are not described or illustrated in sufficient detail to develop solutions and consider options or funding requirements. Asset condition and performance discussion is fairly limited; it is likely that as funding becomes more constrained that robust lifecycle planning and funding requirements will be essential.

While there is a focus on pavements, there is a minimum level of understanding required for management of other asset groups. In particular, footpaths are an issue in centres where there is higher pedestrian use and an aging population.

Safety is not well integrated in to the AMP. Alignment of objectives and regional initiatives should be reflected in the AMP.

A lack of supporting information and references has affected the peer review scoring of the AMP. The consequence is that the score is lower than the true level of Asset Management practice, as is solely based on what is presented in the AMP. Fortunately it is relatively easy to improve the quality of the AMP by better referencing of supporting documents, and describing actual practices in places where this increases confidence in the AMP.

Figure 3: Asset Management Level



2.14.8 Assumptions

A significant forecasting assumption is defined as:

Something you take as being true for the purposes of a future action(s).

The Local Government Act 2002 requires Councils to disclose the assumptions it has used to develop the LTP. Councils are required to show the assumptions, the level of uncertainty and quantify the potential effect of the uncertainty on the forecast financial estimates.

The following tables list the assumptions Council has made, including associated risks, in preparing its forecast financial statements for the LTP.

Table 7: Assumption – Ageing Population

Assumption	That the median age of Rangitikei District residents will increase significantly over the long-term leading to changes in the way Council delivers services.
Detailed Forecasts	The number of residents aged 65+ increased by over 20 % from 2006 to 2013. Older people now make up approximately 16 % of the resident population (March 2013). This is expected to increase to approximately 24 % in 2031. The median age of residents in the Rangitikei District was forecast to increase from 40 years old in 2006 to 44 years old in 2031 (medium growth Statistics NZ 2006 base series) or 46 years old (high growth Statistics NZ series). These forecasts do not currently look high enough with the 2013 Census results showing a major shift in age structure for residents in the District. The median age in 2013 jumped to 44 years from 40 years in 2006. Clearly there has been an outflow of people aged 30-44 years. These people tend to be in families with children that are also lost to the District. The number of families in the District remained static between 2006 and 2013, despite the 2 % decrease in total population. The median age may well reduce in the next Census (2018) if net migration reverses. On current forecasts the changes will be steady and substantial over time. Council will need to focus more on the impact of this trend in the later years of this LTP.
Risk	The increase in older people is happening at a faster rate than previously forecast. If the migration flows again turn into a strong outflow to Australia then this trend will continue. A major shift towards older people is likely to change the type of services demanded from Council, and the ability to pay for those services. Council will come under increasing pressure to reduce costs and certain types of services. The growth forecast is likely to result in an increase in the numbers of working people with families over the short to medium term (from positive migration).
Level of uncertainty	The long-term trend to an older population is reasonably certain. The actual outcomes are highly dependent on the migration trends. A sustained and significant return of migrants from Australia would result in the median age falling in the medium term. This is also driven by business growth and employment trends. Palmerston North City has a much lower median age due to the number of tertiary students and the army base at Linton.

Impact on Council Services	Council may need to alter the mix of services delivered over time. This is unlikely to result in new activities, but rather the types of services and facilities. This would include recreation assets and services, Roading design and footpaths.
Financial impact	Affordability of rates will increase in importance. The specifications of Council services may change but overall this is unlikely to result in higher costs.
Mitigating factors	A change in demands for Council services is not new and is part of the political process. The range of Council services utilised by older people is not significantly different from younger people. While the need for organised active team sports as traditionally catered for may decline there will still be a demand for open spaces, walkways, pools, halls etc.
Data source	Statistics NZ 2013 Census and 2010 population forecasts update. Population and Household Projections 2016 to 2046, Rangitikei District and Area Units, Community Services, RDC. Asset Management Plans RDC.

Table 8: Assumption – Infrastructure Capacity

Assumption	That forecast population, household and business growth can be catered for by current and planned capacity of assets.
Detailed Forecasts	The reducing household occupancy rate will result in an increasing number of urban households. While this results in increased network connections and hard surface stormwater runoff, there is also be an offsetting trend to lower usage per connection through water saving appliances and public awareness. The planned upgrades and improvements of the Marton, Bulls and Hunterville WWTP and water supply storage will support any growth in the urban areas. Roading congestion is generally low on a national scale. A small number of specific upgrades to intersections are planned to address some current issues. Current capacity is generally sufficient to cater for expected population changes. The majority of growth is likely to be in the southern rural areas and rural villages, particularly around Ohakea, Bulls and possibly Ratana.
Risk	That the planned upgrades of key assets can be maintained at the same level within the District without a drop in level of service due to reduced number of rate payers. A possible surge in growth in a number of rural villages would place pressure on 3 waters infrastructure in those villages. This is unlikely and there is considerable existing capacity in these villages.
Level of uncertainty	As noted in population and household assumptions, predicted growth is based on projections. However asset managers have confirmed considerable existing capacity and additional planned capacity. A much higher growth rate would be required before capacity issues arose during the next 10 years.

Impact on Council Services	Capacity exists to cater for forecast population and business growth. Growth significantly above this level may result in the need to expand the major infrastructure networks and would require funding. Growth will place more demand on recreational and community facilities. These facilities also have considerable capacity to cater for additional residents.
Financial impact	Urban growth that required additional infrastructure capacity would require investment by Council. This could be achieved through a combination of loan funding, development contributions, reserves and by rating. Council operates within safe margins of borrowing and more borrowing could be undertaken should the need arise, although this is considered unlikely. Additional properties results in an expansion of the rating base. Given the current and already planned infrastructural capacities the forecast growth results in a positive financial impact on Council.
Mitigating factors	Significant growth above the current Statistics NZ high forecasts would be required before capacity levels in Marton, Taihape or villages and the roading network were reached. This is considered highly unlikely in the short term. Any major changes to the growth trend will be identified through Census analysis and building consent figures.
Data source	Statistics NZ 2013 Census and 2010 population forecasts update. Population and Household Projections 2016 to 2046 and Asset Management Plans.

Table 9: Assumption – Local Government Legislative Framework

Assumption	Legislative changes will not have a significant effect on Council's finances or levels of service, or change the current governance arrangements. It is assumed existing shared service operation and collaboration will continue.

Strategic Environment

Detailed Forecasts	Rangitikei District Council has a shared service agreement with Manawatu District Council, covering infrastructure and animal control. It also has a shared service agreement with Wanganui Council for building regulatory services. Rangitikei District Council also works closely with Horizons Regional Council which is a provider of services including Civil Defence and Emergency Management. Further collaborative agreements are likely over time, with any efficiency gains assumed to be considered at the time of establishment. No additional efficiency gains have been factored into the budgets. The Council is assumed to retain the current boundaries and it is assumed that there will be no forced amalgamations. Local government has been in a reform process over the last four years. The Better Local Government programme is ongoing and further legislative changes are possible. Key areas affected by potential legislative change are in regulatory and compliance areas including RMA processes and earthquake prone building standards. Possible changes to the Building Act (2004) are likely to increase levels of service required by Council but still remain uncertain. The Asset Management Plans for Environmental and Regulatory Management assume: • additional expenditure to assess all commercial and some multi-unit multi-story residential buildings • the current levels of service and demand continue for RMA processes but officers are closely monitoring the situation. Roading, Water Supply, Wastewater and Stormwater are also the subjects of ongoing reviews that could impact on the way these services are delivered. Local Government New Zealand is leading a review of possible efficiencies in the three waters activities. This LTP assumes that the Council will continue to deliver these infrastructural services within the existing legislative framework. It is also assumed that legislated minimum levels of service / standards (such as drinking water quality) will not be changed.
Risk	Decisions by other Councils could change the current shared service agreements and result in different cost structures or levels of service delivered by the Council. This risk is seen as moderate in the longer term but low in the short term. Changes in legislation could result in additional mandatory services that will increase costs for the Council. This risk is seen as high. Council boundaries may be altered by the government or through a review by the Local Government Commission.
Level of uncertainty	High - Government policy can change significantly, especially with a change of government. Changes were announced in 2013 to the RMA and to the Building Act in 2014. The government could not gain sufficient support for the RMA changes and these may not become law. The government has stated that forced amalgamations will not occur. This may change over time. Any group in the community can now initiate a review of Council boundaries. Over time it is likely that the issue of amalgamation with one or more neighbours will arise and be the subject of a Local Government Commission review. The earthquake prone building requirements are likely to be enacted in some form.

Impact on Council Services	Any changes to the structure of local government involving the Rangitikei District would result in a new LTP and a different governance arrangement. Changes to the mode of delivery for infrastructure services would result in different governance arrangements for those activities.
Financial impact	Additional resources will be required to assess the structural rating of all the buildings required under proposed changes to the Building Act. Any amalgamation process would result in policy resources being diverted or additional advice being sought. Any changes to the delivery of infrastructure services may remove these costs from the Council, but is unlikely to reduce the costs to ratepayers who receive the services.
Mitigating factors	Council continues to enjoy close working relationships with neighbouring Councils at the governance and officer levels. Specific requirements from new legislation can be partially addressed through changes to fees and charges, or through additional targeted rates.
Data source	Statistics NZ 2013 Census and 2010 population forecasts update. Population and Household Projections 2016 to 2046, Rangitikei District and Area Units, Community Services, RDC. Asset Management Plans RDC and MDC.

Table 10: Assumption – Climate Change

Assumption	It is assumed that although Rangitikei District will be affected by long-term climate change in parallel with predicted changes for the North Island west coast, climate change will not significantly impact during the life of this long-term plan
Detailed Forecasts	Analysis of International Panel on Climate Change data has led NIWA to a number of conclusions on temperature changes. Further, Ministry for the Environment reports have identified predicted change in other weather patterns including wind and rainfall. Impacts to 2040 are forecast to not be significantly damaging. NIWA interpretation of the Intergovernmental Panel on Climate Change fourth assessment The present design criteria for infrastructure for extreme events are very likely to be exceeded more frequently by 2030 Rangitikei is not one of the initial ‘hotspots’ for impacts in New Zealand Rainfall on the west coast is expected to increase with Manawatu-Wanganui forecast to be up to have 5 % more rainfall (by 2040) with more varied rainfall patterns and more frequent flood events. By 2040, NIWA predictions show a likely mean annual temperature increase of between 0.6 and 1.3 °C. NIWA projects an increase in westerly winds that will increase weather patterns affecting this coast, including increased storminess, heavy swells, strong winds and ex-tropical cyclones. Predicted increases in temperature and rainfall lead to increased probability of landslides, which NIWA suggests will increase in probability likely to at least double this century.

Risk	Any significant climate change would affect demand for Council services and could adversely affect infrastructure Risk of significant and frequent impacts is seen as: • High to certain in the very long term (50 years plus). • Moderate in long-term (20 years plus) • Low in short to medium term.
Level of uncertainty	While the long-term trend of rising temperatures and more frequent intense weather events is reasonably certain, the short to medium term impacts are less certain.
Impact on Council Services	Any significant climate change would affect demand for Council services and could adversely affect infrastructure. Effects of climate change that are a concern for Council are primarily increased incidences of extreme weather. For example, increased rainfall causing flooding would impact on Council stormwater services, secondary impacts on Roading, water and wastewater services and potentially civil defence and emergency management. The risk is that storm damage from flooding becomes more frequent and that stormwater standards will not be met. This would increase costs from repair works, and also possibly lead to increasing levels of service.
Financial impact	Significant impacts are not expected to be frequent in the next few decades. No additional costs have been factored into this LTP in addition to the policy of holding depreciation renewal reserves. Costs from damages associated with extreme weather are likely to rise as the incidence of these events increases in the future. Costs to the Council include repairing infrastructure or assets, while costs to the public and
Mitigating factors	Financial impacts will be mitigated by ensuring adequate insurance cover is used and appropriate maintenance is undertaken as a preventative measure. Climate change is not an exact science and unusual weather patterns are becoming more common at present. Much more rapid climate change is possible and could result in frequent storm damage from flooding and wind. There is no accepted evidence yet as to the likelihood or consequences of this happening in the short term. A watching brief will be maintained. Major flood protection works have been completed under several bridges and river banks in order to improve flood protection works as a result of the 2004 floods (Horizons). Technology is always changing and it is likely that new and cost effective plant and materials will be available to meet some of the challenges in the future.
Data source	Intergovernmental Panel on Climate Change Fourth Assessment, NIWA and Ministry for the Environment

Table 11: Assumption – Natural Disasters

Assumption	Rangitikei District Council is prepared to respond with any natural hazards including floods, storms, earthquakes and volcanic activity that occur during the life of this long-term plan.

Detailed Forecasts	An increasing number of natural disasters including earthquakes, floods and volcanic events have occurred in New Zealand in the last decade. Insurance is becoming increasingly difficult to obtain at an affordable level. It is assumed that natural disasters will not be catastrophic in scale such as experienced by Christchurch City recently. Any major natural disaster that results in significant repair costs to Council will be largely funded by insurance and/or government assistance. The District experienced a major flood event in 2004. Climate change trends are increasing the risk that this will occur again on a more regular basis. Moderate earthquakes are likely to occur in the LTP period but damaging earthquakes are far less likely. However, there are a number of fault lines through or near the District and a major earthquake would cause significant damage. The recent Christchurch earthquake dictates that emergency preparedness for a natural disaster must be taken seriously. The sequence of earthquakes, in a region not known to face a threat from earthquakes, highlights the need for preparedness.
Risk	Council may not be adequately prepared or resourced to respond to a major natural disaster, or to a succession of natural disasters. Activities of Council may be unable to deliver agreed levels of service. A series of natural disasters may exhaust Council reserves and prudent borrowing ability.
Level of uncertainty	A high level of uncertainty exists around natural disasters. For this reason, considerable effort is placed on mitigating factors including the significant financial mitigating factors.
Impact on Council Services	Rangitikei District and other District businesses could be subject to a break in business continuity in the event of a major natural event. Council services including water (treatment, drinking), the road network and wastewater networks and treatment could be disrupted for considerable periods of time. Depending on the severity or timing of disasters, Council may not have either enough staff to manage recovery and response.
Financial impact	A major natural event would impact on Council by demanding immediate funding. This would reduce the resilience of the Council for meeting future unforeseen costs. Additional borrowing would impact on future rating levels.
Mitigating factors	The Council has prepared a detailed business continuity plan, which outlines both crisis response and recovery. Civil Defence emergency planning is in alignment with business continuity preparedness. The Council also continues to be part of the Manawatu-Wanganui Civil Defence and Emergency Management Group working to ensure preparedness for any natural disaster, coordinate a response and support recovery. Emergency reserves are currently held in contingency for such issues and Council ensures it is adequately insured. Loan facilities are also available should the need arise and the Council has significant capacity within its limits for the level of debt. Major natural disasters are attracting Government and private charitable sector support.

Table 12: Assumption – Funding and Demand

Assumptions	Rangitikei District Council will receive a reduced proportion of funding for the maintenance and renewal of the local Roading network. The proportion will reduce by up to 3 % over the first three years of the LTP then remain stable after that. That Rangitikei District is able to service demand for alternative modes of transport, including both public transport, cycling and walking, over the life of the ten-year period
Detailed Forecasts	In Rangitikei District of the usually resident people aged over 15 who travelled to work, 91 % of journeys to work are undertaken by car, van or truck. Only 1 % of journeys to work are by public transport, 2 % by bicycle and 5 % walked or jogged. 13 % of residents worked from home with this % fairly stable (all data 2013 Census). The heavy reliance on private transport is expected to continue with steady but minor gains in public transport and walking / biking usage. Statistics New Zealand data shows that the large majority of residents who travel to work outside the District travel to Palmerston North or Wanganui. The heaviest traffic volumes within the wider horizons region are the Marton and Bulls to Wanganui traffic corridors, via Wanganui Road or SH3. The Regional Land Transport strategy has identified the need to provide cost-effective and appropriate public transport in small towns and rural areas as a key transport issue for the region. Funding for the maintenance and renewal of the local Roading network is shared with NZTA. The funding for the NZTA proportion (the FAR) comes from user charges through petrol taxes and road user charges. The system and formula for this funding is changing from 1 July 2015. The Council is forecast to receive 2 % less funding from NZTA over the next three years (from a 53 % subsidy rate to 52 %). The FAR had increased slightly over the last few years. The Emergency works (primarily from flood damage) is also changing and the new system will also result in reduced funding from NZTA.
Risk	Cost efficiencies will not be sufficient to offset reduced NZTA funding. Future funding from NZTA could be reduced again leading to serious long-term impacts on Roading levels of service. Council will face increasing demands from some residents for previously unsupported services such as cycle ways. Increasing travel to work in surrounding Districts will place increasing stress on key arterial routes.
Level of uncertainty	Current and future NZTA funding is decided by NZTA and central government transport policies. Higher fuel prices could change transport patterns. However between 2006 and 2013 fewer people walked or biked to work.

Impact on Council Services	Reduced NZTA funding could result in lower levels of service to match available funds. The Council may face an increased demand for funding for public transport, footpaths, walkways and cycle-ways, or facilitating other attempts to solve transport challenges.
Financial impact	Reduced funding from NZTA results in lowering levels of service, increased rates (local share) or further efficiencies (or a combination of these). Roading is a significant activity of Council and changes to NZTA funding can have a major impact on activity funding. Increased demand for cycle ways and walkways will result in the need for increased funding.
Mitigating factors	More people walking or biking would reduce the required maintenance on roads. New technology, better asset management and improved procurement practices may drive further efficiencies in the future reducing the costs of maintaining the Roading network. Public transport is not traditionally a District Council function but Council is working closely with provider Horizons Regional Council to ensure best and most appropriate services for the Rangitikei.
Data source	RDC, MDC, NZ Stats 2013 Census, Horizons RLTS.

Table 13: Assumption – Resource Consents

Assumptions	Renewed resource consents will be issued without major changes to conditions. Resource consents issued for new / upgraded infrastructure will not contain significantly different conditions / standards to those anticipated in the project.
Detailed Forecasts	Considerable impact would be felt if either consent were issued with stricter conditions or consents were not renewed. In both cases, Council would face additional financial cost. It is assumed however that consents will be renewed without these additional impacts.
Risk	If consents are issued with higher standards, or there is a tightening of existing consent conditions above those contained in the Council AMPs, communities could face significant costs to meet ongoing consent conditions. Operating in breach of consents would leave it open to legal implications and potentially fines. Standards for infrastructure have steadily increased over time.

Level of uncertainty	Low in short term as standards are set by legislation and Horizons One Plan. Some additional conditions may arise depending on public submissions to consents. In the long-term standards may change as the One Plan is reviewed and/or government policy changes. This is most likely in regard to Water take consents and wastewater discharge consents.
Impact on Council Services	If consents are renewed with different conditions, changes to levels of service and model of operation may be necessary. If consents cannot be obtained new works could be delayed, impacting on provision of services. This is particularly relevant to both wastewater and water supply activities though also relevant to Roading and stormwater.
Financial impact	If there were changes to conditions or consents not renewed or issued, Council would face additional costs either to meet consents or to continue a process to apply for new consents. Council is well-positioned to support additional consent requirements however there would be an opportunity cost of not undertaking other infrastructure works or services. Affordability of services in small communities could become increasingly difficult.
Mitigating factors	Implementation of One Plan by Horizons Regional Council is the main variable in the short to medium term. Council has a good working relationship with Horizons. The Council will monitor and work with Horizons to ensure RDC has sufficient notice of and is well-placed to manage any change required. While Council can advocate on the community's behalf, there is little or no flexibility in terms of consent conditions. The government has recognised the financial impacts on smaller communities and contestable funding is available for both water and wastewater upgrades. The Council is continually involved in applying for such funding for smaller projects.
Data source	Horizons One Plan.

Table 14: Assumption - Inflation

Assumptions	It is assumed that different rates of inflation will apply across different years and to different expenditure types. Appendix one contains the BERL inflation adjusters (commissioned by the Society of Local Government Managers) used in producing this plan. These forecasts were issued in September 2014.
Detailed Forecasts	The inflation forecasts in appendix one have been used to prepare the financial information within the LTP. These forecasts are updated each year and each new
Risk	It is possible that rates will vary significantly from that budgeted for, resulting in the need for major changes to future annual budgets. This risk is seen as low in the short term, although actual inflation is likely to vary across the forecast categories (both plus and minus).

Level of uncertainty	High in the long-term. Major changes to inflation trends results from changes to the demand for resources in New Zealand, and with NZ's major trading partners. These economic trends can change significantly year to year, with the impacts on resource prices dependent on their availability.
Impact on Council Services	Significant (and unexpected) cost increases will raise questions over levels of service and affordability.
Financial impact	Council may face increased costs if inflation rates differ significantly from forecasts. The biggest impact in the short term would be to threaten the viability of major projects.
Mitigating factors	Major projects and most infrastructure maintenance are subject to tenders. These tend to be multi-year contracts that reduce the risk to Council in the short term. Council can decide to not proceed with projects if tendered costs have exceeded the budget. Council closely monitors its budget and performance against budget. Emerging trends in the economy affecting inflation can be identified at early stages and budgets and spending adjusted if necessary to ensure there are no sudden impacts. Council also utilises several sources of funds including external and internal borrowing and rates so the risk of inflation is not to all sources of funding.
Data source	BERL inflation adjustors (provided through SOLGM).

Table 15: Assumption – Interest Rates on Loans Raised

Assumptions	Council has budgeted for this Long Term Plan that interest on loans raised will average 7 %. This figure was derived in conjunction with our bankers BNZ, however this could vary.
Detailed Forecasts	The inflation forecasts in appendix one have been used to prepare the financial information within the LTP. These forecasts are updated each year and each new LTP uses the most recent update.
Risk	Council may face additional costs for infrastructure upgrades and renewals and other projects if interest rates rise. Significant increases in interest rates would reduce the number of projects able to be completed without increasing other sources of funding.
Level of uncertainty	Relatively low in the short term but higher in the long-term. Interest rates vary subject to market conditions both in New Zealand and overseas, however this is a conservative projection.
Impact on Council Services	Significant increases will impact the most on infrastructure and community activities with major upgrades or asset renewals planned. The impact will depend on the level of depreciation reserves and other sources of funding.

Financial impact	Higher interest rates will increase the costs of borrowing and consequently the affordability of those services that use loan funding.
Mitigating factors	The impact of moderate increases in interest rates is likely to be manageable overall, as Council could absorb an increase in interest rates due to prudent levels of borrowing. Increased costs would only apply to new borrowings and therefore the average cost would not increase quickly. Local government is able to borrow at very competitive rates in the market. Specific projects delivering increased levels of service would be reviewed to confirm viability before being confirmed.
Data source	Financial strategy and bank forecasts

Table 16: Assumption – Return on Investments

Assumption	It is assumed that return on investments made by RDC will be 5.75 %. This figure was derived in conjunction with our banker BNZ.
Detailed Forecasts	The return on investments rate is used to calculate the interest revenue for the Council. There are a number of investments held for strategic purposes rather than being held purely for financial gain. These have been taken into account when assessing the rate above. Council has a number of fixed, long-term investments that have also impacted on the rate used.
Risk	Interest rates are projected, not set, so some variation could occur. Investment rates will generally follow interest rates and maintain a consistent difference.
Level of uncertainty	Low in short term - A reasonable amount of certainty is attached to Government and sector forecasts.
Impact on Council Services	Investment revenue is not significant so there would be minimal impact on Council Services.
Financial impact	Lower interest rates on Council's investments will lead to lower revenue. This tends to have a positive impact on Council finances as interest rates on borrowing would also have fallen. Council is a net borrower so costs reduce more than revenue declines.
Mitigating factors	Only a very small proportion of Council's revenue is from interest therefore impact, even from a large change in interest rates, is not material.
Data Source	Financial strategy and bank forecasts.

Table 17: Assumption – Useful Life

Assumption	It is assumed that assets will last as long as estimated in the asset management plans produced during this LTP process and that on average condition scores used were accurate.
Detailed Forecasts	Factors from an extraordinary event or higher business / population than forecast could result in increased demand that impacts upon the life of an asset. Many different possible factors can affect different assets – so to calculate and mitigate against each is difficult.
Risk	Any significant unanticipated asset deterioration either due to external events or inadequate condition scoring.
Level of uncertainty	A reasonable amount of certainty exists.
Impact on Council Services	If an asset needed to be replaced earlier than forecast it would have an impact on the service – for example there may be an unplanned shutdown in the case of water services or a bridge failure may result in closure. It may be that unexpected costs from replacement of one asset could impact on other services from another. For example, Council was forced to increase borrowing or to use more rates take.
Financial impact	Unbudgeted capital and / or maintenance expenditure would impact on finances by requiring funding – this could be addressed in a number of ways from borrowing (for renewals), using reserves or a rates increase. Higher maintenance costs over the longer term would require more depreciation funding (rates). If borrowing was selected, there would be both repayments on capital and unbudgeted costs for interest payments. Borrowing would have to be within Council's financial policy.
Mitigating factors	Assets are sensitive to both external factors and events and, to some extent, to the life of other assets. Monitoring condition of assets on an ongoing basis and updating of asset management plans with condition scores should ensure there is little unanticipated replacement works required.
Data Source	Asset Management Plans, LTP.

Table 18: Assumption – Cost of Capital Works

Assumption	Capital works costs will not vary significantly from budget.

Detailed Forecasts	Financial budgeting is indicative and it is common for projects to incur cost overruns or under-budget results. There is a considerable cost associated with making project budgets more accurate. Considerable time is spent on estimating projects in the first three years of the LTP, with generally less confidence given to projects in years 4-10. Major capital works programmes such as Roading can manage this by reviewing levels of service, with budgets also monitored and updated annually for annual planning.
Risk	Council could face higher than budgeted costs that do not fit within the Financial Strategy limits.
Level of uncertainty	Low in the next three years but higher in the longer term.
Impact on Council Services	Levels of service may be reduced to ensure budgets are met, or future projects deferred.
Financial impact	Higher than anticipated costs can increase levels of debt and unbudgeted interest payments if loan funds are used. This can flow on to affect Council's total debt levels.
Mitigating factors	Levels of service can be revised annually to ensure budgets are met and multi-year contracts can provide a degree of certainty over major capital works projects. Project planning and business case processes are in place to increase the accuracy of planned projects. Projects are re-assessed as part of each LTP process and costs are updated to reflect the latest costings and technology changes.
Data Source	Long Term Plan.

Table 19: Assumption - Valuations

Assumption	The value of infrastructure will increase at the same rate as inflation.
Detailed Forecasts	Recent valuation increases in infrastructure have been modest reflecting a subdued inflationary environment. With economic activity increasing across New Zealand there is a possibility that asset prices will increase at a faster rate. Increased valuations result in higher depreciation requirements requiring higher funding levels.
Risk	Increased valuations would require higher than forecast depreciation funding and this will impact on Council's other spending. The Christchurch rebuild may increase demand for assets to the point where asset prices increase faster than inflation.
Level of uncertainty	The inflation and asset price environment is steady and the high $NZ reduces the prices of imported capital equipment and fuel. The extent of asset price increases from higher economic growth and the Christchurch rebuild in the short to medium term has increased uncertainty.

Impact on Council Services	Higher valuations could result in higher depreciation requirements that impact on Council level of services able to be delivered within the forecast funding limits.
Financial impact	Increased funding to cover depreciation costs would be required.
Mitigating factors	Growth in the Rangitikei Region is slow and the costs of assets relatively stable.
Data Source	Annual valuations.

Table 20: Assumption – External Borrowing

Assumption	Council will be able to borrow at the required level.
Detailed Forecasts	The economic picture in New Zealand is positive. Indicators are that this will continue for some time. The Reserve Bank says New Zealand's financial system is resilient and positioned to support economic growth. Government finances are improving and there is high demand for government and local government debt. While it is likely Council will be able to secure loans, it cannot be guaranteed.
Risk	Inability to fund services or capital investment if Council is not able to borrow.
Level of uncertainty	New Zealand faces an uncertain world economic environment, particularly the future growth in China that is driving the current economic growth. There is a moderate amount of uncertainty but considerable less than at the time of the previous LTP.
Impact on Council Services	If Council's ability to borrow is affected then three options exist – defer capital works, reduce levels of service or increase rates or other operating funding (fees and charges, grants) to fund capital works.
Financial impact	If rates are used as an alternative source of funding for capital projects, rates requirements would rise and forecast levels of service would come under review.
Mitigating factors	The uncertain environment is an ongoing factor, however the Council enjoys a strong relationship and loan facilities with BNZ which could be drawn down if the need arose. The financial strategy is prudent in all regards with debt levels reflecting a prudent approach.
Data Source	Reserve Bank Financial Stability Report November 2013.

3 Asset Description

3.1 Asset Register

The following information provides an overview of the assets involved in the Rangitikei District transportation activity. The information shown is collated here as a reference resource of the extent of the assets involved.

The Roading assets are managed in a RAMM (Road Assessment and Maintenance Management) Database. Over 85,500 individual asset components are detailed in the database which provides the functionality to undertake the following activities:

- Forward Works planning.
- Valuation.
- Remaining Useful life monitoring.
- Maintenance Task Dispatching.
- Aggregating Data for reporting.
- Cost code management.
- Forecasting.

Limited access is provided to the RAMM database to licensed users of the database, to manage and control data integrity.

3.2 Data Collection

Existing assets – the assets contained in the database, with useful life remaining are managed both in the field with electronic collection devices, and in-house with desktop application. Modifications consist of maintenance cost inputting, updating replacement information and work programme management.

Vested assets – New assets, that are constructed by Council initiated work programmes or new land development is uploaded into the RAMM database. Pre-established default unit rates and useful lives automate and simplify the process for future data management. Specific requirements are required as part of construction projects and subdivision development to provide the data in an electronic format complying with Council's requirement to simplify and ensure quality data uploads.

Disposal of assets – Any surplus asset that is removed from service is deleted from the RAMM database.

3.3 Condition Monitoring

The inspections of roads, bridges and structures, culvert inspection, traffic facilities (signs and lights), is undertaken on a regular cycle by both the road network maintenance contractor and Council's Roading engineers to monitor and evaluate the asset conditions. Specific inspections are initiated after weather events to ensure road closures and damage is managed in a timely manner.

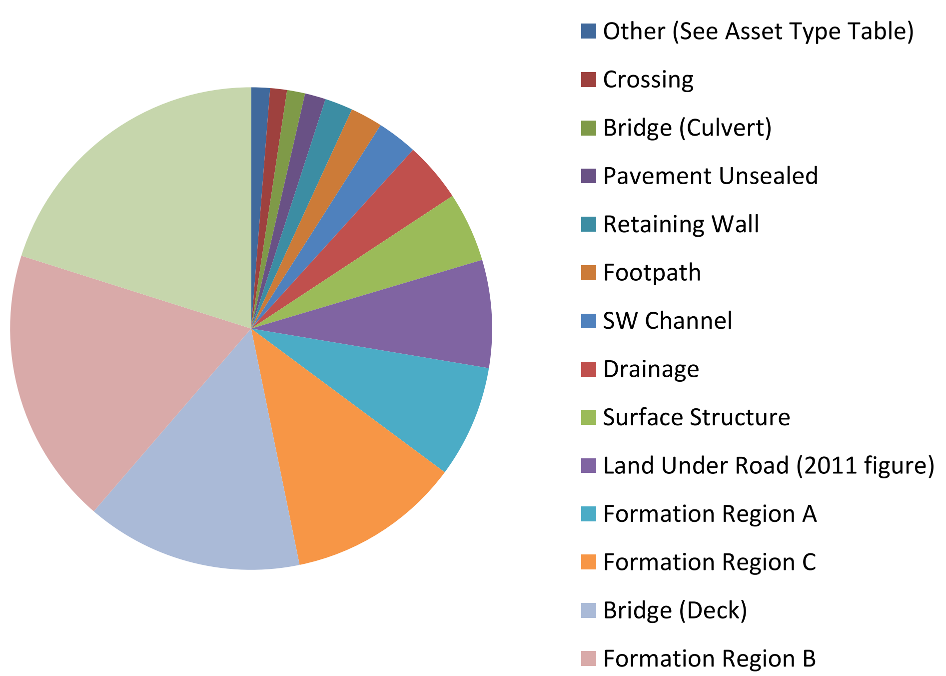
Specialist inspections of roads are conducted annually on specified roads to assess the condition rating (roughness) of pavements and footpaths. External service providers provide the resource to complete these surveys.

The condition of the assets are linked to the levels of service specified in the LTP, this Asset plan and the road network maintenance contract

3.4 Components

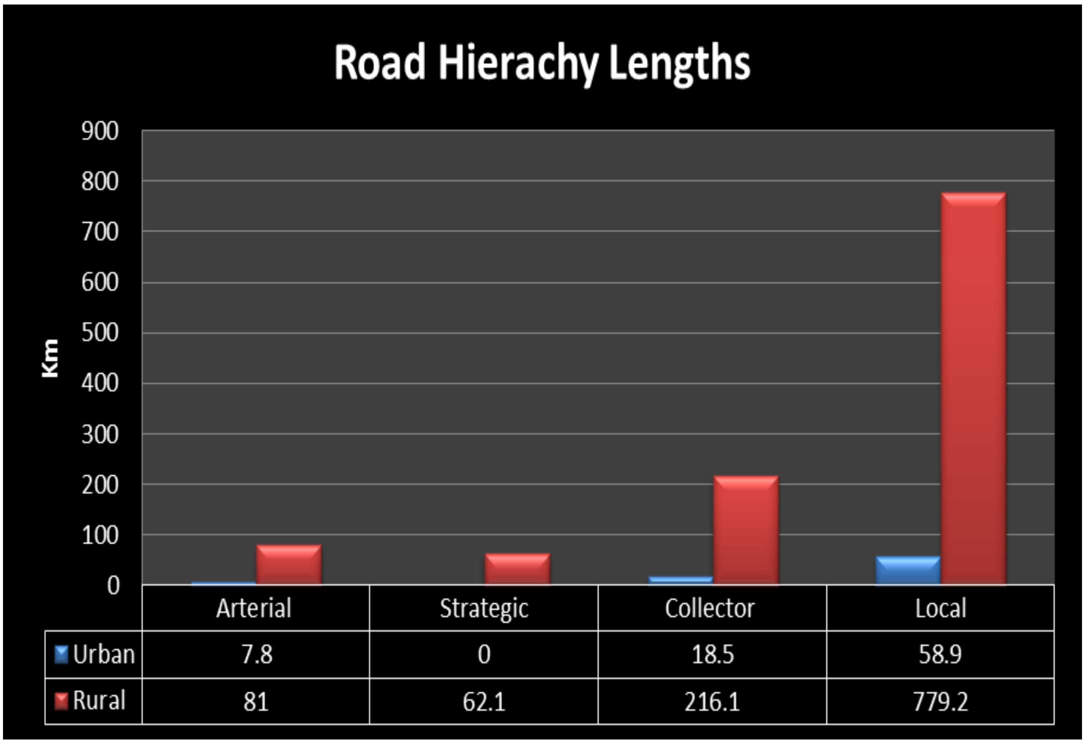
The components of the network are shown below, by replacement cost.

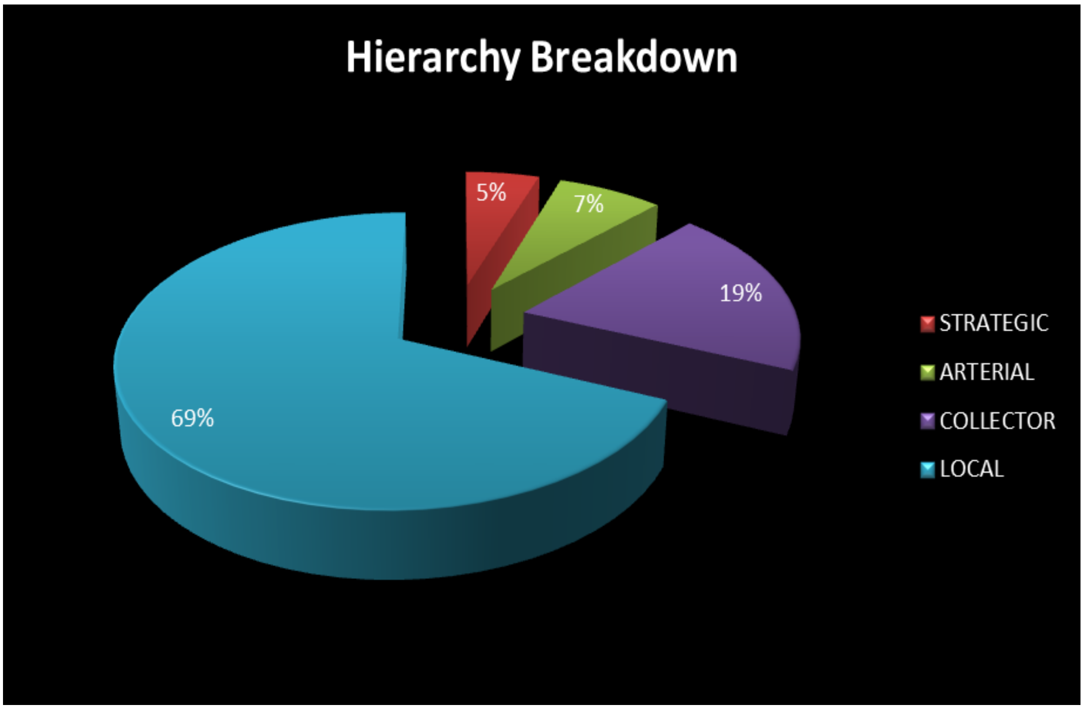
Figure 4: Asset Groups by Replacement Cost (2011 Valuation Report)

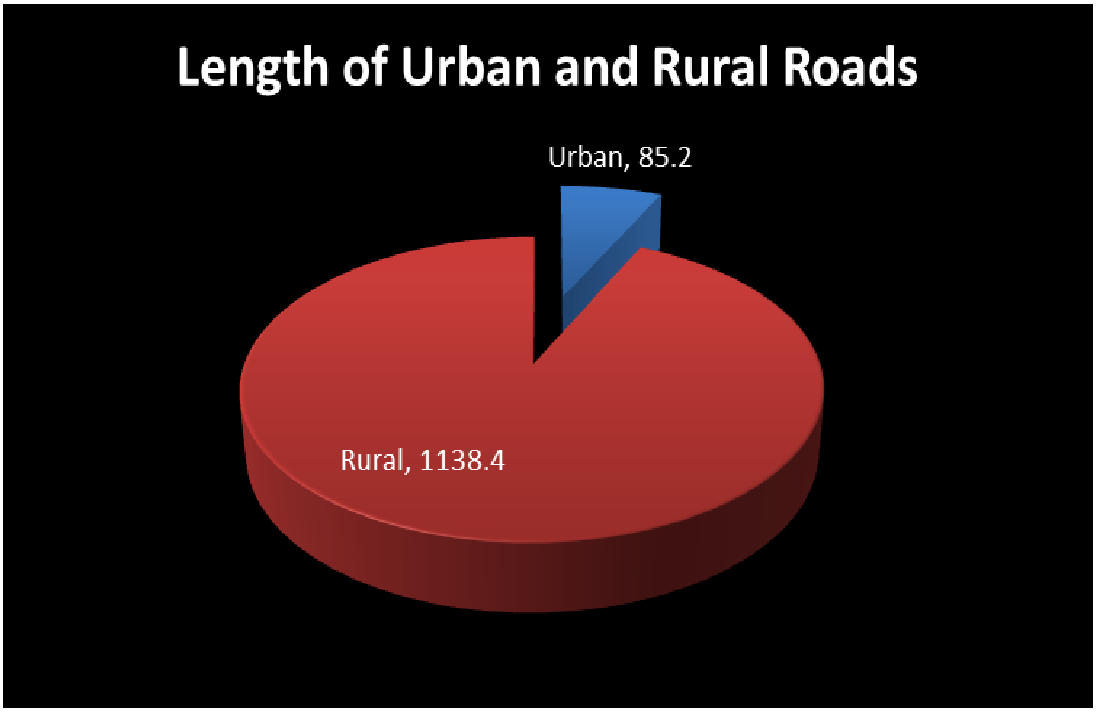


3.5 Network Hierarchy

The charts below illustrate the network comprises of a high proportion of local roads with a smaller volume of collector roads and a high proportion of rural roads as opposed to urban.


Road Hierachy Lengths
Km
900
800
700
600
500
400
300
200
100
0
Arterial
Strategic
Collector
Local
Urban
7.8
0
18.5
58.9
Rural
81
62.1
216.1
779.2


Hierarchy Breakdown
5%
7%
19%
69%
STRATEGIC
ARTERIAL
COLLECTOR
LOCAL



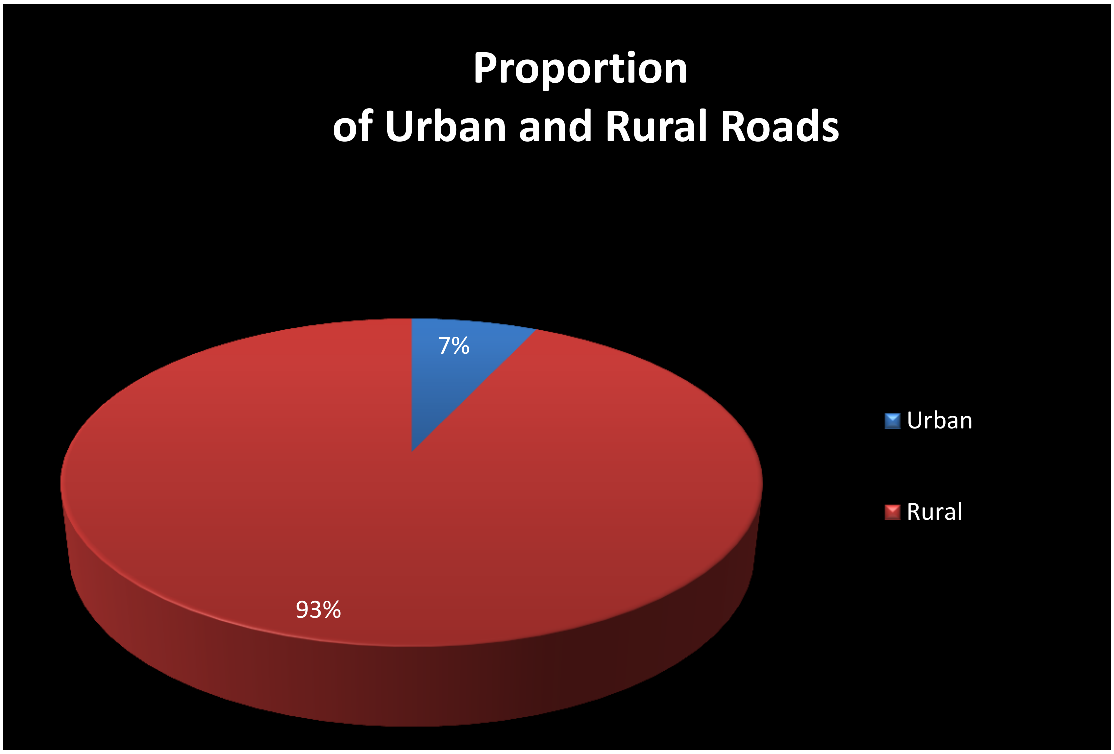
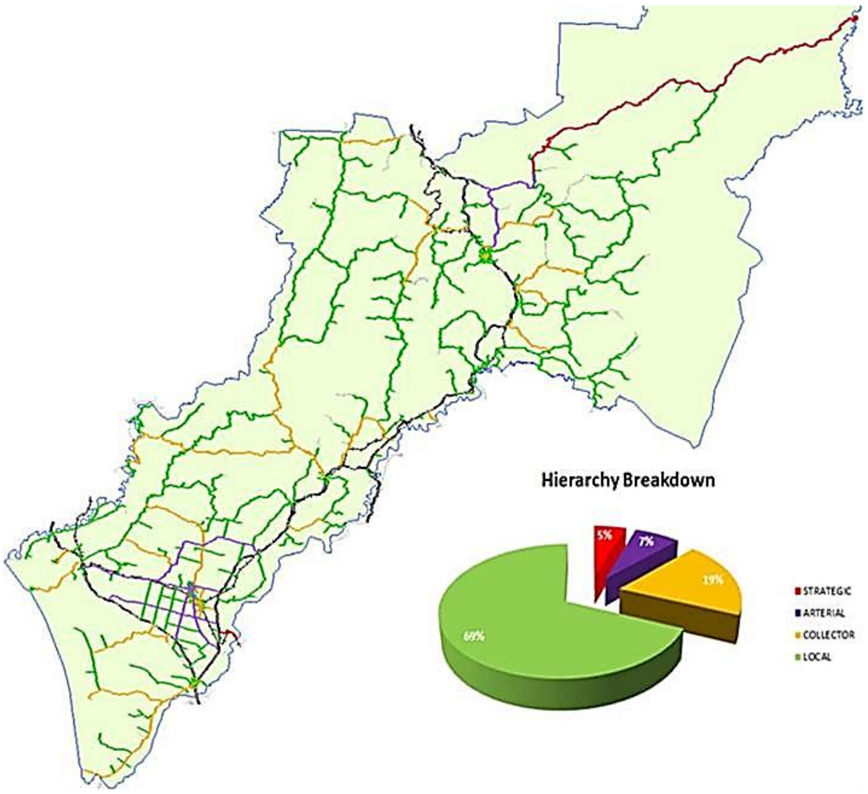


Figure 5: Road Hierarchy



3.5.1 Road Safety

Implementing national, regional and local road safety initiatives involves the coordination of activities within the Roading team. Road Safety Action Plan forums are operational and include involvement of external stakeholders such as NZ Police, Regional Road Safety coordinator, ACC and NZTA.

3.5.2 Transportation Planning

The transportation sector is highly regulated and planning is required to ensure:

- Long Term Planning and consultation occurs as required under the Local Government Act 2002.
- NZTA requirements are met in terms of funding applications and reports along with compliance with rules and guidance.
- Development is managed effectively within the Resource Management Act 1991 and the Regional/District Planning Framework.
- The asset is managed effectively and efficiently through the use of technology, information management and wise decision making.

Transportation planning is undertaken by the Asset Manager –Roading with support from internal transport staff, and consultants.

4 Levels of Service

The Rangitikei District Council aims to provide sustainable levels of service to the community in all areas.

The term "Level of Service" refers to the standard to which a service is delivered to the customer. This may include targets for availability, quality, quantity, responsiveness and customer satisfaction. The Council ensures that levels of service are customer focused, technically meaningful and address the issues that are important to the community.

4.1 Legislative Requirements

Table 3 below details the statutory requirements and other guidelines that are relevant for setting service standards for the Roading activity.

Table 21: Legislative Impacts on Levels of Service

Legislation	Impact on Level of Service
Local Government Act 2002	Sets statutory requirements in terms of : Establishing minimum level of service standards Frequency of reviewing levels of service standards Degree of community consultation and level of information provided Identification of community outcomes and priorities for the District or region Frequency of the preparation and adoption of the Long Term Plan
Health and Safety in Employment Act 1992	Sets statutory requirements in terms of Health and Safety and minimum best practice
Civil Defence Emergency Management Act 2002	Maintain and review annually an emergency management plan that is accepted as suitable by independent review.
Resource Management Act 1991	Requires Council to: Sustain the potential of natural and physical resources to meet the needs of future generations Comply with the District and Regional Plan To avoid, remedy or mitigate any adverse effect on the environment Take into account the principles of the Treaty of Waitangi
Building Act 1991	No building consents issued inconsistent with the Act. PIM and LIM requests actioned within 10 working days. PIMs/LIMs issued contain all relevant information known to Council.

Legislation	Impact on Level of Service
Rangitikei District Council District Plan	Sets out rules for the use of land within the District, including permitted activities and activities for which resource consent must first be obtained

4.2 Environmental Effects

There are a number of legislative mechanisms aimed to avoid or mitigate potential adverse environmental effects associated with the management of the Transport network. These are set at national, regional and District level.

Statutory requirements have been outlined in the Asset Description section; however, specific requirements relating to environmental stewardship are covered in more detail in the following sub sections.

The role of Central Government is one of setting policy for asset management across New Zealand. This is achieved through the following key legislation.

4.2.1 National Land Transport Programme (NLTP)

Under the GPS, the NLTP contains all the land transport activities, such as public transport services and road construction and maintenance, which are expected to receive funding from the NZ Transport Agency. The NZTA is responsible for allocating funding to land transport.

The NLTP targets investments that will help to address the important challenges facing land transport through:

- Improving the efficiency of key transport routes.
- Improving public transport.
- Easing severe congestion in key urban areas.
- Upgrading important freight and tourism routes.
- Improving safety.
- Improving access to markets, employment and areas that contribute to economic growth.

4.2.2 Resource Management Act 1991

Under the Resource Management Act 1991, Council has a statutory obligation to avoid, remedy or mitigate any adverse effects on the environment through sustainable management. In this context, resource consents are one way, in which Council regulates the effects of activities such as building roads or bridges. Innovative design and use of Best Appropriate Practice in accordance with Councils Engineering Standards and Guidelines are also beneficial in taking into account and managing the effects an activity may have on the environment.

4.2.3 Local Government Act 2002

Specific to environmental stewardship the Local Government Act (LGA) includes the principles of making itself aware of community views; providing opportunities for Maori to participate in decision making processes; collaborating and cooperating with other local authorities as appropriate; ensuring prudent stewardship of resources; and taking a sustainable development approach.

The LGA outlines the responsibilities of local authorities and the decision making process for activities undertaken on behalf of their community, primarily through the requirement to adopt a Long Term Plan (LTP). Councils are encouraged by the LGA to identify overall long-term priorities and to plan for the future.

4.2.4 Land Transport Management Act 2003

The purpose of the Land Transport Management Act 2003 (LTMA) is to:

- Provide an integrated approach to land transport funding and management.
- Improve social and environmental responsibility in funding, planning and management of land transport.
- Improve long-term planning and investment in land transport.
- Ensure land transport funding is cost effective.
- Improve flexibility of funding including enabling land transport infrastructure to be built on a tolled or public/private partnership basis or combination of these.

The LTMA also requires the Council to consult with a wide range of parties when developing the annual land transport programme and requires that the programme is consistent with the Regional Land Transport Strategy (RLTS).

4.2.5 Land Transport (Road Safety and Other Matters) Amendment Act 2011

This Act amends the Land Transport Act 1998. Among other things it provides new powers for road controlling authorities to:

- Restrict heavy traffic on roads.
- Make certain bylaws including.

- Restricting specified class of traffic.
- restricting vehicles on unformed roads.
- Restricting planting of vegetation near corners.

4.2.6 Government Policy Statement

The Government Policy Statement on Land Transport Funding (GPS) sets out the government's priorities for expenditure from the National Land Transport Fund over the next 10 years. It sets out how funding is allocated between activities such as road safety policing, state highways, local roads and public transport.

4.2.7 Hazardous Substances and New Organisms Act 1996 (HSNO)

The HSNO Act and regulations control the import, manufacture or use (including disposal) of hazardous substances. Council administers the HSNO Act through enforcement officers, with a focus on facilities and activities that use, store, transport or dispose of hazardous substances, rather than on the substances themselves.

4.2.8 Regional Level

4.2.8.1 Proposed Horizons Regional Plan: One Plan

The Horizons Regional Council is responsible under the RMA for ensuring that the natural and physical resources of the region (such as the land, air, water and coastal resources) are managed in a sustainable manner.

The Proposed Horizons One Plan applies to the management of air, land and water resources in the region including: air, soil, rivers and streams, lakes, groundwater, wetlands and the coast.

Pre- release meetings for the One Plan were held in 2004 and 2005. Submissions closed at the end of August 2007 with hearings on the submissions held in mid-2008. Decisions on the submissions were released in August 2010.

Those parts of the One Plan that did not receive opposition through submissions have now become operative. Where submissions have not been upheld, appeals can be lodged until late November 2010. Hearings will be held in 2011 and it was anticipated the One Plan would become fully operative during 2011.

The One Plan identifies natural values of the regions resources and policies for protecting them. It identifies specific management areas related certain streams, lakes, wetlands, aquifers and air quality areas. It also identifies rules that specify whether an activity is permitted or whether resource consent is needed.

4.2.8.2 Regional Land Transport Strategy (RLTS)

The Horizons Regional Land Transport Strategy (RLTS) sets the strategic direction for transport in the Region by describing the vision, objectives and outcomes that will guide the development of the Region's transport network over the next 30 years. The Strategy covers all forms of land transport, including public transport, local roads, state highways, walking and cycling.

The RLTS vision is for:

> *A safe, sustainable and resilient transport system that supports economic development and lifestyle choices, with strong connections to national corridors.*

Section 175(2)(h) of the Land Transport Act as amended by the LTMA 2011, states that every regional land transport strategy must give early and full consideration to land transport options and alternatives in a way that avoids, to the extent reasonable in the circumstances, adverse effects on the environment. The following adverse effects (but not limited to) were considered in the RLTS:

- Traffic congestion (including impacts on air quality).
- Vehicle emissions.
- Carbon dioxide predictions.
- Transport noise.
- Vehicle growth rate.
- Percentage of commuting trips by public transport, cycling and pedestrian modes.
- Fuel usage.
- Use of efficient energy modes.
- Impacts on urban amenity.

It is important to note that the RLTS is a strategic document and does not cover detail at a micro level (i.e. project design). The Strategy however, raises awareness and provides direction for future projects. Submissions have been received on the RLTS with regards to the plans formal adoption. However, no decision has been made at this time. This will need to be reviewed with the next AMP update.

4.2.9 District Level

4.2.9.1 District Plan

The District Plan provides zoning throughout the District. Certain activities that are permitted in one zone may not be permitted in another. The different types of resource consents are:

- Land use.
- Subdivision.

Activities that need resource consent are classified as controlled restricted discretionary, discretionary and non-complying.

4.2.9.2 Long Term Plan

Council has specified the following environmental community outcome in the Long Term Plan 2009-2019 which relates to land transport management:

- Environmentally responsible development.

4.3 Development and Monitoring

The level of service for this activity is the agreed quality of service that the Council has established through community consultation during the Long Term Plan process.

Figure 6: Levels of Service Development

The process for the development and monitoring of levels of service can be summarised as follows

- Identify the customers of the service and other parties with an interest (stakeholders).
- Define the current levels of service the organisation delivers.
- Design and carry out consultation to define the desired service level.
- Establish service targets and service achieved over a long period.
- Measure and report to community on level of service achieved.
- Review levels of service with stakeholders at regular intervals to check desirability and affordability of level of service provided.

The Asset Management Plan aims to document each of these steps for the activity, identifies any issues such as adequacy of consultation, suitability of standards, or service gaps, and describes plans to address or improve them.

It is common for customers to demand a continual improvement in service, and while the Council will strive to deliver improvements, the level of service is constrained by cost considerations. It is therefore important that when Council consults with the community over levels of service, cost information is provided in order for the price/quality trade-off to be established.

By the end of 2014, the New Zealand Transport Agency, and the Roading Efficiency Group, will have released the One Network Road Classification outcomes. This will facilitate a review of all Levels of Service and the delivery of the Customer Outcomes. It is anticipated that the proposed Levels of Service, given these are consistent across New Zealand, will be incorporated into the Councils Levels of Service and Roading practices.

4.4 Consultation

4.4.1 Processes

The Council has carried out significant consultation to establish the Community Outcomes for the Long Term Plan (LTP). These were reviewed in 2011 following the changes to the Local Government Act in 2010. For the LTP, the Community Outcomes retain the essence of those included in previous Rangitikei Community Plans.

4.4.2 Legislation

Legislation that require Council to undertake consultation for Roading include:

- Local Government Act 2002.
- Resource Management Act 1991.
- Land Transport Management Act 2003.

4.4.3 Significance Policy

Under the LGA 2002, each Council is required to have a Policy of Significance. The requirements for the policy can be seen as being a means for ensuring that in making decisions that Council is:

- Clear about why it is addressing a matter.
- Has considered and evaluated the options and alternatives.
- Has information on the community view about the matter and the options for addressing it.
- Has an understanding of the views and preferences of those persons likely to be affected by, or have an interest in the matter.

A significant activity is one that has a high degree of significance in terms of its impact on either:

- The well-being of the people and environment of Rangitikei District; and/or
- Persons likely to be affected by or with an interest in that activity; and/or
- Capacity of the Rangitikei District Council to provide for the well-being of the District.

Rangitikei District Council considers transportation a significant activity, which therefore requires consultation.

4.4.4 Consultation Policy

The Council's Public Consultation Policy (C301) states that the Council will:

- Clarify its expectations through public consultation.
- Allow sufficient time for effective response to its proposals.
- Report on public proposals and follow up when necessary.
- Maintain the consultative process.

4.4.5 Special Consultative Procedure (SCP)

There are a number of instances where the Council will undertake consultation at a District wide or comprehensive level. This generally occurs when there is a requirement to use the Special Consultative Procedure as prescribed in the LGA 2002. This occurs in the following situations:

- Adopting or amending the Community Plan. (The Community Plan is reviewed every three years with the Annual Plan giving effect to that Plan in the intervening years. Council must consult on community outcomes at least once every six years).
- Adopting the Annual Budget.
- Adopting, amending or reviewing a Bylaw.
- Proposing a change in the way a significant activity is undertaken.
- Significant decisions not already provided for in the Community Plan.
- Termination of a service.

The Council will decide that some decisions are significant and will therefore require a more rigorous assessment of options and a more robust consultative process. Those decisions are treated as amendments to the Community Plan and can be dealt with either separately or as part of the Annual Plan process.

4.4.6 One Network Road Classification (ONRC)

The goal of the One Network Road Classification (ONRC) system, currently being developed by the NZTA, is to provide road users, whether they are vehicle drivers, riders on passenger transport, cyclists or pedestrians with more consistent customer levels of service across the country.

This is important for road users of the network as diverse as freight operators who want to know the costs of operating their vehicles across multiple District networks and how to value journey time consistently and reliably.

The ONRC is still under development in conjunction with the NZ Transport Agency and Local Authorities. The specific amendments to the National Levels of Service are required to be incorporated into the Asset Plans, LTP’s and funding frameworks in the 2018-2021 plans.

4.4.7 Customer Profile

The identified customers who use the services provided by this activity include the following:

- ***Residents*** - These people live in the District.

- ***Ratepayers*** - This includes people who own properties in the District but may/not reside in the District.

- ***Local users*** - They are the users of the services provided by this activity on an occasional or regular basis.

- ***Visitors*** - These people do not live within the District but visit the District to carry out their businesses or to undertake other activities.

- ***Businesses*** - Individuals or organisations that carry out their business in the District.

- ***Other stakeholders*** - Individuals or organisations that have interest or are affected by the services water undertaken by the Council. They include neighbouring Local authorities, Horizon Regional Council, Community Boards and Committees, Local Iwi, Public service providers, NZTA.

4.4.8 Customer Expectations

Customer satisfaction surveys indicate that customer expectations are:

- Adequate maintenance and reliability of Roading and footpath network:
  - Smooth footpaths which enable residents with all types of mobility to travel on them.
  - To be able to easily travel around the District, in both rural and urban areas, so that residents are able to meet their daily requirements.
  - To ensure maintenance of roads in undertaken so that Roading networks, especially in rural areas, are reliable.
- A safe road and footpath network:
  - The provision of street lighting which ensures residents feel safe when travelling around the District (walking, cycling, driving, etc.).
  - The implementation, use and monitoring of surveillance cameras to deter anti-social behaviour.
  - The implementation of urban design principles to improve the aesthetics of roads and footpaths (e.g. planting).

4.5 Strategic Driver

The strategic driver for the Roading and footpaths Group of Activities provides the guiding principle for Council's Level of Service.

Strategic Driver: The maintenance of the current Roading network as close to the current standard as possible within budget constraints.

4.5.1 Strategic Goals

Activity and asset management for each activity in the group of activities also have a strategic goal. These are shown in the table below.

Table 22: Strategic Goals by Asset Group

Asset Group	Strategic Goal
Pavements	To provide a pavement network that is suitable for the effective and efficient movement of vehicles and people, has a safe suitable all weather surface (in terms of skid resistance, geometric design, noise reduction and smoothness) and has a structure suitable for legal traffic loading requirements.
Bridges	That all road bridges, culverts and structures having a waterway area greater than 3.4 m^2 provide continuous all-weather vehicle access over rivers, streams and uneven terrain, and ensuring the safety of road users.
Traffic Services	To maintain the network of street lighting at the current level of provision.
Stormwater Drainage	To maintain storm water drainage assets, which efficiently drain storm water runoff from the carriageway.
Pedestrian Facilities	To continue to develop the footpath network so there is at least a footpath on one side of each residential street in the District's towns.
Vegetation Management	To ensure road berms maintain a buffer area between the carriageway/footpath and private property for the purpose of installation of utilities, street planting and road support structures.

4.5.2 Intended Level of Service

The LTP focuses on major aspects of each group of activities for the purposes of identifying Levels of Service for annual reporting and performance monitoring. For the Roading and footpaths group of activities, these are:

- Provide a safe Roading network, which allows people to travel from A to B, free of loose gravel or potholes and maintaining the level of sealed roads currently available.
- The network is maintained to a level where travelers have minimal interruption on their journey and achieve suitable travel times. Improving road safety is a primary

consideration when planning, implementing and completing work on the road network. Reducing or eliminating accidents caused by the road network is a consideration during all decision making.

- A functional road network that provides access to residential, commercial and retail premises and some beautification of road reserves.
- Increased footpath asset length and footpath renewal programme.
- Maintenance of existing street lighting network. No upgrade or renewal.

4.6 Information Sources

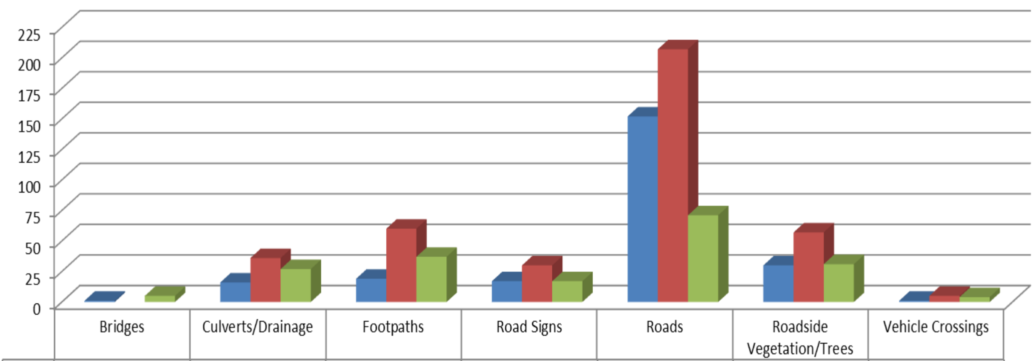
The Council undertakes both customer surveys and assessments of the complaints/service request records to obtain information on the delivery of levels of service to customers. This research identifies areas that are performing well, those that require improving or require intervention. Also of significant value to Council are regular meeting minutes with various Community Committees and Boards throughout the District, which provide wide ranging information and highlight any particular issue to be addressed. This information compliments the regular management inspections of assets undertaken by Council and their agents.

4.6.1 Service Requests

The Council Database has the facility to record information pertaining to a particular item, a facility to request services and provides Council with a monitoring facility for response times to requests from Customers. The tracking of a type of activity can be monitored against contractor performance or whether a significant issue is/or has occurred within the District.

The chart below provides a summary of service requests recorded in the Council Database system. Not surprisingly, the roads category records the highest percentage of received requests for service. Further service requests dating back to 2007 were recorded in a different database and matching activities with the information below skews the results. However, the general percentage of the 2011 – 2013 results for roads (52 %) and footpaths (14 %) is similar to the combined roads and footpaths (70 %) during 2007–2011.

Figure 7: Service Requests by Asset Type (2011-2013)



	Bridges	Culverts/Drainage	Footpaths	Road Signs	Roads	Roadside Vegetation/Trees	Vehicle Crossings
2011	1	16	19	17	152	30	1
2012		36	60	30	207	57	5
2013	5	27	37	17	71	31	4

Unsurprisingly the highest category shown is “Roads” which contain a broad number of specific areas within this, ranging from pothole repairs to unsealed road grading.

Next, following closely behind, is “Roadside Vegetation/Trees” where, like roads, issues of concern are perhaps more immediate and identifiable

The performance ratings of footpaths have improved in recent years and that reflects the number of service requests being relatively low.

4.6.2 Customer Surveys

Gaining feedback on customers satisfaction with the current level of service regarding the Roading and footpaths group of activities is important as it shows the Council which service needs to be improved and where customer expectations lie in terms of service development.

The District Council has participated in the Communitrak survey, undertaken by the National Research Bureau Ltd, for several years. The most recent Communitrak surveys were completed in 2007 and 2010.

In 2011, in the run up to the preparation of the 2012-2022 LTP, Council decided that it would no longer use Communitrak as the basis for its qualitative information. This was because the Communitrak survey is only undertaken every three years and limited to those residents with a landline, therefore it is of limited interpretive value.

Instead, Council has implemented an annual survey of residents with a representative sample from across the District. The survey is completed by residents on a form provided and posted back to Council in a freepost envelope provided.

The annual survey is sent to 2000 randomly selected residents from the rates data base. These 2000 surveys are separated by urban and rural ward as follows:

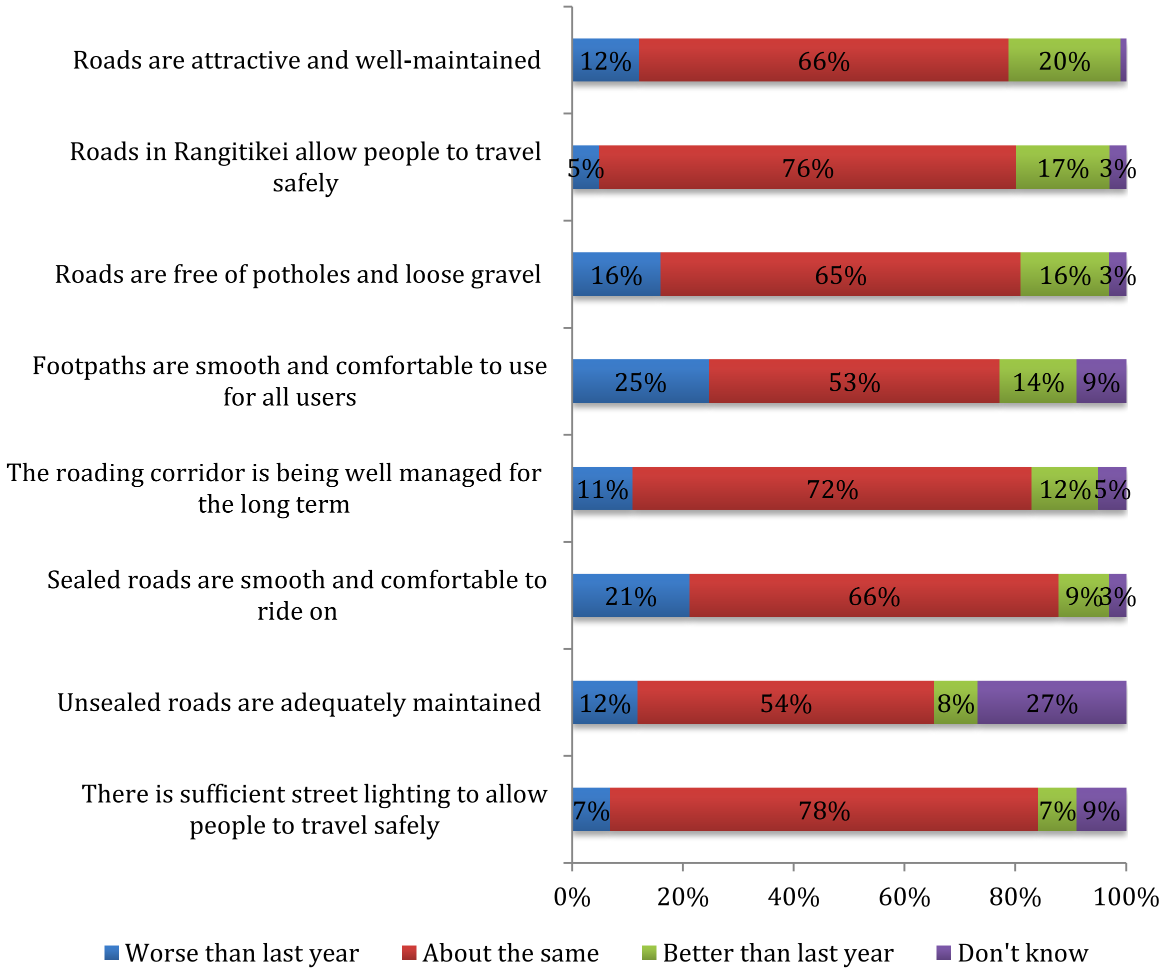
Table 23: Residents Surveyed by Ward

Ward	Residents
Marton Urban	600
Marton Rural	200
Bulls Urban	250
Bulls Rural	100
Taihape Urban	250
Taihape Rural	100
Turakina	250
Hunterville	250
Total	**2,000**

For these surveys, residents are asked to rate eight statements regarding the Roading network. The answers provide for a “better than last year”, “worse than last year”, or “about the same” report card. The aim of the survey is to gain a more favourable perception of Council’s activities year on year.

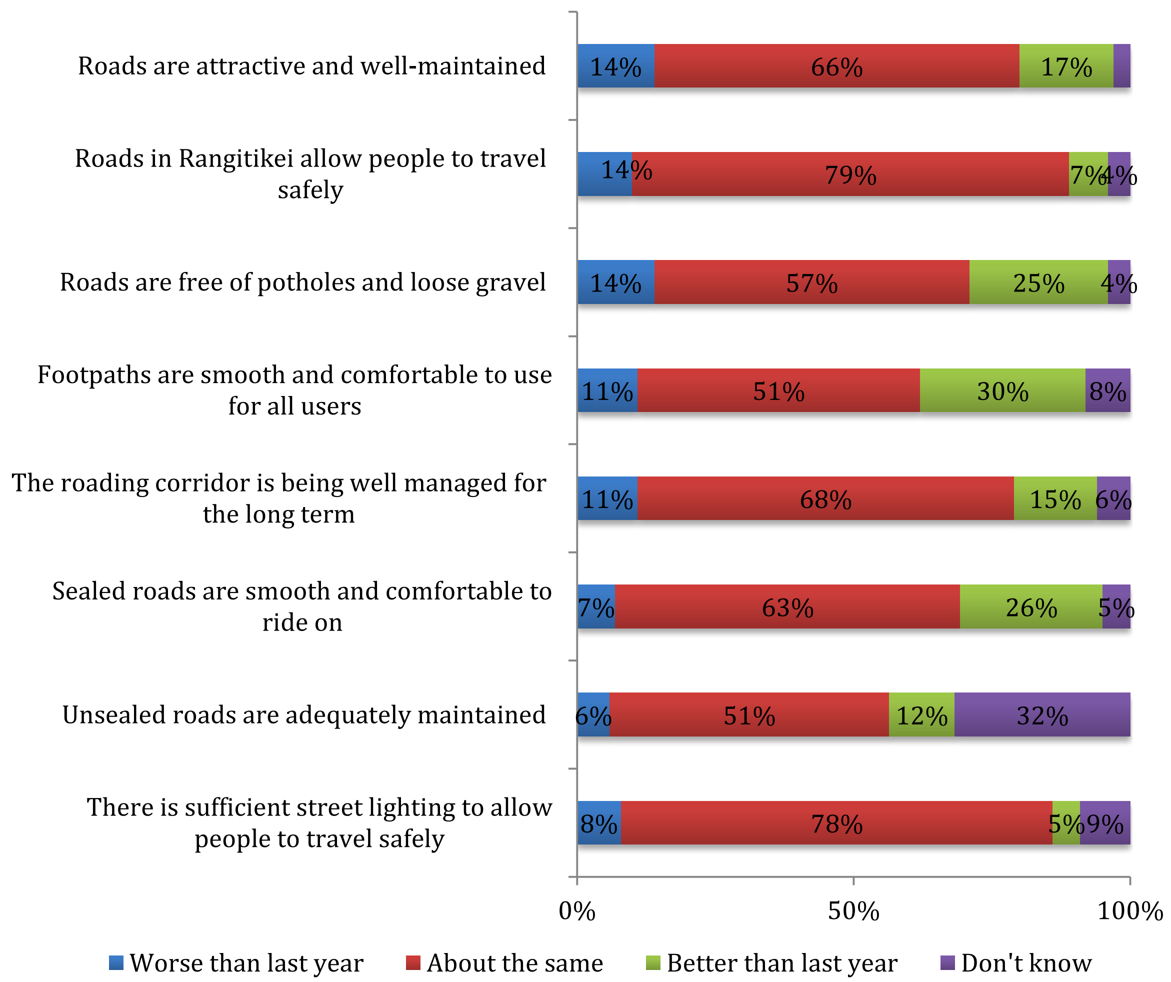
Performance targets are expressed as ‘a greater proportion (than in the previous year)’. The results of the 2012 and 2013 surveys are given below in Graphs 3d and 3e.

Figure 8: Customer Survey Results (2012)



The majority of residents perceive the service provision of District Roading network to be consistent with the last year. The top three measures that reflect highest proportion of residents rating the service as better than last year are: ‘roads are attractive and well-maintained’ (20 %), ‘roads allow people to travel safely’ (17 %) and ‘roads are free of potholes and loose gravel’ (16 %). The measures that residents were most likely to see as deteriorating (worse than last year) are ‘footpaths being smooth and comfortable’ (25 %) and ‘sealed roads are smooth and comfortable to ride on’ (21 %).

Figure 9: Customer Survey Results (2013)



The results from the 2013 survey are very useful as they can be compared with the 2012 results to assess progress.

The number of residents that allocate a 'better than last year' rating to the condition of footpaths is up from 14 % in 2012 to 30 % in 2013. The question of sealed roads being smooth and comfortable to ride on is up from 9 % in 2012 to 26 % in 2013, and the maintenance of unsealed roads is up from 8 %, to 12 % in 2013. Encouragingly, no measures received more than 14 % of residents believing that the service was 'worse than last year'.

4.7 Performance Measures

The current non-financial performance measures for the Roading assets are detailed in the LTP. They are related to:

- The smooth travel exposure of the Roading network.

- The number and responses to callouts relating to the Roading network (including specifically potholes and safety issues).

- Residents' perceptions of the Roading and footpaths group of assets by annual survey.

4.7.1 Performance Measures

The Local Government Amendment Act 2010 provides that the Secretary of Local Government will introduce standard performance measures that are applicable to Local authorities so that the public may compare the levels of service provided in relation to a group of activities by different local authorities. The measures apply to the mandatory groups of activities as specified in the Act, namely:

- Water supply.

- Sewerage and the treatment and disposal of sewage.

- Storm water drainage.

- Flood protection and control works.

- Roads and footpaths.

Section 4 of Schedule 10 of the Amendment Act 2010, specifies the information to be provided in the Long Term Plan as part of the statement of service provision. As well as the performance measures for the mandatory Groups of Activities, the Act also requires that the Local Authority provide information on:

- The performance measures that the Local Authority considers will enable the public to assess the levels of service for major aspects of groups of activities for which performance measures have not been specified as mandatory measures.

- The performance targets or targets set by the Local authority for each performance measure.

When the Mandatory measures are introduced, Council will review its current suite of levels of service measures to remove duplication and to ensure that all major aspects of the activity and aspects of the service that are of interests to the community are reported upon efficiently and effectively.

Table 3f shows that the mandatory performance measures, coming into effect in 2014, are very similar to those already implemented by Council.Council's Long Term Plan 2015-2025 lists the following performance measures for this activity, under the Satement of Service Provision:

Table 24: Performance Measures

Level of Service	Performance Measure (* = mandatory)	Measured by	Benchmark	Target			
				2015-206	2016-2017	2017-2018	2018-2025
Provide a sustainable roading network which is maintained in accordance with each road's significance for local communications and the local economy, taking into account the Ione Roading Network Classification and funding subsidies	*Road condition The average quality of ride on a sealed local road network measured by smooth travel exposure	The process defined in the Council's agreement with NZTA (NAASRA roughness counts)	2013/14: 96.5% achieved	96.5%	96.5%	96.5%	96.5% The roading network has been maintained as close to the current standard as possible within budget constraints
	*Road maintenance The percentage of the sealed road network that is resurfaced	Council and contractor records	2014/15 Annual Plan: 8% (i.e. 55 km of resealing and 8.8 km of road rehabilitation). The network has 796 km of sealed road.	8%	8%	8%	8%. The roading network has been maintained as close to the current standard as possible within budget constraints
	The percentage of the unsealed road network which is remetalled during the year	Council and contractor records	At least 75% of network remetalled each year– 12,000m^3	At least 75%	At least 75%	At least 75%	At least 75%

Level of Service	Performance Measure (* = mandatory)	Measured by	Benchmark	Target			
				2015-206	2016-2017	2017-2018	2018-2025
	*Footpaths The percentage of footpaths within the District that fall within the level of service or service standard for the condition of footpaths that is set out in the Council's relevant document (such as its annual plan, activity management plan, asset management plan, annual works programme or long term plan)	Grading system to rate footpath condition based on visual inspections • Excellent • Good • Fair • Poor • Very Poor Footpaths assessed in approximately 100 metre lengths. Sample of non-CBD footpaths will include ten lengths in Bulls, Marton and Taihape, and four lengths in Mangaweka, Hunterville and Ratana. Assessments normally conducted in November and May of each year.	At least 80% of footpath lengths in CBD areas in Bulls, Marton, Hunterville and Taihape are at grade 3 or higher At least 65% of sampled footpaths lengths outside CBD areas are at grade 3 or higher At least 90% of sampled footpaths assessed at grade 5 are included in upgrade programme during the following two years.	At least 80% of footpath lengths in CBD areas in Bulls, Marton, Hunterville and Taihape are at grade 3 or higher At least 65% of sampled footpaths lengths outside CBD areas are at grade 3 or higher At least 90% of sampled footpaths assessed at grade 5 are included in upgrade programme during the following two years.	At least 80% of footpath lengths in CBD areas in Bulls, Marton, Hunterville and Taihape are at grade 3 or higher At least 70% of sampled footpaths lengths outside CBD areas are at grade 3 or higher At least 90% of sampled footpaths assessed at grade 5 are included in upgrade programme during the following two years.	At least 80% of footpath lengths in CBD areas in Bulls, Marton, Hunterville and Taihape are at grade 3 or higher At least 70% of sampled footpaths lengths outside CBD areas are at grade 3 or higher At least 90% of sampled footpaths assessed at grade 5 are included in upgrade programme during the following two years.	At least 85% of footpath lengths in CBD areas in Bulls, Marton, Hunterville and Taihape are at grade 3 or higher At least 75% of sampled footpaths lengths outside CBD areas are at grade 3 or higher At least 90% of sampled footpaths assessed at grade 5 are included in upgrade programme during the following two years.

Level of Service	Performance Measure (* = mandatory)	Measured by	Benchmark	Target			
				2015-206	2016-2017	2017-2018	2018-2025
	*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	Police records of crashes on the Council's Roading network	3 fatalities and 12 serious injury accidents	No change or a reduction from previous year	No change or a reduction from previous year	No change or a reduction from previous year	No change or a reduction from previous year
Be responsive to community expectations over the roading network and requests for service	Adequacy of provision and maintenance of footpaths, street-lighting and local roads (annual survey)	"Report card" qualitative statements. Groups targeted for consultation: Residents where programmed renewal has taken place; Community Boards/ Committees; Community group database; Business sector database	2014/15 13% believed it was better than last year, 65% about the same, 21% worse than last year (2% didn't know).	A greater proportion (than in the benchmark) or more than 10% of the sample believe that Council's service is getting better	A greater proportion (than in the previous year) or more than 10% of the sample believe that Council's service is getting better	A greater proportion (than in the previous year) or more than 10% of the sample believe that Council's service is getting better	A greater proportion (than in the previous year) or more than 10% of the sample believe that Council's service is getting better

Level of Service	Performance Measure (* = mandatory)	Measured by	Benchmark	Target			
				2015-206	2016-2017	2017-2018	2018-2025
	*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. Note: Council measures resolution as well as initial attendance in response to such requests.	Contractor and Council records of requests for service.	2013/14 91% after-hour callout responded to within 12 hours; 71% callouts during work hours responded to within 6 hours; 96% of all callouts (i.e. completed) within one month of the request. The Contractor is required to respond to afterhours call-outs within 12 hours, and working hours call-outs within 6 hours	95% after-hours callouts responded to within 12 hours 95% callouts during working hours, responded to within 6 hours 85% of all callouts resolved (i.e. completed) within one month of the request. Specific reference to callouts relating to potholes	95% after-hours callouts responded to within 12 hours 95% callouts during working hours, responded to within 6 hours 85% of all callouts resolved (i.e. completed) within one month of the request. Specific reference to callouts relating to potholes	95% after-hours callouts responded to within 12 hours 95% callouts during working hours, responded to within 6 hours 85% of all callouts resolved (i.e. completed) within one month of the request. Specific reference to callouts relating to potholes	95% after-hours callouts responded to within 12 hours 95% callouts during working hours, responded to within 6 hours 85% of all callouts resolved (i.e. completed) within one month of the request. Specific reference to callouts relating to potholes

4.7.2 Performance Gaps

There are a number of areas where Council struggles to deliver levels of service which include:

- Maintained smoothness on unsealed roads during periods of continued dry weather.
- Maintaining specified grass heights during high growth periods.
- Maintaining the District wide maintenance regime during and immediately following heavy rain storms.

As the One Network Road Classification is in the process of being introduced, a whole of District review will take place to identify the performance gaps. This is identified in the Improvement Plan.

4.7.3 Desired Level of Service

There is a desire by the community for the extension of the sealed Roading network and the length of the footpath asset. Council has a small footpath extension programme. However, it has not funded a programme to extend the sealed Roading network since 2009.

There is also a demand for Council to make sure that the footpaths are more accessible for those with mobility issues, particularly mobility scooters and wheelchairs. This would require that Council increase its Level of Service for footpaths, with a higher specification for its renewal and capital programmes in the footpaths activity.

A desired level of service for Council is the reduction in future maintenance costs. Part of this process is to develop new maintenance techniques, which require less frequent routine maintenance. Continued monitoring of the network is occurring, which provides information to the Roading team regarding the effectiveness of the maintenance techniques used, and, therefore, facilitates opportunities for improvement. However, it is unlikely given constraints regarding funding that efficiency in maintenance techniques will lead to any increased level of service.

The key barrier to increasing levels of service, including the length of the footpath and sealed road network asset is affordability.

This implies that Council must cut budgets in the Roading and footpaths area in order to maintain rates rises within an acceptable band.

4.7.4 Technical Levels of Service

Technical levels of service are developed from the agreed customer levels of service. These technical standards do not require specific adoption by the Council, as they are interpretations of the Council’s expectations and decisions. They are however, represented in any level of service approval process as part of the overall suite of service levels that pertain to Councils transportation activities.

The technical levels of service are also important to demonstrate to the NZ Transport Agency that the Council is maintaining, operating and improving the transport activity in a manner that provides the Agency with sufficient confidence to continue to provide the subsidised funding of the Councils Land Transport Programme. Indeed, in many cases the technical levels of service utilised directly relate to published NZTA technical requirements or guidelines.

The main source of technical level of service monitoring and assessment is through Council's Customer Satisfaction Surveys and RAMM and dTIMS outputs. Biennial road rating and roughness surveys are undertaken to assess the condition of the sealed network. From this, the Council's Roading Asset Management team produces a "Treatment Selection Analysis Report" which among other things provides an assessment of the condition of the network on specific faults and defects determined by the RAMM software. These include:

- Road roughness.
- Shoving of the pavement.
- Cracking of the sealed surface.
- Flushing of the surface with bitumen.
- Potholes.
- Scabbing through the loss of the chip surface.
- Edge break.

Roughness has been adopted as the key Service Target for the sealed and unsealed network as it is a concept that can be understood by the Community and has measurability, repeatability, relevance and consistency. It can also be compared nationally to other road controlling authorities.

4.7.5 Reporting

A robust system for measuring, recording and reporting performance is essential to tracking if Council is to achieve its objectives and deliver the agreed levels of service.

In general, this can be achieved using existing systems but will require development of new processes to cover the range of measures effectively. Measurement and recording of performance will require involvement of other parties outside of the Asset Delivery Unit, both internal to Council (e.g. Customer Services) and external (e.g. Maintenance Contractor). Buy-in from these other parties, possibly requiring contract variations, will be essential to successful performance reporting.

Regular performance reviews of targeted improvement areas will be required and annual performance reporting is intended. Future AMPs will report on the current level of performance that has been achieved and this will contribute to the identification of further improvement actions that may be required.

Monthly financial reporting and the progress of projects are reported quarterly to Council's management team, while level of service achievement reporting is prepared for the Annual Report.

4.7.6 Historic Levels of Service Performance

While the discussion within this section provides sound information on performance to date, analysis shows there are opportunities to improve the confidence in this information.

Integrating information from NZTA and RLTS reports with Council reporting processes also provides an opportunity for improved management and reporting.

Documenting trends is fundamental to ascertaining appropriate targets for the future and improvements to this process are proposed. This should include improved analysis and illustration of the targets set, the achievement levels and the extent of the gap between the two. The use of error bar graphs and combining parameters over time is anticipated.

4.7.7 The Future

Measurement of achievement occurs across a number of parameters, much of which are highly technical. These care described below under performance measures.

Public reporting via the Annual Plan will continue to be the key reporting tool for Council. The level of achievement of the levels of service is reported to an extent that is regarded as appropriate for the wider community. More detailed reporting will be undertaken to underpin the public reporting and assist with the prudent management of the schemes.

5 Growth and Demand

5.1 Overview

The purpose of this section is to examine the key drivers of the future demand for the Districts Roading assets and explore the impact these drivers may have on the provision of these assets. Exploring the future demand of the District's Roading assets is important as it enables Council to plan for potential changes and identify the most practical response to changing demands. It also ensures risks associated with changes in demand are adequately managed.

5.2 Demand Drivers

The roads and transportation asset is facing some major changes at present, which will place additional stresses on the physical assets and budgets. The major factors driving future demand are:

- Population and demographic change.
- Accuracy of predicted future populations.
- Central government funding policy.
- Changes to rural economy.
- Rising costs of oil based products.
- Land use change.
- Changing technologies.
- Changing legislative requirements.
- Changing regional and District planning requirements.
- Climate and climate change.

5.2.1 Demand Changes

Increasing demand for services over time generates a requirement for the development of additional infrastructure. Expenditure programmes need to be planned to fund the capital works and associated on-going operational expenditure. Alternately, it may be possible to manage demand within the existing system capacity.

Where a reduced demand is forecast it may be appropriate to renew assets with a lesser capacity, operational expenses may decrease or an asset may become surplus to requirements.

The land transport network is responsible for the efficient movement of people and goods throughout the District and to neighbouring Districts. The land transport network is a core facility maintained by the Council to assist it in meeting its Community Outcomes. Roading provides particularly strong inputs into the following Community Outcomes:

- Enjoying life in the Rangitikei.
- Lifelong Educational opportunities.
- A buoyant District economy.
- Access to health services.
- A safe and caring community.
- A treasured natural environment.

The present road network was set up many decades ago and has been gradually upgraded to the present standard. It is quite evident, however, that community expectations in the Roading area are increasing which will require on-going development of the Roading network.

Generally, the network copes with the demands on it. While there is little demand for the supply of new infrastructure, apart from that required in subdivision work, the present network will need considerable redevelopment over the next decade to meet this community expectation. However, some factors that may force the need for change on the assets or the management of the asset are discussed below and in the following paragraphs:

An increase or decrease in population: This will result in an increase or decrease in traffic on the roads which will increase or decrease congestion and reduce/improve the level of service provided by the road, as well as varying wear on the roads. The increase in traffic will see an increase in maintenance costs, but a decrease in traffic will also place pressure on sustaining the cost of maintaining the roads.

A change in the way a road is used: The creation of a new sub-division, or the development of new industry in one part of the District, may change how a road will be used. This may mean roads will need to be upgraded to accommodate the changing use.

A change in the level of service demanded by the road users: Over time, communities tend to expect improving service from their assets. Roads and the activities involved in managing the roads therefore, may need to be improved to satisfy these future needs.

A change in the strategic management of the assets: The Council's policies and management strategies are in continual evolution to keep pace with the changing needs of the community, statutory requirements, funding organisations and central government. The trend to more lifestyle blocks in the country-side has also changed the expectation of the travelling public in rural areas. These rural roads are no longer used only by local farmers, but now have a much wider range of people and vehicle types driving on them. This has resulted in factors such as smoothness of ride, loose metal and higher speeds becoming more important to more road users. Changes to policies and management strategies can also have a significant effect on how assets are managed.

5.3 Population Projections

The average population in the District is gradually declining and ageing. In summary over the next ten years:

- The population will reduce by 9 % from 14,730 to 13,470.
- The average age of the population will increase from 40 to 45 years old.
- The number of rating units in the District may reduce by 3–5 %.

This means that an increasing number of the District's ratepayers are likely to be on low and/or fixed income. In addition, an increasing number of the District's population are likely to experience decreased mobility, both in terms of the need for the footpath network to be able to accommodate greater use of mobility scooters and in increasing numbers of residents being unable or unwilling to drive.

However, the road network is still required in its current length if it is to continue to provide "a safe Roading network which allows people to travel from A to B" and particularly to meet the needs of the rural economy.

See the table below for District population projections by area.

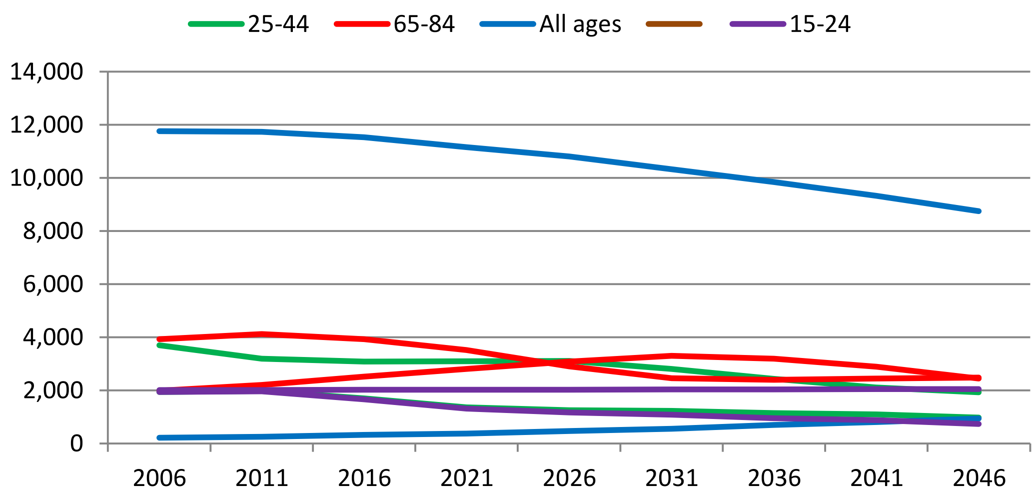
Table 25: Population Projections[2]

Year	2006	2011	2016	2021	2026	2031	2036	2041	2046
Marton	4,723	4,637	4,499	4,362	4,197	3,992	3,711	3,388	3,049
Lake Alice	3,008	2,897	2,731	2,579	2,398	2,203	1,991	1,786	1,590

[2] Statistics New Zealand: 2013 Census

Year	2006	2011	2016	2021	2026	2031	2036	2041	2046
Pohonui-Porewa	2,075	2,004	1,889	1,777	1,647	1,510	1,366	1,231	1,099
Taihape	1,802	1,759	1,692	1,624	1,542	1,443	1,323	1,198	1,069
Bulls	1,702	1,649	1,584	1,526	1,452	1,349	1,232	1,113	1,000
Moawhango	722	694	649	606	557	504	452	407	364
Hunterville	447	438	423	407	389	369	342	313	282
Ratana Community	360	347	328	312	291	268	240	213	186
Mangaweka	173	168	159	149	138	127	115	103	91
Koitiata	95	95	94	91	88	85	81	75	69
Ngamatea	43	41	39	37	34	30	27	24	21
District	**15,150**	**14,730**	**14,085**	**13,470**	**12,735**	**11,880**	**10,880**	**9,850**	**8,820**

Figure 10: Population Projections (2006-2046) – Low-Medium



Assumptions - That the District will experience a declining number of people usually residing and working in the towns and villages.

Level of uncertainty - moderate – The table above shows predictions regarding the forecasted future populations of the towns and villages within the Rangitikei District. In other words, the most optimistic view is that there will be between less than two thirds of the current population living in the non-urban areas and about three quarters of the current population living in the urban areas of Marton, Bulls, Taihape and Hunterville.

In terms of spread geographically across the District, 80 % of the population is projected to live south of Hunterville. In addition, depopulation is unlikely to occur evenly between urban/rural and north/south of the District.

Statistics NZ further advise that the important unknown in their calculations is the figure assumed for net migration from the District to elsewhere. If this differs significantly from the figure assumed, then the impact on the population predictions will also be significant. Net migration is assumed to be 700-800 per 5-year period in the medium projections and 900-1,000 per 5-year period in the low projections.

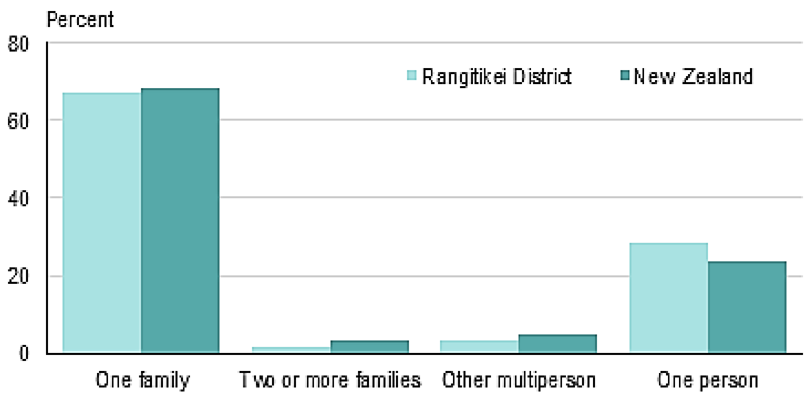
Finally, it does not appear that the projections for the Ratana Community have taken account of the potential for the new development to increase population at the Paa.

One-family households make up 67.1 % of all households in Rangitikei District. For New Zealand as a whole, one-family households make up 68.3 % of all households.

In Rangitikei District, there are 1,569 one-person households making up 28.2 % of all households. In New Zealand, one-person households make up 23.5 % of all households.

The average household size in Rangitikei District is 2.4 people, compared with an average of 2.7 people for all of New Zealand.

Figure 11: Household Composition (2013 Census)



5.4 Roading Growth and Demand

5.4.1 Major Influences

Particular trends that have a significant impact on the road asset include:

Forestry - Problems can occur with the heavy vehicles associated with forest harvesting damaging pavements that were not designed for such use. These demands on pavements can be high but are usually of a short duration corresponding to forestry logging practices.

Forestry-traffic growth is especially an issue in the general foothills areas of the District, and will require monitoring of heavy vehicles, such as logging trucks, travelling on District roads and of the effects of this travel on the network

Dairy conversion - Conversion of land use to dairying has a direct effect on the road network, specifically with pavement widths, pavement loadings and safety under all pressures. Conversion to other intensive land uses not currently known or anticipated may have similar effects, which is potentially one of the risks to the Council from climate change problems. Inadequate seal widths on sealed roads used by dairy tankers become apparent by increasing maintenance demands and need to be addressed by seal widening improvement programmes. Increasing seal width also improves safety by providing sufficient road space for heavy vehicles to pass in opposing directions. Tankers and other heavy vehicles also create problems on unsealed roads, requiring increased maintenance, grading and generating more dust than most other vehicles.

High Productivity Motor Vehicles - In 2010, amendments were made to the Land Transport Rule for Vehicle dimensions and Mass. This included:

- High-productivity vehicles would be allowed long-term permits to operate on approved routes at weights up to 53 t and lengths up to 22 m.
- Vehicles below 44 t would be able to operate at higher axle limits without permits.
- Operation over 53 t and 22 m would require overweight and over dimension permits.
- Overweight permits may be issued to divisible loads.
- Road controlling authorities would be able to issue overweight permits to cover the transport of divisible loads such as general freight and cargo. Currently, overweight permits are only issued to indivisible specialist loads generally limited to 44 t.

In October 2011 the Minister of Transport official lifted the 44 t weight limit of laden milk trucks by one tonne to 45 t until the end of the year throughout New Zealand.

5.4.2 Central Government Funding Policy

Central government assistance towards the maintenance of the local Roading network is set by the Financial Assistance Rate (FAR) provided by NZTA. Currently the Council receives a FAR subsidy for a number of the Roading assets of 58 %. Given the size of Council's local Roading network and its importance in the rural economy, it is a vital source of income. There has been significant investment in the Roading assets by both the Council and NZTA.

Maximising the FAR will become even more crucial as fewer rate payers will be available to fund the maintenance of the network. However, currently NZTA is reviewing the FAR. A decrease in the FAR provided by NZTA may significantly reduce the levels of service able to be provided for this asset.

5.4.3 Rural Economy

Current trends indicate that there will be increasing dairying conversions and forestry activities in the District. These are outlined in the District Overview section of the LTP. This will lead to a greater use of the Roading network requiring additional maintenance costs. In the case of dairying conversions, the change is a daily increase in heavy vehicle movements to take milk from the dairying unit. In the case of forestry activity, there is little or no use for many years within a particular area then during the logging period, a concentrated number of heavy vehicle movements will occur in a short space of time.

Many of the roads servicing these land blocks were not constructed to handle the high level of loading they are currently facing. Consequently, the dairying and logging truck routes are likely to be a key driver of the rehabilitation forward work programme.

The provision of recreational and tourist opportunities within the District may increase visitor numbers. This in turn will increase the use of particular roads, thus increasing the wear and increase maintenance requirements.

5.4.4 Oil-based Products

The Roading and footpaths activity relies upon materials and goods that are derived from oil-based commodities. The costs of the activity are therefore very sensitive to changes in the price of these commodities. Trends indicate that these price rises are greater than the average CPI and therefore Roading costs are increasing at a faster rate than the costs of other Council services. Global oil prices have been reasonably stable over the past few years (i.e. increasing at a steady rate rather than fluctuating wildly).

Oil is also a limited commodity and there is active debate as to when global peak oil will occur, how to measure peak oil, and whether peak oil production will be supply or demand driven. Reducing the reliance of this activity on oil-based commodities will result in the need for alternative methods to be used and this may increase the cost of providing these services, at least in the short-term.

5.4.5 Economic Trends

The main industry groups in the District are:

- Dairy.
- Agriculture.

Farming has, and is expected to continue to have, a significant impact on the District's economy. One of Council's objectives is to ensure that this industry is not adversely affected by changes in Council policy and planning requirements.

Farming in the District has responded to climatic and trade uncertainties in recent years by diversifying and, in some cases, subdividing and selling land for residential development. As a result dairying, deer farming and residential development have increased while sheep farming has declined.

Other industries in the District that provide a varied source of employment in the District include:

- Meat processing e.g. CMP.
- Small to Medium industry e.g. Wrightson Grain Silo.
- Commercial and Industrial Opportunities.
- Golf Courses e.g. Rangitane Golf Club.
- Natural Resources – gravel extraction.

Some of these industries have a lesser effect on the District's overall economy, but are important for providing a variety of employment opportunities within Rangitikei. The Council is looking to attract new commercial and industry ventures to the District.

5.4.6 Land Use Patterns

At present road use is directly related to residential development with each household estimated to produce between six and eight vehicle movements/day.

The potential changes to land use in the future of the Rangitikei District and the subsequent effects on the Roading network are difficult to determine with accuracy. However, it is important that the roads likely to be affected are prepared in readiness for these changes.

Demand for new or upgraded facilities arises from the needs of the existing population i.e. meeting the level of service standards, changing habits and lifestyle of the population. This demand manifests itself in the need for:

- New roads.
- Sealing of unsealed roads.
- Widening and alignment improvements.
- Upgraded intersections.
- New and upgraded bridges.
- Appropriate urban facilities in closely settled areas e.g. street lights or footpaths.

The Council intends to maintain its awareness of these issues and plans to provide a Roading network which meets the communities' expectations.

As discussed, farm conversions and on-going development of the dairy industry in Rangitikei, Manawatu, Taranaki and the Tararua are to a lesser extent, increasing gravel extraction and processing. This is subsequently increasing localised heavy traffic movements on routes to and from processing and distribution hubs. This loading particularly affects pavement assets, with significant growth in heavy axle loadings causing increased deterioration. Greater numbers of larger, heavier vehicles also affects the need for geometric improvements, such as seal widening, and can affect the need for seal extensions on affected routes.

5.4.7 Rail Transport

The District is served by two railway lines, being the North Island Main Truck Railway and the Marton to New Plymouth with destinations as far afield as Wellington and Auckland. This line also provides access to the Taranaki and Hawkes Bay ports via separate rail lines accessed either in Palmerston North or Marton. These links are parallel to SH 1 to the north and south, SH3 to the west and SH2 to the East. There are disused facilities for loading freight onto or off rail in the District thus, any “competitive” effect between road and rail freight is of little significance to the District’s Roading network.

5.4.8 Technological Change

Roading is an area where technological changes are occurring with new road materials and traffic management techniques being continually developed. The development of different traffic management techniques, for example restricting particular traffic movements and encouraging the use of arterial roads, in conjunction with more restrictive property-access provisions can help ensure that efficient traffic flows are maintained and capacity is optimised.

The development of alternative road materials can significantly reduce maintenance cost and lessen disruption to traffic by increasing pavement life and improving surface texture. An example is the use of fabric or polymer modified bitumen in reconstruction and rehabilitation work to increase the flexural capacity of the surface and extend pavement life.

5.5 Other Drivers

5.5.1 Climate Change

The Resource Management Act 2004 Amendment Act defined climate change as:

> *A change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to the natural climate variability.*

It is necessary to consider climate change issues in relation to the Roading activity to ensure the sustainability of this activity and maintain the agreed levels of service

5.5.2 Legislative Change

Changes to legislation may introduce changes to the demand for transport services, typically such changes will affect the characteristics of the traffic (e.g. truck weight limits) or the management of the transportation activity (e.g. Government Policy Statement on Transport Funding).

It is accepted that legislative change can occur at any time and that the impacts of such changes can be broad or quite specific. Council's assumptions for strategic planning accept the legislative framework that is in place at the time of planning.

5.5.3 Corridor Access

The transport corridor provides an essential conduit for a range of utilities including Council's 3 Waters, Telecommunications, Natural Gas and Electricity.

Broadband rollout will involve considerable excavation throughout the District over the period of the Long Term Plan. Delaying works such as footpath resurfacing is favoured to avoid rework and inferior assets.

5.6 Demand Planning

5.6.1 Traffic Counts

Traffic counts provide the basic information to support capacity planning. Council has a comprehensive traffic count programme in place which is managed through the RAMM system. Classified Counts (number and type of traffic) are used for this information.

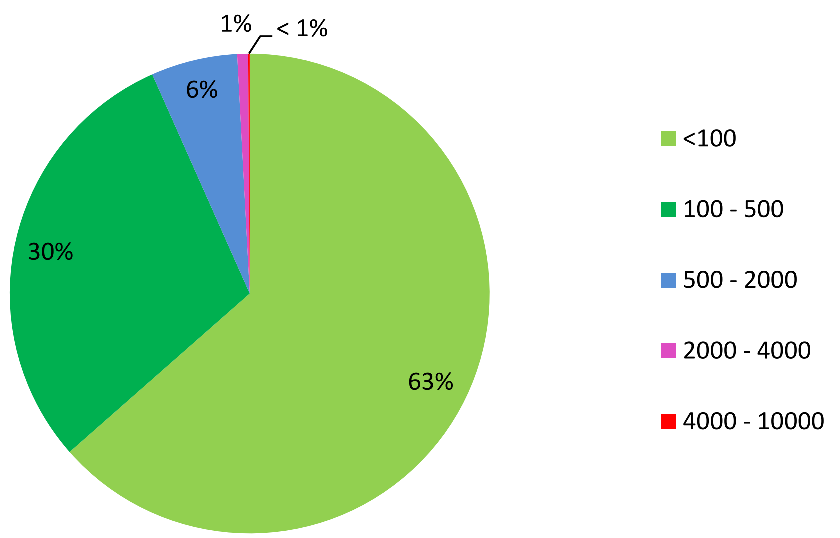
There are a number of reference sites which are surveyed annually to ensure trends are tracked, while all other roads are surveyed every three years. The information is held in RAMM and is readily accessible.

5.6.2 Asset Capacity

Generally the District's roads and intersections are far from their ultimate capacities and many are unlikely to reach those points in the near future. Under the conditions that prevail on most of the rural principal road network, two lane roads can be expected to carry up to 4,800 vpd, without a significant decrease in the level of service. However, there are some points where there is difficulty meeting the demand and where future growth may create strain on the network and possible delays at peak times.

Chart 4a illustrates the proportions of Daily Traffic across the network; most notable is that 63 % of the length of the network (771 km) carries less than 100 vpd. In terms of the expected capacity of a two lane road, less than one percent of the length of the network currently carries more than 5,000 vpd. This comprises 1.2 km of urban road.

Figure 12: Roads by Average Daily Traffic Volume



In the more rural areas, the District's roads and intersections are far from their ultimate capacities and many are unlikely to reach those limits in the near future. There is significant redundancy in the network that reflects the historic development of most roads that came about from the simple metalling of partially formed tracks as the District was colonised.

Under the conditions that typically prevail on rural Roading networks, two-lane roads can be expected to carry up to 4,800 vpd total without a significant decrease in the level of service. However, there are some points where it can benefit from specific minor improvements for example intersection realignments and other safety works, being carried out.

5.6.3 Achievements

The land transport network is required to provide for the safe and efficient movement of people and goods throughout the District and to neighbouring Districts. Its performance directly influences the economic viability and sustainability of the District, the wider Manawatu region, and indeed the Country. The District's land transport network is a core strategic facility and is maintained (excluding state highways) by the Council to assist it in meeting its Community Outcomes. It provides particularly strong inputs into the achievement of Community Outcomes.

Growth and Demand

The road network was set up many decades ago and has been gradually upgraded to the present standard. However, it is quite evident that community expectations in the Roading area are increasing, which requires regular reviews of levels of service and programmes for the continual improvement and development of the Roading network.

Another significant driver of improvements comes from the expectations of new residents in the District. The more rural environment that the District offers attracts these people; however, they expect higher levels of service more akin to those in metropolitan areas. Generally, the network has been coping with the demands on it, but this is expected to change.

New infrastructure has been continually added to the network from new urban subdivisions since the District was established in 1989. The majority of new urban infrastructure is vested at no initial cost to the Council by private developers; however the Council is then responsible for the on-going maintenance and renewal of this infrastructure in perpetuity.

Parts of the present network will need considerable redevelopment over the next decade, and beyond, to meet community and growth expectations. The factors that will force the need for change on the assets or the management of the asset are discussed in the following paragraphs:

Changes in the way roads are used: The creation of new urban subdivisions, or the development of new industry in one part of the District, may change how an individual road or roads, or even a sub-network is used. This may mean roads will need to be modified or upgraded to accommodate the changing use.

Changes in the level of service demanded by the road users: Over time, communities tend to expect improving service from their assets. Agreed levels of service for roads, and the activities involved in managing the roads, will help to control this tendency but level of service may nevertheless need to be improved to satisfy these future needs. The trend to more lifestyle blocks in the countryside has also changed the expectation of the travelling public in rural areas where rural roads are no longer used only by local farmers, but now carry a much wider range of people and vehicle types. This has resulted in factors such as smoothness of ride, loose metal, dust and higher speeds becoming more important to more road users

Similarly, more people wish to cycle and feel safe whilst doing so, on the District’s typically narrow rural roads. These people seek wider carriageways, cycle lanes and off-road pathways to address their needs:

Increases in fuel costs: This will put pressure on the Council to provide or facilitate more affordable and sustainable transport solutions for the District’s residents. This may require additional public transport services and an investment in walking and cycling infrastructure to cater for short trips. However, there are disconnections between what can be realistically provided in the District’s urban and rural areas

Changes in the strategic management of the assets: The Council's policies and management strategies are continually evolving to keep pace with the changing needs of the community, statutory requirements, funding organisations and central government's requirements. Changes to policies and management strategies can also have a significant effect on how assets are managed

5.6.4 Minor Improvements

The funding of improvements is catered for in the subsidised Land Transport Programme as Activity Class 5 – Improvement of Local Roads. Activity Class 5 includes NZTA Work Categories 322 to 325 and 341 and can include substantial projects such as new bridges, and new roads, in addition to road reconstruction and minor improvements. Individual projects generally have to meet assessment criteria under NZTA's Project Evaluation Manual to be eligible for funding.

The exceptions are those in Work Category 341 – Minor Improvements, Safety and other related Roading improvement projects up to a value of $250,000 per project can be funded from this category. This is taken from a bulk allocation that is equivalent to 8 % of the value of the Council's Land Transport Maintenance and Renewal Programmes. This equates to approximately $507,000 per annum. Previously this work was referred to as "minor safety improvements" and was limited to a cost of up to $150,000 per project.

The Council operates a Hazards and Deficiency Database that lists and prioritizes these projects for funding from this allocation.

Wherever possible the Council utilises subsidised funding sources to carry out major works. If major transportation projects are not eligible for subsidised funding, the Council then considers fully funding these as projects in order to achieve them.

Approved projects are bulk funded by The NZTA through Work Category 341 – Minor Improvements of the Land Transport Programme. The total value of this fund for each road controlling authority is limited to 5 % of the value of its total maintenance and renewal budgets in the Land Transport Programme.

Prior to 2012 the Council identified Minor Improvement candidates using a spreadsheet listing all identified projects ranked on the basis of crash history and then traffic volume; crash data was derived from the NZTA crash statistics. The list included possible projects identified by staff, ratepayers and Councillors over a number of years. Potential project candidates were then ranked and annually reported to the Council for approval within the bulk funding allocation.

In 2012 a Hazard and Deficiency Database replaced the original spreadsheet process. This evaluates and ranks projects more robustly based on a risk reduction, traffic and cost basis.

As part of the development of this database, consideration was extended to intersection lighting, intersection seal-backs and other safety-related projects that were not previously considered for funding in this manner. As a consequence of these changes, a number of similar projects, of a relatively low cost, were ranked at the top of the list of projects. The Council decided to spread the work over a number of work types to achieve some degree of parity both on the type of work and how it is distributed across the network and District in a more equitable manner, this has meant that the priorities determined by the deficiency database process are not rigidly followed.

5.6.5 New Improvement Planning

The LTP process stipulated by the Local Government Act 2002 requires the Council to plan and forecast its activities for long periods into the future, and to publish and consult on its intentions at three-yearly intervals. In the periods between LTPs, Council is required to follow a simpler Annual Plan procedure. There is no real scope under this system for making significant changes to major LTP programmes at Annual Plan time unless there are exceptional circumstances.

The Land Transport Management Amendment Act 2008 introduced a requirement for road controlling authorities to prepare three-yearly Land Transport Programmes. However, the requirement for territorial local authorities to do so is only an indirect one in that major projects need to be prioritised and coordinated on regional basis in order to obtain funding from the National Land Transport Programme and a Regional Land Transport Programme is required as an input to the National Land Transport Programme. The Regional Transport Committee performs this prioritisation task and achieves the regional consensus necessary to develop and confirm the Regional Land Transport Programme.

The Council operates a Projects Database that lists potential individual improvement projects from sources such as township committees or community boards, staff and Councillors. These requests may also arise from public enquires and projects not usually expected to be contained in other forward more formal programmes, e.g. seal extensions and seal widening programmes etc. Typically, these requests are associated with township renewal and improvement works such as footpath extensions, new kerb and channel, individual street lights and street upgrades. Renewal recommendations are not part of this process, other than their interaction with street upgrading in some instances.

5.6.6 Options

The Local Government Act 2002 requires that:

77. (1) A local authority must, in the course of the decision making process,—

(a) Seek to identify all reasonably practicable options for the achievement of the objective of a decision; and

(b) Assess those options by considering;

(i) The benefits and costs of each option in terms of the present and future social, economic, environmental, and cultural well-being of the District or region; and

(ii) The extent to which community outcomes would be promoted or achieved in an integrated and efficient manner by each option; and

(iii) The impact of each option on the local authority's capacity to meet present and future needs in relation to any statutory responsibility of the local authority; and

(iv) Any other matters that, in the opinion of the local authority, are relevant; and

(c) If any of the options identified under paragraph (a) involves a significant decision in relation to land or a body of water, take into account the relationship of Maori and their culture and traditions with their ancestral land, water, sites, waahi tapu, valued flora, fauna and other taonga.The Council does however have discretion as to:

(i) The extent to which different options are to be identified and assessed; and

(ii) The degree to which benefits and costs are to be quantified; and

(iii) The extent and detail of the information to be considered; and

(iv) The extent and nature of any written record to be kept of the manner in which it has complied with those sections.

(a) The principles set out in section 14; and

(b) The extent of the local authority's resources; and

(c) The extent to which the nature of a decision, or the circumstances in which a decision is taken, allow the local authority scope and opportunity to consider a range of options or the views and preferences of other persons.

This plan considers available options such as:

- The social, economic, environmental, and cultural wellbeing of the District, by taking appropriate cognisance of the Council's Goals and objectives.
- The extent to which community outcomes would be promoted or achieved by having regard to the Council's published community outcomes.

In considering these matters there is a need to coordinate projects within the Roading activity and between this and other activities of the Council. This integration has occurred where possible with the continual development of the Council's systems and Asset Management Plans.

Analysis of the benefits and costs of options is not appropriate at these early stages of project and plan development covered by this plan. Rather, these factors should be considered in the decision making process that is followed before any specific project is built.

Most improvement projects listed in this plan should therefore generally be regarded as 'likely solutions to the problem' rather than firm indications as to the exact option that will be built. However, some projects only explore options and consider benefits, costs and wider community issues in the process of making more strategic recommendations.

5.6.7 Local Priorities

As part of the development of LTP, the District's communities, via their respective Township Committees and Community Boards, are provided the opportunity to rank proposed improvement projects in order of their preferences. The Council will then consider these preferences in the preparation of the LTP and Annual Budgets. Usually these proposals include mainly minor improvement works, like footpath extensions and new street lights; however, other works such as street upgrades, that strictly speaking are renewal works, are included to simplify the consultation and consideration processes and to ensure that the communities are fully informed.

Where Roading projects are likely to be approved as part of the National Land Transport Programme (NLTP) they are incorporated into the Council's Land Transport Programme. The proposed Land Transport Programme is approved by the Council before submission to the NZTA.

Until 2008, the LTP was submitted annually to the NZTA for funding approval. The Land Transport Management Amendment Act 2008 introduced a three year National Land Transport Programme to coincide with local authorities' three yearly LTP budgeting processes. The requirement to submit a local LTP for approval is now indirect; a Regional Land Transport Programme has to be compiled and this cannot be done without the relevant information from all the road controlling authorities' individual Land Transport Programmes.

5.7 Proposed Improvements

5.7.1 Pavements

Proposed improvements to road pavements can be split into several different categories:

5.7.1.1 Seal Extensions

Previously, if a benefit-cost ratio (BCR) of over 4 could be obtained, then a seal extension was programmed as subsidised work through the Council's Land Transport Programme. This however became rarer as the busier roads were sealed and seal extensions were carried out as non-subsidised Roading works.

The main factor affecting the BCR is the traffic volume. Previously a long-standing "rule of thumb" was a road could be considered viable to seal if the traffic volume was over 90 vpd. Increases in sealing costs and other changes in economic criteria suggest that an on a comparative basis today this has increased to 150-200 vpd.

The roads included in the early seal extension programmes were readily identified high use unsealed roads, and those that were the subject of ratepayer submissions. However, since the early 1990s, when the Council started to obtain traffic counts for all unsealed road sections, each section was ranked on a consistent and objective basis to determine a prioritised annual forward programme for consideration by the Council. As part of this, the traffic counts of the top ranked 25 seal extension candidates were validated to ensure an accurate ranking relativity.

In recent years the number of seal extension obtaining a BCR over 2 has been rare. This is why no rural seal extensions were carried out in 2007-2008. Previously the Council was open to funding 50 % of the cost of a seal extension if this was matched by other funding, for example by property owners who were strongly advocating having their road sealed. In 2007 the Council decided that they could no longer support this type of commitment.

Recently the original seal extension forward programme has been updated and improved, to correct inaccuracies and miscalculations that have crept into the original spreadsheet-based prioritisation process over time. The updated Seal Extension Forward Programme has been repopulated with RAMM inventory information and traffic counts and this can now be repeated easily and consistently before each review. The updated Seal Extension Forward Programme is in Annex G.

While the original forward programme was updated annually to enable the Council to consider potential seal extension candidates in conjunction with its Annual Budget process, the revised Forward Programme will only be updated and reprioritised on three yearly cycles in conjunction with updating this Plan. This will provide greater certainty to ratepayers and the Council and fit more closely with the LTP and Land Transport Programme cycles. It also reflects the continuing objective of having no traffic counts over three years old.

5.7.1.2 Seal Widening

Deficient seal widths in the District are driven by identified maintenance and safety issues. A seal widening forward programme identifies candidates based on sections where there is insufficient road width when compared to adjacent sections. This may include those with significant maintenance liabilities from edge break and rutting. It also considers when the road is due for resealing so that widening can occur in advance of this allowing the completed full pavement to be re-sealed to provide a homogeneous surfacing, in terms of life and appearance.

5.7.2 Kerb and Channel

On occasion, Council has used an external consultant to carry out a sealed road pavement assessment, which includes an examination of all damaged or broken kerb throughout the District. The results of this survey are submitted and stored via the RAMM system for future use .Council uses this data to assist in the creation of forward works programmes for repairing and renewing kerb and channel.

Furthermore, this information can also be used to support the construction of new kerb and channel within urban areas requiring improvements in pavement drainage.

Much of the older data stored in RAMM is heavily influenced by the assumptions made about construction dates of older kerb and channel and is therefore subject to more scrutiny. New improvements will be balanced with the forward works programme in combination with renewal works and new projects are expected to be limited in scale and undertaken under minor improvements.

5.7.3 Other Improvements

There is no improvement or development work planned for other asset groups at this stage.

5.7.4 Town Upgrades

Township improvement works are carried out mainly at the request of the local township committees. The Council operates a Projects Database that lists potential individual improvement projects from sources such as township committees or community boards, staff and Councilors.

These requests may also arise from public enquires and projects not usually expected to be contained in other forward more formal programmes e.g. seal extensions and seal widening programmes etc. Typically, these requests are associated with township improvement works such as footpath extensions, new kerb and channel, individual street lights and street upgrades. Renewal recommendations are not part of this process, other than their interaction with street upgrading in some instances.

Street upgrades are essentially renewal works as they mostly consist of the renewal of old footpaths, kerb and channel, street lights and pavements. However, they also can incorporate new improvements that relate more to the aesthetics of the street e.g. the use of aesthetically pleasing surfacing such as cobblestones, decorative light poles, traffic calming devices, landscaping and the undergrounding of existing overhead services. On this basis, the common view is that street upgrade projects are treated more as an overall improvement project than a number of separate renewal projects in terms of prioritisation.

In advance of each LTP process the Council consults with the respective township committees to determine a preferred priority for the works to be carried out over the next three-year period. This is because even in 'LTP years' The Council is unlikely to be able to unable to fund all these improvements, for budgetary reasons, so the most desired projects are proposed. The Council balances the demands for these new improvements over the District in a fair and impartial manner within the global funding constraints for this type of work.

5.7.5 Funding

All of these works are currently identified in NZTA Work Category 324 – Road Reconstruction in the Council's proposed Land Transport Programmes on the basis they are assumed to qualify for subsidy at the Council's current financial assistance rate of 58 %. If this proves not to be the case, the Council will need to reconsider its options, which include meeting the additional costs, including fully funding the works, deferring the projects or abandoning them.

5.7.6 Level of Service Improvements

With one exception the current customer levels detailed in the Levels of Service section of this Plan reflect current service levels delivered by the Council. This can be described as substantially "business as usual".

From time to time significant safety problems arise at particular points on the network. For example, the severity or number of crashes at a particular intersection might increase to the extent that a major improvement project is necessary and justified.

On existing roads these types of interventions are generally not considered improvement backlogs; rather, they are usually newly justified improvement works. However, they could form part of a backlog if they have been identified for longer than it would usually take to programme and fund a new project, and remain programmed. As discussed eligible projects up to a cost of $250,000 can be funded through a block allocation in the Council's subsidised Land Transport Programme.

5.7.7 Level of Service Backlogs

The backlog of new improvement works required to address shortfalls in current levels of service is assessed by comparing the lists of required works with the rates at which they are being completed. While the completion rates can be determined relatively easily lists of required works are more difficult to generate.

For example, it could be argued that the sealing of approximately 454 km of unsealed roads in the District is a backlog of work as all these roads are listed in the schedule. However, this would be incorrect as it is seldom that any of these roads meet the Council's and the NZTA's criteria for sealing. The establishment of these criteria and polices by the Council in this situation is an example how the perceived backlogs, or unrealistic levels of service expectations, can be managed. Similar principles are applied to other Roading assets both on a formal and informal basis using sound engineering judgment and expertise.

5.7.8 Programming Improvements

The new improvement programmes reflect a balance between what is affordable and what is achievable with the funding currently, or expected to be, available.

Most road network level of service gaps are known intuitively and are relatively small in the context of the whole network. These are compensated for in the day-to-day administration of the asset. When this cannot occur, additional funding is sought to address the gap. This normally occurs when the Council's Land Transport Programmes is compiled and submitted to the NZTA for approval. However, the NZTA usually requires any such requests to be "evidence based" before approving any additional funding.

The Improvement Plan includes a number of individual tasks over sub-asset groups to review and identify any potential level of service backlogs that are outside normally acceptable time variances / lead times.

6 Environmental Management

6.1 Overview

This section describes the environmental legislative obligations that Council has in undertaking the Transport activity including requirements specified as conditions of resource consents. It also demonstrates Rangitikei District Council's commitment to environmental stewardship through the inclusion of environmental impact mitigation in relevant Council strategies.

Environmental sustainability, protection of heritage values and the enhancement/protection of amenity are very important to the community. Maintaining these values is essential to tourism, economic viability and the social and cultural health of the Rangitikei District communities.

This section pulls together the many elements that contribute to good environmental management as relevant to the Rangitikei District Council.

6.2 Resource Consents

If the construction of an asset does not meet the development controls outlined in the District Plan or relates to an activity that has the potential to result in adverse effects on the environment, beyond those contemplated by the District Plan provisions, resource consent may be required. An Assessment of Environmental Effects (AEE) is required to support any resource consent applications to the respective Councils when seeking approval to construct, alter or vary the use of a facility or building that is not permitted by the relevant plan.

The AEE process involves the identification and assessment of both the potential and the perceived physical, social and cultural impacts that the proposed works may have on the existing environment, and includes the examination and comparison of options and alternatives for mitigating any identified adverse effects, and the confirmation and recommendations on the preferred options and methodology to carry out the works.

The critical environmental factors requiring consideration may include geological and geotechnical effects of land movement (cut and fill), the ecological and biological effects of vegetation removal or earthworks, and the cultural, archaeological and social effects on the environment of the development. These, together with noise, traffic, and visual effects, may require specialist inputs and consultation with the local communities.

The AEE process involves:

- The effects of the proposal on other person(s) e.g. neighbours affected by dust or noise.

- The effects of the proposal on the natural environment e.g. increase in the amount of dust or the disturbance of waterways due to earthworks.
- The visual impact of the proposed activity.
- Proposed methods of how you plan to minimise any identified adverse effects.

The critical environmental factors requiring consideration include:

- Ecosystems and their constituent parts, including people and communities.
- All natural and physical resources.
- Amenity values.
- The social, economic, aesthetic, and cultural conditions which affect the matters stated in the paragraphs above.

RDC holds a number of resource consents to enable the safe and environmentally appropriate operation of its Transport activities.

6.3 Potential Issues

There are a number of adverse environmental effects that can occur in the process of undertaking Transport related development, particularly major construction projects. The potential effects of the Transport activity can be generated during both the construction phase and the operational use of the network. The information provided below outlines some of these issues and associated mitigation measures that could be employed.

6.3.1 Dust

Dust can affect vegetation health along the edge of the earthworks area, can be a nuisance to the surrounding public, and can contribute to sediment loads by being deposited in areas without sediment control measures. Sediments deposited on sealed public roads can also result in a dust nuisance. Similarly, unsealed roads can present a dust nuisance during periods of prolonged drought.

The following mitigation measures may be considered in the control of dust emissions:

- Wheel washing for trucks leaving development sites.
- Spraying down areas (with water) to control dust emissions.
- Monitoring at site boundaries.

6.3.2 Sediment Runoff

Sediment runoff from development works is generally controlled via sediment control techniques and administered by the Regional Council. Sediment from exposed areas of land can enter waterways, streams and rivers, potentially causing adverse effects to fauna and flora.

The following mitigation measures may be considered in the control of sediment runoff:

- Effective sediment control techniques such as cut-off drains, ponds, and silt fences retain sediment and prevent it from entering water systems.
- Compliance with an approved sediment and erosion control plan.

6.3.3 Noise

Noise is a factor to be considered during construction projects. The District Plan contains the standards for noise and the restrictions imposed on construction such as hours of operation and the decibel limits to be adhered to. Monitoring typically takes place to establish background noise levels against which construction and traffic noise can be measured against. The documents that Council shall have regard to include:

- NZS 6806: 1993 Road Traffic Sound.
- Guidelines for the Management of Road Traffic Noise – State Highway Improvements by Transit New Zealand 1994.

The following mitigation measures may be considered in the control of noise emissions:

- Hours of permitted work.
- Monitoring at site boundaries.
- Compliance with standards.
- Community consultation.

6.3.4 Cultural Heritage

Places of particular cultural heritage value have been scheduled and identified on the District planning maps so that location is known and can be taken into account when considering development and applying for resource consents. The scheduled sites are those that are registered under the Historic Places Act 1993, or those requested to be scheduled following consultation with iwi. Not all sites are recorded and for major developments it is important that consultation be undertaken with tangata whenua, registered archaeologists, NZ Historic Places Trust and the Regional Council. Protocols can be developed in the event of discovery.

The following mitigation measures may be considered when taking into account cultural heritage values or sites:

- Consultation with key stakeholders.
- Development of protocols.
- Due diligence prior to development.

6.3.5 Stormwater Discharges

Stormwater discharges need to be managed to prevent pollutants from entering waterways. Roads provide a number or potential contaminants such as metals (from vehicles), hydrocarbons, gross pollutants (litter) and herbicides (from vegetation control). These can cause adverse effects for flora and fauna in receiving waters.

In addition, stormwater pipes/culvert outlets can cause scour during large flows.

The following mitigation measures may be considered in the control of stormwater discharges:

- Retention dams, swales, and outfall structures to dissipate flows. Any number of options can be evaluated prior to consent approvals.
- Evaluate receiving waters to determine background water quality.
- Monitoring of the mixing zone.

6.3.6 Climate Change

New Zealand's climate varies significantly from year to year and from decade to decade. Human-induced long-term trends will be superimposed on these natural variations and it is this combination that will provide the future climate extremes to which New Zealand society will be exposed.

The Ministry for the Environment has produced a document entitled "Climate Change and Long Term Planning" which advises that projections of New Zealand's future climate indicate:

- Temperatures increase on average by 1 °C by 2040 and 2 °C by 2090.
- Rainfall has a pattern of increases in the west (up to 5 % by 2040 and 10 % by 2090) and decreases in the east and north (exceeding 5 % in places by 2090). There is marked seasonality in the rainfall distribution pattern changes.
- Sea levels will rise.

- Decreased frosts.
- Increased frequency of high temperatures.
- Increased frequency of extreme daily rainfalls.
- Higher snow lines and possible reduced snow coverage.
- Possible increase in strong winds.
- Wetter in the west and south, drier in the north and east.
- Increase in frequency and severity of extreme events e.g. heavy rainfall, storm surges, drought and very high temperatures.

The document also states:

> *Key principles for responding to climate change – local government is required to operate under a range of principles that are set out in law or have evolved through good practice and case law. The principles should also be kept in mind when adapting to the effects of climate change.*

The key principles are:

- Sustainability.
- Consideration of the foreseeable needs of future generations.
- Avoidance, remedy or mitigation of adverse effects.
- Adoption of a precautionary approach.
- The ethic of stewardship / Kaitiakitanga.
- Consultation and participation.
- Financial responsibility.
- Liability.
- Resilient communities.
- Spill.

The following mitigation measures may be considered when taking into account climate change:

- Have regard to projections during planning phases.

- Cognisance of areas located as being potential hazard zones.
- Specialist advice.

6.4 Hazards

The Rangitikei District and surrounding regions are exposed to a number of natural hazards. From an activity point of view hazards have the potential to cause major disruption and need to be taken into account.

Information on the risk posed by natural hazards is sparse for Rangitikei District. In conjunction with the Horizon Regional Council, the Council has developed a database of natural hazards.

The Proposed One Plan put forward by Horizon Regional Council sets outs responsibilities for natural hazard management relevant to the Rangitikei District. The plan to minimise risks of natural hazards through:

- Raising public awareness of the risks of natural hazards through education, including information about what natural hazards exist in the Region, what people can do to minimise their own level of risk, and what help is available.
- Making territorial authorities responsible for developing objectives, policies, and methods (including rules) for the control of the use of land to avoid or mitigate natural hazards in all areas and for all activities except land-use activities in the coastal marine area, erosion protection works that cross or adjoin mean high water spring and land-use activities in the beds of rivers and lakes for the purpose of avoiding or mitigating natural hazards.
- Identifying flood ways and other areas known to be inundated by a 0.5% annual exceedance probability flood event in District Plans, and controlling land-use activities in these areas.

6.4.1 Flooding

Flooding is a commonly occurring major natural hazard that results when the natural and modified drainage systems fail in a particular rainfall event. The risk of flooding is influenced by a number of factors such as:

- Weather systems.
- Hydrological factors (catchment size, rainfall intensity and infiltration).
- Hydraulic factors.
- Soil type.

- Land use.
- Ground saturation.

Storm events and the resulting flooding can result in significant adverse effects on both residents and the environment. These effects may include:

- Personal injury or loss of life, property and possessions or livelihood.
- Disruption of utilities and transportation networks.
- Impacts on the environment may include vegetation and habitat loss, erosion and sedimentation in waterways, and soil and water contamination.

Flooding hazards within the Rangitikei District have principally occurred within the Taihape and northern areas of the District. Horizon Regional Council is also modelling the flood risks for Marton and Bulls.

6.4.2 Landslides

Landslides are generally caused by slope saturation and can include mudslides, debris flow or avalanches, rock falls and rock slides. Increased ground saturation can be caused by intense rainfall, changes in groundwater and water level changes in rivers, earth dams, lake banks and the coastline. Generally flooding and landslide events are closely linked as they both result from heavy rainfall, stormwater runoff and ground saturation.

The risk of landslide is influenced by a number of factors such as:

- Underlying geology;
- Proximity to rivers, lakes and the coast;
- Past and present land use including vegetation changes; and
- Infrastructure development.

Landslides can result in significant adverse effects on the road network including blocking roads by material dropping onto the road or loss of the road because the supporting country and the road slip away.

6.4.3 Earthquakes

New Zealand is considered amongst the most seismically active places on earth, as it is located on an active boundary of two tectonic plates

6.4.4 Volcanic Activity

Ruapehu is one of New Zealand's most active volcanoes, with ten eruptions since 1861. However, the eruptions aren't the only threat. There is a more serious threat from the volcanic mudflow called a lahar. In between eruptions, a lake forms in the volcano's caldera from melting snow. If a previous eruption has deposited a dam of ash, rocks and mud in the lake's natural overflow point, then the lake becomes dangerously full, held back only by the temporary dam.

Mount Ruapehu has erupted at least 18 times since 1861 and has produced numerous lahars – the most recent of which occurred on 18 March 2007.

The Region is a major corridor for road and rail transportation networks. There is an extensive network of both state highways and local roads throughout the area, and the road network has been identified as being the most critical of the transportation networks.

The main causes of large-scale failure are earthquake and river flooding, with severe storms and landslides causing most site specific failures. The consequences are primarily social and economic, with isolation and restricted access being the main issues. Despite this, there is arguably more redundancy within the road network than any of the other lifeline utilities.

Plans to deal with a large scale failure are detailed in the CDEM Plans.

6.5 Future Requirements

The main item that needs to be addressed from an Environmental Stewardship perspective is the tracking of resource consents and the conditions that they may contain. Tracking legislation will also need to occur, specifically in relation to Climate Change and the impacts this might have on the transport network. In addition to this, a constant monitoring of natural hazards and their impacts will need to be ongoing.

7 Lifecycle Management

7.1 Overview

This section of the Asset Management Plan describes the lifecycle management plans for each asset and non-asset group. The asset groups and their principal components are:

Table 26: Asset Groups

Asset Group	Asset Type	Description
Road pavements	Formation	Existing/modified material supporting the sub-base and basecourse layers.
	Sub-base	Lower structural layer between the formation and basecourse.
	Basecourse	Top structural layer of the pavement.
	Shoulders	Grass and metal between seal edge and drainage feature.
	Top surface	Bitumen-bound chip seal or Asphaltic Concrete surface.
Drainage	Culverts	Pipe system under roads to convey stormwater runoff.
	Kerb and channel	Concrete lined channels on urban streets/roads to control runoff.
	Sumps and soak holes	Collection structures to control discharge of runoff.
	Open water channel	Earth-formed v-drain beside rural roads.
Surface Water Channel	Kerb and channel	Concrete-lined channels on urban streets/roads to control runoff.
	Deep and shallow surface water channels	Predominantly on rural roads to control carriageway drainage.
Bridges	Abutments	Fixed platform to support deck ends.
	Piers	Mid-point columns to support decking.
	Deck spans	Trafficable platform atop the abutment and piers.
	Large culverts	Pipe area greater than 3.4 m^2 of cross-sectional area.
Retaining walls		Carriageway formation and support and

Asset Group	Asset Type	Description
		protection structures.
Street lighting	Luminaire	Light fitting including control gear and lamp.
	Poles	Concrete or steel column to support the lamp.
	Brackets	Supporting the luminaire atop the pole.
Traffic services	Signs	Message board to convey safety and directional information.
	Posts	Wooden or steel post to support the sign.
	Markings	Painted lines on road surface.
	Islands	Traffic control structures at intersections.
	Rails	Road side site visibility and safety protection rails (fencing).
Footpaths		Concrete, Paved, Asphaltic and unsealed pedestrian pathways.
Environmental	Vegetation control	Control or grass and noxious plants.
	Emergency works	Snow clearing, flood damage reinstatement, or other natural response.
	Stock underpasses	Below ground structures to enable stock to pass under the road.
	Street cleaning	Detritus removal.
Operation and asset management	Asset management	Strategic management of the Roading network.
	Systems	RAMM database to manage Roading inventory.
	Road closure	Council approved activities for community or sport events.
	Traffic management	Function of operating on legal roads safely.
	Corridor access	Permit approval system to operate of roads.

The lifecycle management plans for each asset group detail the methods and actions planned to deliver the agreed levels of service while optimising lifecycle costs. The lifecycle management plans cover asset Information identifying:

- The scope and nature of the assets;

- The current condition of the assets;
- The current capacity and performance of asset relative to the adopted level of service;
- Demand projections and risk;
- Management of, and standards for, all asset lifecycle work activity – operations, maintenance, renewals, new improvements and disposals; and
- Costs and timings of identified works and forecast works needs for all asset lifecycle work activity (maintenance, renewal, development and disposal) required to action the adopted lifecycle asset management strategies.

The table below gives a summary of asset type, component, quantity/length and replacement cost:

Table 27: Asset Description - Overall

Asset Type	Component	Unit	Quantity	ORC Value
Bridge	Bridge (Culvert)	m	1,276	11,155,988
	Bridge (Deck)	m²	18,802	87,383,742
Crossing	Crossing	Each	4,433	6,518,210
Drainage	Drainage	Each	1,073	1,584,358
		m	56,413	20,847,686
Footpath	Footpath	m	250	28,213
		m²	159,961	12,177,514
Land	Rural	ha	3,951	23,706,000
	Urban	ha	226	16,272,000
Marking	Marking	Each	1,517	36,101
		m	251,251	80,638
Railing	Railing	m	17,484	2,380,908
Retaining Wall	Retaining Wall	Each	3	32,640
		m	121	758,417
		m²	11,745	13,415,890
Shoulder	Shoulder	m²	109,310	138,992

Asset Type	Component	Unit	Quantity	ORC Value
Sign	Sign	Each	5,660	1,452,666
	Sign Post	Each	3,035	390,831
Street light	Street Light (Bracket)	Each	1,864	651,989
	Street Light (Light)	Each	1,651	536,710
	Street Light (Pole)	Each	281	926,226
SW Channel	Surface Water Channel	m	1,326,633	15,561,957
Treatment Length	Formation Region A	m^3	1,725,753	41,450,346
	Formation Region B	m^3	4,284,566	102,909,706
	Formation Region C	m^3	1,855,508	44,566,875
	Pavement 1st Coat	m^2	4,708,438	22,286,077
	Pavement R k-Depth	m^3	1,158,842	79,954,834
	Pavement R u-D < 2000	m^3	1,643	113,369
	Pavement R u-D > 2000	m^3	3,286	226,737
	Pavement U k-Depth	m^3	115,490	7,968,302
	Pavement U u-D < 2000	m^3	1,901	131,143
	Pavement U u-D > 2000	m^3	3,801	262,286
	Pavement Unseal	m^2	2,493,144	7,181,310
	Surface Structure	m^2	6,300,002	24,189,152
Total				**547,277,814**

Summary of table above ordered by value, this information is also shown in the following graph:

Table 28: Asset Valuation - Overall

Asset Type	Replacement Cost ($)
Marking	116,739
Shoulder	138,992
Sign	1,843,496

Asset Type	Replacement Cost ($)
Street light	2,114,925
Railing	2,380,908
Crossing	6,518,210
Footpath	12,205,728
Retaining Wall	14,206,947
SW Channel	15,561,957
Land Under Roads (Urban)	16,272,000
Drainage	22,432,044
Land Under Roads (Rural)	23,706,000
Road Surface	31,370,461
Bridge	98,539,730
Road Pavement	110,942,748
Road Formation	188,926,928
Total	**547,277,814**

The network is often classified by surface type and whether the roads are urban or rural classification.

The following information summarises the road network by those classifications:

Table 29: Sealed vs. Unsealed by Length

Type	Length (km)		
	Sealed	Unsealed	Network
Urban	84	3	87
Rural	712	426	1,138
Both	796	429	1,225

Table 30: Sealed vs. Unsealed by Proportion

Type	Proportion (%)		
	Sealed	Unsealed	Network
Urban	6.9%	0.2%	7.1%
Rural	58.1%	34.8%	92.9%
Both	65.0%	35.0%	100%

The network is further categorised by road hierarchy. Roads are classified into categories based on the number traffic of movements per day on each road coupled with the criticality of traffic routes. NZTA is currently in the process of advising Local Authorities on a new strategy to categorise road hierarchy to achieve national consistency. This should be finalised during 2014 and will significantly change the current road hierarchy.

The use made of roads is measured in terms of the total estimated distance travelled on them each year (Vehicle Kilometres Travelled - VKT). NZTA statistics show that in 2004 approximately 71.5 million VKT were travelled over the network, this decreased slightly to 70.1 million VKT in 2012. Over the eight year period, the decrease is negligible and shows growth is static.

The percentage of use on both sealed and unsealed roads is shown in the table below.

Table 31: Network Summary - Usage

Type	Usage (%)		
	Sealed	Unsealed	Network
Urban	15.02	0.02	15.00
Rural	81.36	3.59	85.00
Both	96.38	3.62	100.00

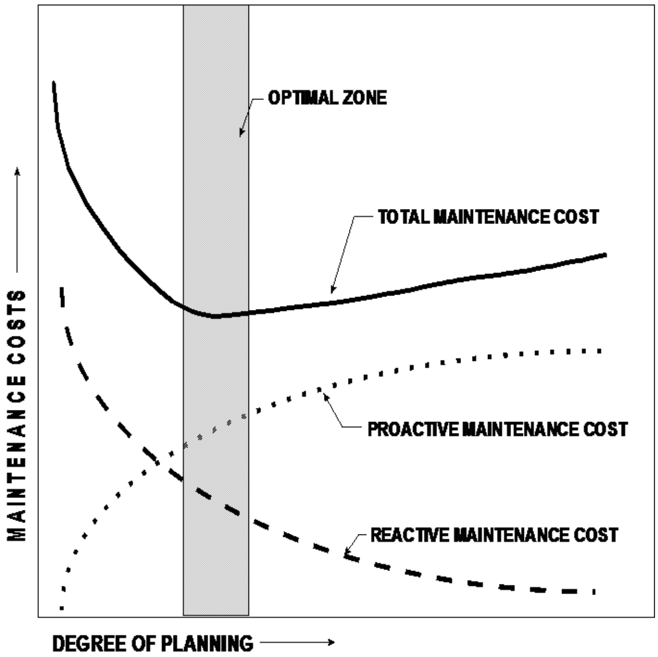
The tables above show that while 35 % of the network consists of unsealed roads these contribute to less than 4 % of the use of the network.

7.1.1 Service Delivery and Rationale

7.1.1.1 Strategy

This section describes how the Council will manage and maintain the identified levels of service for the Roading Assets, identifying and maintaining the service capacity, the operating regime, and assess the estimated costs of providing them. A key element of asset management planning is determining the most cost effective blend of planned and unplanned maintenance as illustrated in the diagram below.

Figure 13: Proactive vs. Reactive Maintenance



7.1.1.2 Funding Strategy

The Council sets its funding for land transport operations, maintenance and renewals three yearly, through the Long Term Plan (LTP) process. Since 2009, the Land Transport Management Act 2003 requires road controlling authorities such as the Council to prepare and submit their three year Land Transport Programs for approval as part of a Regional Land Transport Programme, which is then incorporated into the National Land Transport Programme (NLTP).

The incorporation into the NLTP is part of the Governments co-investment into the National Land Transport Programme. Although currently under review, the co-investment rate, known as the Financial Assistance Rate (FAR) is an average of 50 % of the total cost of the providing the Land Transport Activities throughout the country. The Government provides its guidance on investment of the Land Transport activity via the Government Policy Statement (GPS) for Land Transport, which is issued by the Ministry of Transport. The outcome of the FAR review will be released to the industry by mid-2014.

It is expected that the review will impact on Rangitikei District Councils current maintenance strategy, as the FAR is likely to reduce the funds available for maintenance and renewal activities.

The subsidised Land Transport Programme is a summary of a range of individual activity classes. Each category covers a specific quantum of works and approved funding is dedicated for the delivery of that activity. The activity classes are as follows:

Table 32: Maintenance Activity Classes

Activity Class - Maintenance	**Work Component**
111 – Sealed Pavement Maintenance	Pavement Repairs, Potholes, unsealed shoulder maintenance, pre-reseal repairs
112 – Unsealed pavement maintenance	Grading and maintenance of running course material
113 – Routine drainage maintenance	Cleaning of kerb and channel, sumps, water table clearing, culvert maintenance culverts < 3.4 m^2
114 – Structures maintenance	Maintenance of bridges, retaining structures, guard rails, large culverts > 3.4 m^2
121 – Environmental maintenance	Snow clearing, vegetation control, litter collection on rural roads
122 – Traffic Services maintenance	Maintenance of signs, marker pegs, pavement marking, sight rails, street lighting and power costs
124 – Cycle path maintenance	Maintenance of dedicated cycle paths
131 – Level crossing warning devices	Maintenance of level crossing warning devices
141 – Emergency works	Response and restoration of assets following a damaging natural event
151 – Network and asset management	Management of the road network and asset database
Activity Class - Renewals	Work component
211 – Unsealed road metalling	Replacing wearing course material, pavement strengthening
212 – Sealed road surfacing	Maintenance reseals, 2nd coat seals
213 – Drainage renewals	Renewal of culverts < 3.4 m^2
214 – Sealed road rehabilitation	Pavement overlays and strengthening
215 – Structures component replacement	Renewal of components of bridges, retaining walls, guardrails
222 – Traffic services renewals	Renewal of traffic signs, street lighting, pavement markings

Activity Class - Maintenance	Work Component
231 – Associated improvements	Minor drainage and seal width improvements
341 – Minor improvements	Small geometric road and intersection improvements, sight benching, guard railing, safety lighting

Footpath maintenance and renewal is not an activity subsidised by the NZTA, and therefore funded by Council as a non-subsidised activity.

In general, funding of maintenance is set to match the long-term needs established by the maintenance programs set out in this Asset Management Plan.

7.1.1.3 Asset Operations

This section of the Asset Management Plan covers asset operational activities associated with:

- Professional Services.
- Asset Management Systems.

Asset operations are activities that do not have a direct physical effect on asset condition but are necessary to keep the asset appropriately utilised by the timely and professional input of engineering knowledge and the use of asset management systems. This activity distinguishes it from maintenance activities, which directly affect asset condition and performance. Costs such as power supply to street lights and professional services are often defined as operational costs.

7.1.1.4 Professional Services

Professional services for most renewal and new improvement works are regarded as project related and form part of the overall cost of those projects.

The current structure of the infrastructure services originated from a review undertaken in 2009, this saw the development of a shared services arrangement between the Manawatu and Rangitikei District Councils. The agreement provides infrastructure asset management and professional services by Manawatu District Council for the Rangitikei District Council. A number of engineering and administration staff are dedicated to RDC operations with further MDC based staff available as required.

The Strategic Asset Management unit is responsible for providing strategic long-term planning functions, such as the preparation of Asset Management Plans, input into the Long Term Plan, development of forward works programmes and data management.

The New Zealand Transport Agency provides the guidance, via the Programme and Funding Manual, for the setting of fees for Professional Services. Generally professional services provides for the service fees relating to maintenance and operations.

Operational fees include the professional services necessary to:

- Manage the Roading network, including all maintenance activities;
- Prepare contracts for the works and services needed to deliver the agreed levels of service;
- Legalise existing road reserves;
- Produce project feasibility report (PFRs) for capital projects;
- Investigate rehabilitation; and
- Manage preventative maintenance.

NZTA Work Category 151 – Network and Asset Management under the Council's subsidised Land Transport Programme is where funding is sourced for professional services for Activity Class 8 – Maintenance and operations of Local Roads. This category does not include emergency reinstatements.

For the other main activity classes associated with the Council's subsidised Land Transport Programme 10 – Renewal of Local Roads, and 12 New and improved Infrastructure for Local Roads, professional services costs form part of the individual work category budgets that fall under these categories.

Professional services costs incurred by the Council's Roading Strategic Asset Management team, and any external consultants the Council engaged, qualify for NZTA subsidies as long as the activities themselves are subsidised. For example, footpath maintenance is not a subsidised activity so any professional services relating to this activity do not qualify for subsidy.

Professional services costs for non-subsidised activities are fully funded by the Council, including professional services and system costs for all unsubsidised maintenance, renewal or improvement works. These costs are reflected in the financial forecasts in the Financial Summary section of this AMP.

7.1.1.5 Asset Management Systems

The primary asset management system in use is RAMM (Road Assessment and Maintenance Management), which is the main repository for all of the Councils Roading asset inventory and condition rating information. RAMM software has been developed over a number of years and is used by most Road Controlling Authorities in New Zealand to manage their Roading assets.

This system, combined with integrated predicted deterioration modelling functions and asset valuation modules, provides the asset information to produce this plan, and to operate and manage the network.

The software is developed and supported by RAMM Software Ltd, Auckland.

7.1.2 Contractor Performance

Council actively monitors the performance of the contractors, internal professional services unit and consultants to ensure that the performance standards defined in contracts are continually achieved. Contract 903 Road Network Maintenance includes specific network surveillance and condition monitoring as part of the overall network monitoring programme.

7.1.2.1 Monitoring

The following table lists the main asset and condition monitoring systems in place for the major asset groups.

Table 33: Asset Monitoring Systems

Asset Category		**Monitoring**
Roads	Road Pavement	Network Inspection: Inspections by road maintenance contractor ranging from weekly to monthly based on road type Daily monitoring by Council Roading staff RAMM Rating; All sealed roads carrying >500 vpd – rated as per RAMM process 10% of the remaining sealed local road network rated annually so that all are rated once every two years Roughness, Skid Resistance, Surface Texture, Pavement Rutting surveys on major routes and other roads carrying > 500 vpd are conducted three yearly Unsealed roads are currently not rated
	Footpaths	Annual inspection of 100% of network by Roading staff and contractor
Drainage	Culverts (<3.4m2)	Routine visual inspection included in network inspection by road maintenance contractor and Council Roading staff.
	Kerb and Channel	Routine visual inspection included in network inspection by road maintenance contractor and Council Roading staff. RAMM Condition rating of 100% of Network at 3 year intervals (last in 2013)

Asset Category		Monitoring
	Sumps	As part of cyclic cleaning programmes
Structures	Bridges, Large Culverts (>3.4m2), Retaining Structures	Routine visual inspection included in network inspection by road maintenance contractor and Council Roading staff Detailed inspection every 12 months, and during and following natural events Detailed 6 yearly structural inspection on rolling cycle
Safety Facilities	Road Markings, Edge Marker Pegs, Raised Reflective Markers	Routine visual inspection included in network inspection by road maintenance contractor and Council Roading staff. Road Markings are repainted annually.
	Signs, Guardrails, sight rails	Routine visual inspection included in network inspection by road maintenance contractor and Council Roading staff
	Street Lights	Monthly night time inspection and annual daytime inspection by street light maintenance contractor

7.1.2.2 Supervision

Regular auditing of contractors and consultants performance is undertaken to ensure performance measures are being met (as detailed earlier in this section of the plan). The Council Roading team audits contractors' performance by measurement and inspection of work and of the Roading assets.

The Roading team has three engineers who are dedicated to the operations and performance of the road network maintenance contract for Rangitikei District Council. They provide an important conduit between the contractor and the engineer to contract in the identification and resolution of any problems or issues as they occur.

The Council's Roading team have daily contact with the contractors to ensure they:

- Keep themselves informed of where the work is being done.
- Inspect work on a daily basis resolving any issues on site.
- Approve work to the Contractor.
- Clarify contract issues.
- Have a crucial role in developing and maintaining the partnering approach and relationships essential to the successful management of long-term contracts, e.g. the road maintenance contract.

7.1.2.3 Quality Assurance

All main contractors, stipulated as part of any contract, are required to submit for approval a Quality Assurance Plan(s) prior to the commencement of the contract that establishes standard and specific quality procedures relevant to the work being conducted. This is particularly relevant for the main on-going road maintenance, road marking and street lighting contracts. For term period contracts, the Quality Assurance Plan(s) are updated each year of the term of the contract.

7.1.3 Renewal Plan

7.1.3.1 Priorities

For the purpose of allocation of available funds, a broad renewal priority order is necessary. The priority ranking is reviewed annually and adjusted to reflect changes in rates of deterioration that affect safety and pavement integrity:

1. Resealing.
2. Bridge replacement.
3. Area wide treatment, road rehabilitation and reconstruction.
4. Footpaths reconstruction and resurfacing.
5. Road signs, markings and street lighting.
6. Other works.

7.1.3.2 Standards

Renewal works comply with the following technical standards:

- NZTA specifications;
- Austroads – Guide to Traffic Engineering Practice;
- Austroads – Guide to the Structural Design of Road Pavements; and
- Relevant Rangitikei District Council Engineering Standards, policies and guidelines.

7.1.3.3 Sub-assets

The lifecycle management plans describe the renewal of each sub-asset separately. Sub-assets can include components that are funded in different work categories. This particular format has been chosen because it allows better understanding of the relationships between the components of a sub-asset and shows clearer links between the renewal of components.

7.1.3.4 Renewal Plans

This section identifies how the renewal and replacement of assets will be undertaken. Renewals are significant works that do not increase as asset's original design capacity or improve its original condition. Works over and above restoring an asset to its original capacity and condition are referred to as New Improvements and as such are separately identified and funded.

Renewals are distinct from routine maintenance activities. The principal differences being that where routine maintenance is an on-going task occurring from day to day and is necessary to repair wear and tear and keep an asset operating safely, renewal works are periodic and often both expensive and extensive. Renewals restore the service potential of the asset consumed by normal use.

Asset renewal is undertaken when an asset, or a significant component of an asset, has reached the end of its economic life. Renewals are normally considered at the level to which components are split for valuation purposes. Work that restores the structural integrity of components e.g. repairs of concrete spalling on a bridge. It is therefore a maintenance activity and an owning and operating cost as defined by NZ IAS 16.

The renewals sections of the Lifecycle Management section of this Plan provides for:

- The renewal and rehabilitation of existing assets to their original size and capacity; or
- The replacement of the entire component of the asset with the equivalent size or capacity; or
- The replacement component of new improvement works, i.e. the portion of the work that restores the assets to their original size and capacity.

The asset renewal plans identify the needs and drivers for renewing assets and the expected times those assets will be renewed or replaced. To do this they identify renewal requirements, develop forward financial programmes. The proposed future renewal strategies for each of those groups are explained – a specific requirement of the Local Government Act 2002. Several issues influence renewal forecasting and the associated works including:

- Wear and tear.
- Climate and climatic changes.
- Trends in usage.
- Accuracy of predicted trends.

- Local economic trends and the diversity of industries.
- Changing technology and availability of materials.
- Changing community expectations.
- Changing of legislation.

Examples of renewals in the Roading context include:

- Resurfacing of sealed and unsealed carriageways.
- Over laying existing pavements with new structural layers.
- Extensive excavation of existing structural layers and their replacement with new material.
- Replacement of kerb and channel, footpaths, street lights or bridge decks at the ends of their useful lives.

The funding of predominately all of the Council's Roading renewal activities is through its subsidised Land Transport Programme as Activity Class 10 – Renewal of Local Roads. This encompasses the NZTA Work Categories 211 to 231. The NZTA does not share the costs of footpath renewals, which are therefore fully funded by the Council.

Renewal works may be undertaken as separate contracts or, depending on the scale of works, be incorporated in maintenance contracts. The method of delivery is irrelevant to this definition. It is nevertheless important that renewal costs be identified separately.

7.1.3.5 Planning Tools

The purpose of cyclic renewal, replacement or rehabilitation strategies is to provide for the progressive replacement of individual asset components that have reached the end of their useful lives. Renewal works should be scheduled to occur 'just when the asset or a component of the asset is worn out'.

In Roading, there is a large asset base with a large number of different contributing asset types and different service lives and use rates. In this circumstance, renewals can be regarded as the work needed to maintain the value of the network over the long term. The timing of renewals is largely affected by the use and the condition of the asset elements. Renewals should extend an asset's life from that originally envisaged.

The overall objective for rehabilitating and renewing pavements is to apply the correct treatments at the optimum time so that the required level of service is delivered whilst minimising total lifecycle costs.

Renewals expenditure levels are set and adjusted on the following bases:

- The age profiles of the assets.
- The condition profile of the assets.
- On-going maintenance requirements and costs.
- The life expectancies of individual asset components.
- Items that warrant no significant expenditure are not renewed and may be scheduled for disposal.

Failure to plan and implement adequate and appropriately timed cyclic asset renewal programmes will result in a decline in the overall standard and performance of the asset or individual asset components. This can lead to increasing costs of ownership over time and a risk to public safety if not renewed or maintained. The Council employs a number of techniques to assist it in establishing the most appropriate time in an assets life for renewal to occur. These techniques include:

Deterioration Modelling

In this context, Deterioration Modelling is the predictive modelling of network components and network use to:

- Generate expected performance curves for asset components over time.
- Generate a list of feasible alternatives for addressing the deterioration of the asset.
- Include the costs borne by road users in the decision making process.
- Optimise the available renewal strategies for different funding levels.
- Prioritise interventions for different funding levels.
- Report on the results of the analyses.

Other procedures based on condition rating surveys have been developed to access the condition of footpaths, kerb and channel and street lights.

Benefit Cost Ratio (BCR)

Benefit Cost Ratio (BCR) analysis is explained in the NZTA Economic Evaluation Manual and is essentially a project level tool. In summary, it considers the costs of various project options over a 30-year period and the user and social costs associated with each option over that time to determine the best option for completing a project.

It is only one of a number of criteria used by the Agency to assess if the work or project is eligible for financial assistance.

Financial Modelling

By law, the Council is required to value all its assets regularly. This accounting procedure also establishes depreciation charges that may be used to fund the renewal of the asset. Valuation and depreciation of transportation assets is discussed further – Financial Management.

The financial depreciation charges obtained by analysis can be interpreted as a statement of the value of the service potential of the asset, or its components, that is lost or consumed through its use. The Asset Valuation Module in RAMM to calculate the replacement cost, depreciated replacement cost and annual depreciation costs of its transportation assets. Historically external consultants have been engaged to supply valuation reports, it is anticipated that this function will be undertaken by the Strategic Asset Management unit from 2015 onward.

In most instances, depreciation is used as a check against other predictions of deterioration, and vice-versa. However, in some cases, such as signs for example, it serves as the best proxy for the behaviour of the asset.

The renewal work and projects in this Lifecycle Plan have principally been developed using data from asset valuations condition rating information from RAMM and on-site inspections. Where data is available, the RAMM valuations utilise this for assessment of remaining useful life.

End of Life Projections

Base lives and remaining lives are determined using the methodology set out in the International Infrastructure Management Manual.

Age and condition profiles are used to determine remaining useful asset lives and forward renewal programmes that are intended to maintain the overall standard of the system. Accurate construction date information for each individual asset is pivotal in creating these profiles.

7.1.4 Asset Improvement Plan

7.1.4.1 New Improvements

The term New Improvements generally refers to new works and is often referred to as Capital expenditure. This results in additional asset capacity and infrastructure to meet:

- Changes in demand for transportation network services under the Council’s control.
- The levels of service and standards that have been adopted by the Council.
- The demands imposed by growth originating from both the Council’s decisions and the private sector.

Improvement works can be carried out by the Council either to improve current levels of service or to meet the demands of growth.

Level of service improvements can be either to remedy current level of service deficiencies, or to meet changed levels of service adopted by the Council. For example, rural seal extensions generally address current level of service deficiencies associated with unsealed roads, whereas construction of off-road cycleways addresses a new or changed level of service.

Improvement works are also vested in the Council by private developers as they complete new urban subdivisions and similar works. Conditions that require new works or upgrades can be established and applied as Financial Contributions under the Resource Management Act, as part of resource consent, or as Development Contributions applied under the Local Government Act 2002. The Council prefers to utilise its development contribution policy, introduced in the 2006 Long Term Plan, for establishing contributions to any new improvements brought about by private development.

Where the improvements required of a developer have recognisable benefits to the wider community the Council contributes pro-rata to the total cost of those works.

The New Improvement sections of the lifecycle management plans identify future new improvement works, and explain the proposed future development strategy in terms of ‘how’ the provision of additional asset capacity will be undertaken. This is a specific requirement of the Local Government Act 2002. In addition, the effects of new improvements vested in the Council are considered, based either on known developments or in high growth parts of the District on trends derived from data gathered during that growth.

In this context, demand forecasting is particularly important as it provides the basis for changing requirements for the service provided and related costs. Demand forecasting also needs to keep pace with the level of new improvements that are introduced and changes in the underlying existing assets.

7.1.5 Disposal Plan

7.1.5.1 Strategy

This section describes how to identify and actively manage assets, which are no longer fit for purpose, and then to programme the most cost effective disposal or removal of those assets.

7.1.5.2 Asset Disposal

Disposal activities are associated with the removal from service of a redundant or surplus 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, etc.).
- Advancements in technology which provide more cost effective options.

To date the only significant disposals that have occurred have been associated with bridges and pavements bypassed where road realignments have occurred. There has also been a small-scale trial of LED street lights involving removal of existing luminaires before the end of their expected life.

7.2 Road Pavements

Pavements are the structural and wearing course layers of a road. They are regarded as the core components of the Roading network's trafficable carriageways. A major failure of a section of pavement can result in the road becoming dangerous and/or impassable.

The purpose of each road pavement is to provide an element of the network that is:

- Appropriate and suitable for the effective and efficient movement of the vehicles and people using or likely to use it;
- Has a suitable all weather surface that is appropriate to its location and function in terms of skid resistance, noise reduction and smoothness; and
- Has a structure suitable to carry legal weight, and most cases over weight, traffic.

Figure 14: Makirikiri Rd, Marton

Pavements consist of four principal components, the sub-grade, sub-base, basecourse and top surface. The composition of these layers differs based on the type, function and locality of the road or street.

The pavement asset is valued in three groups;

1. Formation Layer - the lower structural component consisting of levelled, compacted heavy material.

2. Pavement Layers - compacted layers of graded finer material.

3. Pavement Surface - this could be a thin surface flexible coating such as chip seal or if the pavement is not sealed, the surface will be metal running course.

Based on a total replacement cost of $331 million, pavement assets equate to 60 % of the total of all transport related assets covered by this plan and form the largest single contributing asset group.

The table below shows a pavement asset summary for the Rangitikei District road network.

Table 34: Pavement Asset Summary

Characteristic	Description	Length (km)	Proportion (%)
Length	Sealed	796	65
	Unsealed	429	35
	Total	1,225	100
Land Use	Urban	87	7

Characteristic	Description	Length (km)	Proportion (%)
	Rural	1,138	93
Carriageway Width (RDC minimum standard for rural roads)	Sealed Rural Road > 6.7 m width	104	13
Traffic Volume	Sealed road > 500 vpd	81	7
	Unsealed road > 100 vpd	9	1

Figure 15: Roads by Average Daily Traffic Volume

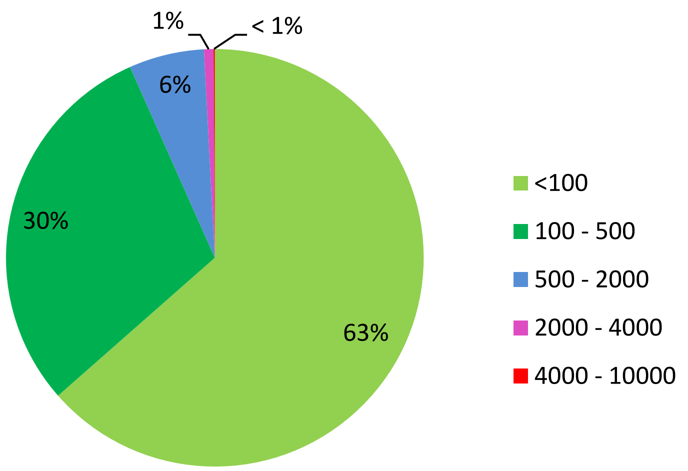


Figure 16: Average Daily Traffic Volumes

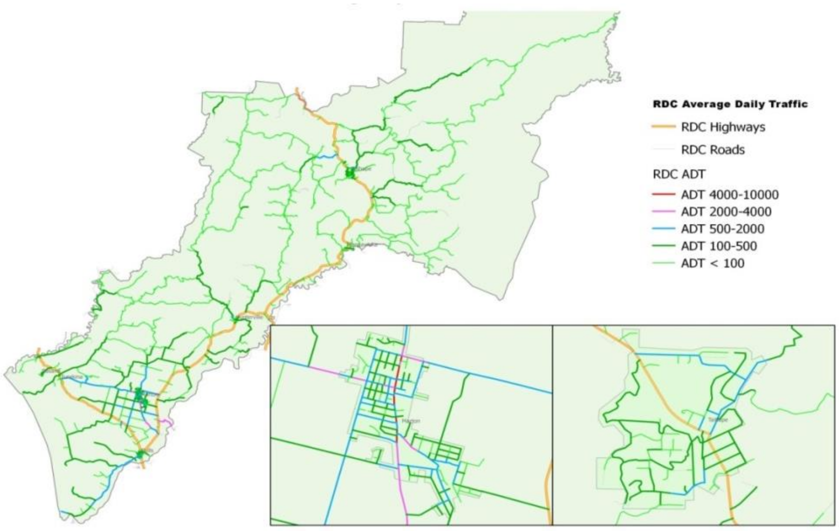


Table 35: Pavement Valuation Summary (1 July 2013)

Component	RC ($)	ODRC ($)	Annual Depreciation ($/year)
Pavement Formation	188,926,928	188,926,928	-
Pavement Layer	110,942,748	39,815,817	1,648,347
Surfacing	31,370,461	11,454,588	2,466,411
Total	**331,240,137**	**240,197,333**	**4,114,758**

Valuation information is from the 2013 Rangitikei District Council Road Asset Valuation Report. Further information on the Asset Valuation is in the Financial Summary section of this AMP.

All of the District's rural sealed roads have chip sealed surfaces with a very small number having thin asphaltic concrete surfaces in specific areas. Both these surfaces are classified as thin surfaced flexible pavements; there are no structural asphaltic concrete or other structural pavements used. If a rural unsealed road is deemed to require a sealed surface, a business case model may be presented to NZTA to attempt to justify how the benefits of the improvements outweigh the long-term costs, in terms of road safety, maintenance and increased traffic loading. For example, a beef or sheep farm is converted to dairying and the advent of tanker-traffic increases the quantity and weight of vehicles on the adjacent road network.

Council does not currently have an ongoing programme to continue with seal extensions of the unsealed road network. However, Council does manage a prioritisation programme for roads suitable for seal extensions for when funding becomes available through the Long Term Plan process.

Current practice is to provide additional strength to a road when it is sealed and to design the pavement for a standard 30-year life. Nearly all of the new pavements that have been added to the network in recent times have come about from new roads and streets vested in the Council by private developers undertaking new urban subdivisions.

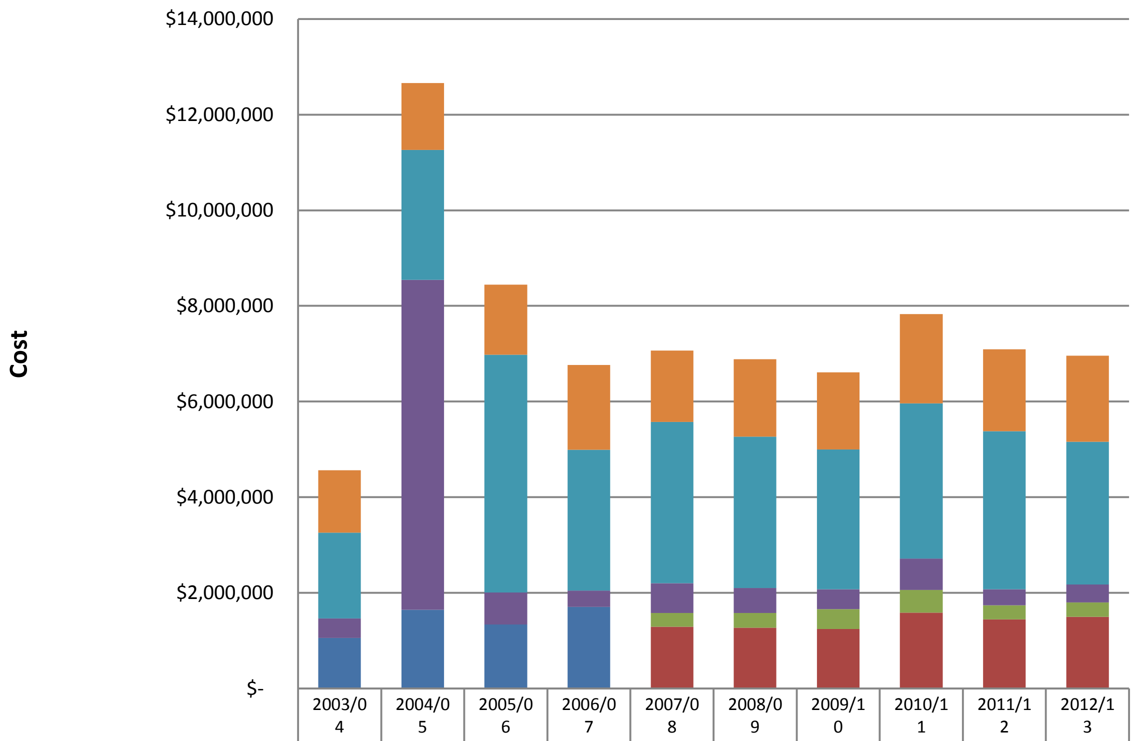
The majority of roads were sealed in the 1950s. Some of the high-volume urban collector and arterial roads have already reached the ends of their lives and have been rehabilitated. The significant increase in traffic that has occurred in recent years is expected to accelerate the need for this type of work. Currently there are plans to widen roads that are being damaged by increases in heavy vehicle numbers, for example, those now being used by dairy tankers where there has historically been none of this traffic.

The key issues relating to pavement management are:

- Maintenance of an accurate inventory of all pavements.
- Keeping routine maintenance to a level that maintains the integrity of the pavement and overall networks.
- Identifying and investigating sections of pavement in need of rehabilitation.
- Ensuring that all necessary rehabilitation is programmed for funding and physical works.

The graph below profiles the expenditure in the pavements activity for the last 10 years. Maintenance funding has continued to focus on historic programme of funding to meet levels of service. Levels of service are under review with the proposed NZTA – One Network road Classification outcomes expected in mid to late 2014. This will result in a re-focus of funding to either meet levels of service or reduce levels of service. NZTA subsidy profiles are anticipated to be established to meet minimum levels of service; therefore Council may choose to increase the local share investment to retain existing levels of service.

Historical Pavement Maintenance and Renewal Costs



	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Sealed Road Surfacing	$1,300,23	$1,397,53	$1,463,76	$1,771,23	$1,495,01	$1,622,64	$1,613,06	$1,865,00	$1,714,74	$1,794,78
Pavement Rehabilitation	$1,791,72	$2,714,00	$4,974,13	$2,946,97	$3,371,80	$3,165,14	$2,927,67	$3,250,00	$3,303,44	$2,988,18
Unsealed Road Metalling	$412,184	$6,901,76	$666,838	$337,720	$618,817	$516,858	$414,375	$650,000	$333,462	$375,068
Unsealed Pavement Maintenance					$287,774	$311,173	$414,748	$475,370	$292,918	$297,488
Sealed Pavement Maintenance					$1,290,56	$1,270,97	$1,242,34	$1,588,37	$1,448,00	$1,500,91
Pavement Maintenance	$1,056,31	$1,645,45	$1,340,03	$1,708,26	$2,119					

7.2.1 Service Delivery

All physical maintenance activities are carried out under contract and Council believes that the current arrangement provides the best solution for maintaining the road.

The Council does not directly employ any physical works maintenance staff to carry out road maintenance activities.

In 2010, the Road Maintenance Contract was rewritten and following an open tender process let to Downer Ltd. The Contract term has completed its 3 year term, and is in the first year of a possible two-year extension, meaning the contract will run until 2015.

Pavement renewal works are all delivered by contract. Some of the required works are included in the Council's Road Maintenance Contract and others are subject to separate project orientated contracts for the delivery of specific physical works such as area wide pavement treatments, minor improvements, and other unsubsidised works and for the delivery of specific professional services as needed.

The contracts generally include:

- Procedures, standards and performance measures. These are defined, but there is flexibility for the contractor to determine the most appropriate materials and methods.
- Requirements for compliance with legislation, e.g. Health and Safety in Employment Act and the Resource Management Act.
- Response times for routine and emergency work occurrences. Response times are defined for notified defects; there are standards by activity type and road type.
- Inspection, programming and reporting requirements.
- Timing and approvals for work programmes.
- Schedules of quantities, except where lump sum based.
- Reporting, claiming, payment and liaison requirements.

7.2.1.1 Sealed Roads

The most common surfacing used is a chip seal, which comprises stone chips embedded in bitumen sprayed onto the basecourse. This surfacing provides the most cost effective and best performing surfacing for thin flexible pavements in the District i.e. thin pavement layers over sub-grades of a moderate to high strength. It is a very cost effective surface due to the availability of stone that can be extracted from local rivers or pits, and crushed to the appropriate size.

The process of applying the pavement with a chip sealed layer to maintain the integrity of the road surface is called resealing. Within the Rangitikei District, the average cycle between reseals is 15 years.

Asphaltic Concrete road surfacing comprises an approximately 30 mm thick dense layer of mixed bitumen and small stone aggregate applied to the basecourse surfacing. It is known for its smooth black finish and is used predominately in new urban subdivisions for its aesthetic properties. It is also used in high wear and high traffic areas because of its durability.

7.2.1.2 Unsealed Roads

In comparison, unsealed roads are quite dynamic in their performance and can have higher maintenance costs. This is because they require more regular intervention to maintain their surfaces and shapes because of the influences of weather and traffic. Unsealed roads have poorer riding characteristics than sealed roads and can create dust nuisances.

The principal maintenance activities on unsealed roads are application of a running course of AP20 metal, which is then re-spread (graded) periodically to maintain an even running surface to vehicles. The rate of metal loss can vary between 10 mm and 20 mm per square metre per annum depending on the use and location of the road.

A typical problem with running course is that as a loose metal that can quickly migrate from the wheel paths, where it is needed the most, to the side of the carriageway under the action of vehicle wheels. While grading does reposition the metal this constant intervention can be considered inefficient.

7.2.2 Pavement Layers

Pavements in the Rangitikei District consist of the following elements:

7.2.2.1 Subgrade

The sub-grade consists of the bulk earthworks required to provide the shape and a firm base to allow the structural components of the road to be built. For the purposes of this section of the Plan, the land on which the carriageway is built and land held for future road construction.

7.2.2.2 Sub-base

Sub-base is a structural metal course laid and compacted on excavated and prepared sub grade, devoid of any organic matter or materials that could consolidate or settle. The sub-base is usually a coarser type of graded gravel, or metal. Typically, it is a pit run material no larger than 65 mm in diameter in layers on average 250 mm thick.

The Subgrade and Sub Base are valued together as the Pavement Formation Area.

7.2.2.3 Basecourse

Basecourse is laid and compacted over the sub-base but to a higher standard. It is the main load-carrying component of the pavement. It also provides the final alignment and shape of the pavement and accepts the surfacing.

The base is made of crushed rock that conforms to a "grading envelope". The size grading allows it to be placed and compacted to higher tolerances than the sub-base. In practice, it is placed in a layer 100 mm to 150 mm or thicker when high loadings are expected.

It is usually specified as M4 AP40, the M4 designation referring to the NZTA specification of that name and the AP40 designation to a material that will pass through a 40 mm aperture sieve.

7.2.2.4 Top Surface

The top surface is the most frequently used means of differentiating between roads and their carriageways. The purpose of the pavement top surface is:

- To shed water, preventing it entering the structural layers underneath.
- To protect the basecourse from the abrasive effects of traffic loading.
- To provide frictional properties for traffic to adhere to.

7.2.3 Operation and Maintenance Plan

7.2.3.1 Goals

General maintenance work is classed as priority work where:

- The safety of road users may be compromised.
- The required level of service has fallen below the prevailing level for the adjacent parts of that section of road.
- It is likely that the area of distress may expand so that the road is incapable of providing the required level of service and a renewal or upgrade will then be required.
- The scope of repair work would change to be become significantly more expensive, if left to deteriorate further.
- Subsequent maintenance, renewal or new improvements work depends on the completion of the planned maintenance repair.

A suitable level of preparedness for prompt and effective response to asset failures and emergencies is maintained by ensuring the availability of suitably trained and equipped staff and service delivery contractors. This is provided through specific requirements detailed in maintenance and other Roading contracts.

The initial, practical and objective response to asset failures is to restore service as quickly as possible by the most economic method available. This may mean having to make temporary repairs if major repairs or renewals are required.

The Council's operations and maintenance strategy is to implement the most cost effective maintenance options through:

- Adequate monitoring the condition and performance of assets;
- Investigation of any system deficiencies which are outside the parameters of the target level of service; and
- Identification of the most appropriate work required to correct defects.

To achieve this, assets are monitored through routine proactive inspections, testing, and analysis of customer complaints and condition reports. Service levels are managed by assessing the consequences of asset failure and assessing the levels of customer expectation. Asset ownership costs are minimised by identifying, evaluating and introducing new technologies and equipment that may improve operational and management efficiencies.

Exposure to risk is managed by maintaining up to date fault detection systems and providing a prompt and effective response to system failures. This exposure is also minimised by maintaining insurance on key insurable assets, undertaking structural checks of key assets and controlling environmental impacts.

A partnering approach is sought and encouraged between the Council's staff, consultants and contractors; its aim is to provide make effective use of resources, systems and procedures by taking collective ownership of these matters and transportation network.

7.2.3.2 Processes

The Council's contract specifications establish the adopted technical levels of service, which in turn deliver the agreed customer levels of service, thus applying the Long Term Plan's Community Outcomes to transportation.

Contract No. 903 is the Council's Roading Maintenance contract. It commenced in 2010 with a contract period of three years with a two-year right of renewal. It covers maintenance and renewal work associated with sealed and unsealed roads, bridges, traffic signs and markers, and footpaths.

Roading work is required to conform to a number of funding guidelines, which are set out in an annual Land Transport Programme Relationship Protocol between the Council and NZTA. The Council Engineer ensures that the road network is maintained to the specified standards while staying within the approved budgets. Individual carriageways may be below the specified standard for short periods, but this is only permitted if the road user is not unduly affected. For example, minor patching work may be undertaken to hold over a pavement until the full repair is done. If the work is deemed urgent it will be carried out, even if this means that there is expenditure over the budget or other less important work has to be deferred to keep overall expenditure under budget. Safety related work always takes priority.

Generally, the budgets have been based on historic and predicted trends, and set at levels that permit the maintenance work necessary during the year to be done.

Agreement is established around three sets of maintenance guidelines, achievement of which is measured against:

- Safety.
- Asset preservation.
- Road user satisfaction.

The Council reports these measures and progress towards these achievements to the NZTA at regular intervals.

Response times are set in the maintenance contracts, and the actual performance of customer-raised queries is recorded through the Council's Service Request System.

The contractor receives requests for service through this system, and notifies of the completion of a request utilising the same system. Regular audits are undertaken to identify any outstanding issues and to ensure that the work has been done as required and that it meets specification.

7.2.3.3 Reactive Maintenance

A suitable level of preparedness is maintained allowing prompt and effective unscheduled responses to emergencies and asset failures. This is achieved by ensuring the availability of suitably trained and equipped staff and service delivery contractors.

The initial response to asset failures is to restore service as quickly as possible using the most practical and economic method available. Temporary repairs will only be made if major repairs or renewals are time consuming to complete. Response requirements for routine maintenance activities and emergency events are listed in specific maintenance contracts.

7.2.4 Renewal Plan

7.2.4.1 Goals

The overall objective for rehabilitating and renewing pavements and pavement surfaces is to apply the correct treatments at the optimum times so that the required level of service is delivered and total lifecycle costs minimised. The required level of renewal will vary depending on:

- The age profile of carriageway surfacing and structure.
- The condition profile of carriageway.
- The level of on-going maintenance demand.
- The differing economic lives of the materials used.
- Traffic growth.

7.2.4.2 Identification of Work

Sealed Roads

Rangitikei District Council has historically operated a rolling forward works programme based on the expected life of the surface to identify reseal sites. Treatment sites and forward work programmes for sealed roads are identified through:

- Analysis of road inventory and condition information held in the RAMM System.
- RAMM Treatment Selection - This technique identifies carriageway sections based analysis of average lifecycle data for broad treatment options, the volume and mix of traffic using the road, pavement condition, roughness, and maintenance costs. It provides a forecast over a three-year period for short term planning processes.
- Contractor and Council staff inspections.

The strategy adopted for renewing sealed surfaces is to reseal pavements as close to the possible to the end of each seal coat's economic life. This is determined by the condition of the pavement and demonstrated by factors such as:

- Crack initiation because of brittle binder;
- Loss of binder adhesion and stone loss;
- Lack of water proofing resulting in potholes and other failures;
- Loss of macro texture resulting in loss of skid resistance; and

- Loss of surface integrity, especially if the existing seal has been subject to potholing, trenching, edge break and dig out repairs.

The following factors affect material selection:

- Traffic volume, percentage of heavy vehicles, and road geometry, and adjacent land use zoning.
- The flexibility of the existing road formation; e.g. thick asphalt is a semi-rigid material and requires a specific design if laid on a flexible foundation or on a pavement formation of insufficient strength to accommodate vehicle loading stresses.
- The proximity of dwellings to the carriageway and potential for noise nuisance.
- Road pavements that are structurally sound but have unacceptably rough surfaces can be rehabilitated by the application of a levelling coat of asphalt.
- A trend towards increased use of thin asphaltic concrete surfacing on main roads in townships to reduce surface roughness, traffic noise and bitumen tracking to improve street amenity.

Nevertheless, after consideration of all these factors, chip seals remain the predominant sealed surfacing on urban and rural roads in the District however, use of asphaltic concrete surfacing is increasing in urban areas.

Figure 17: Road Pavement Flushing

This site shows surface deterioration called flushing. Resealing of this site is the most preferable option for repair of this issue.

Roads for resealing are identified or selected as follows:

- Potential reseals are short listed according to:
    - Seal lifecycles
    - RAMM Treatment Selection Algorithm output
    - Individual road section maintenance histories
    - Second coat seal requirements (i.e. the need to reseal over first coat seals resulting from seal extensions, and seal widening projects, reconstruction and rehabilitation works).
- All short listed sites are inspected by suitably qualified and experienced staff and the priorities suggested from the preceding steps adjusted as appropriate.
- Coordination with other works such as utilities maintenance and renewal works in a forward works programme.

Unsealed Roads

Unsealed roads usually require pavement renewal for one of two reasons:

- Failure of the pavement structure in a similar manner to that which occurs on sealed pavements; and
- Insufficient renewal of the metal surface, resulting in traffic running on the pavement structural layers, eroding and damaging them.

Unsealed roads pavement renewals are identified through inspection, network knowledge and maintenance issues, as discussed previously.

7.2.4.3 Renewal Practices

Pavement renewal on sealed roads is often carried out because of failure of the pavement and resultant rough surface and poor ride. Currently the network has no significant sections of road that have roughness counts high enough to cause sufficient discomfort or increased road user costs to justify pavement renewal on this basis alone. Rather, renewals are more likely to result from an inherent structural failure of the pavement.

Recent NZ research (2007) is showing that rutting of sealed surfaces is a better indication of pavement life, and that the onset of rapid rutting is a reliable indicator of the end of a pavement's life. There is more research being carried out on this subject nationally at present. The Council will continue to monitor this research with a view to enhancing its ability to forecast renewal requirements. If this research is proven reliable then the models used in dTIMS software to predict the deterioration of the sealed road network are likely to be updated to include this indicator.

The Council is often unable to obtain sufficiently high benefits to justify pavement rehabilitation on a benefit cost ratio basis. However, the roads that will require renewal works typically have high maintenance costs, and rehabilitation of these sections is usually justified using least-cost analysis techniques. Similar problems are not encountered with obtaining financial support for resealing.

The types of renewal work undertaken are discussed below.

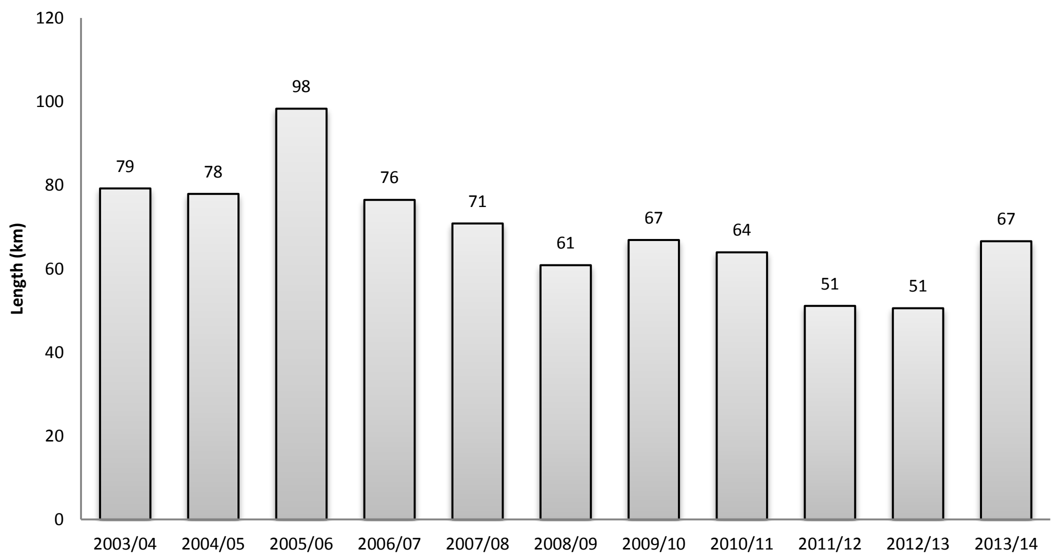
Re-seals

As seals become old they become more brittle and tend to fracture under traffic loadings, this allows the ingress of water and leads to the formation of potholes, and in the worst cases, to failure of the pavement structure.

The predominant resealing technique used is chip sealing. It is used predominately on rural roads; however it was also common to use it on urban streets up to 20 years ago.

Asphaltic concrete (AC or hot mix) is used as a more resilient surface where there are high turning stresses e.g. cul-de-sac heads, intersections and in commercial and industrial areas. They are chosen for use in urban areas from both an aesthetic perspective, to reduce road noise to adjoining properties, and to address the bleeding of bitumen in hot weather that occurs with new chip seal reseals and that can cause damage to floor coverings when it is carried into buildings on the soles of footwear.

Figure 18: Resurfacing Lengths (2003-2014)



The following two graphs show the significant increases in the costs to carry out the annual reseal programme. Fluctuations are due to contract pricing which is heavily influenced by the cost of bitumen at the time of tender.

Figure 19: Resealing Costs (2003-2013)

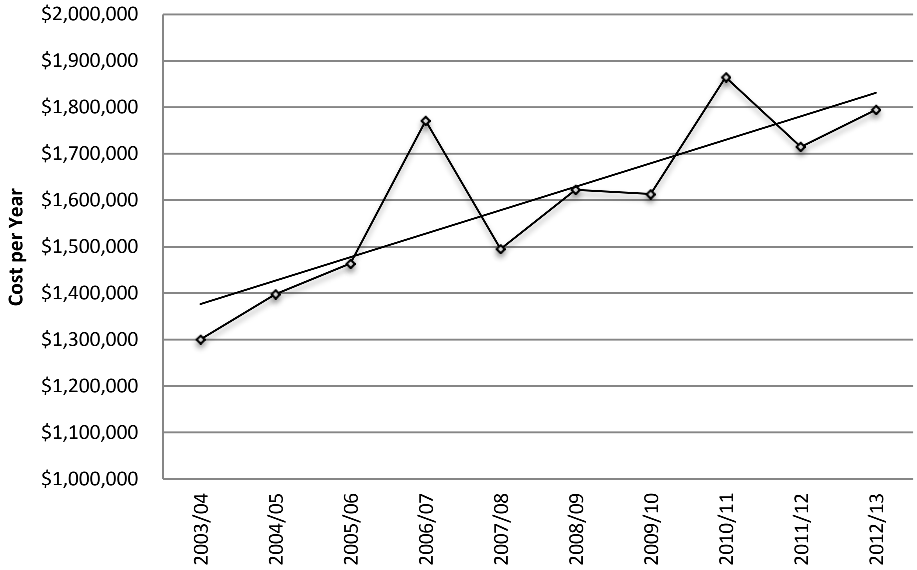
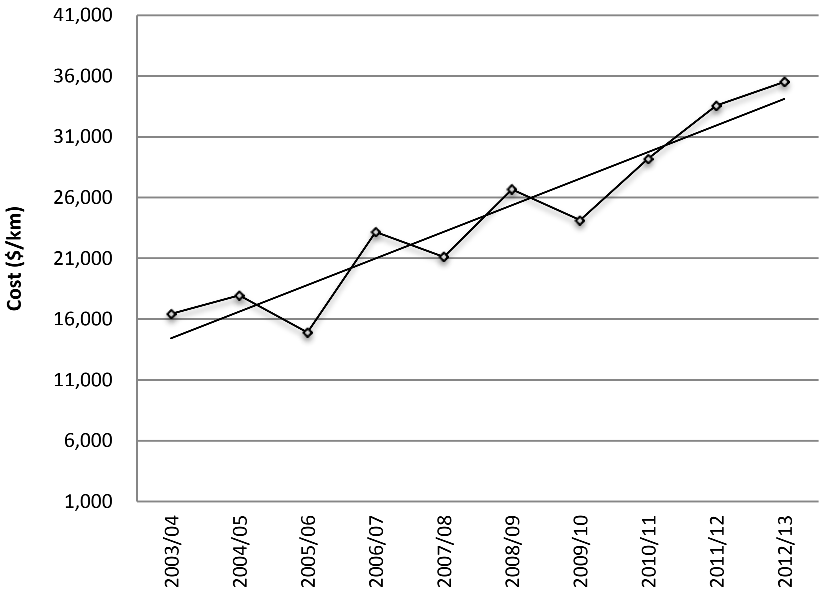


Figure 20: Resealing Cost per Length (2003-2013)



Granular Overlay/Rehabilitation

These techniques are used where only parts of the pavement are exhibiting distress and it is more cost effective to repair only these areas. The life of a pavement is extended by construction of an additional layer of basecourse, with a sealed surface, on top of the pavement that has reached the end of its useful life. This technique is generally referred to as an Area Wide Pavement Treatment and used predominately on rural roads.

This technique can be unsuitable where there is existing kerb and channel, such as in urban areas, as it builds up the crown of the road or street so that the resulting crossfall becomes too steep preventing residents' vehicles from accessing their properties without "bottoming out". In these circumstances it is usually more efficient to carry out a full reconstruction as described below and replace the pavement, and often the kerb and channel, to the appropriate levels.

The following graphs show the length of pavement rehabilitation work that has been carried out on the road network in recent times along with annual costs. The average length of pavement rehabilitation carried out since 2004 is 12.3 km per annum.

Figure 21: Pavement Rehabilitation Lengths (2004-2014)

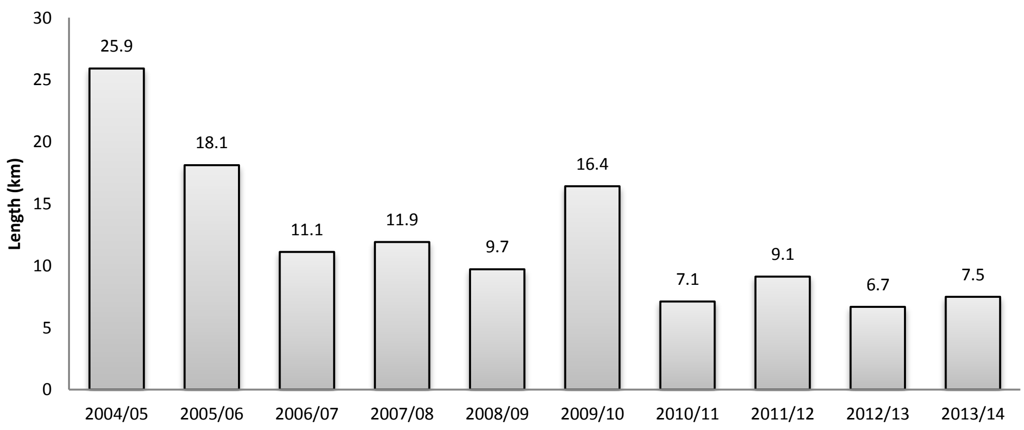


Figure 22: Pavement Rehabilitation Costs (2004-2014)

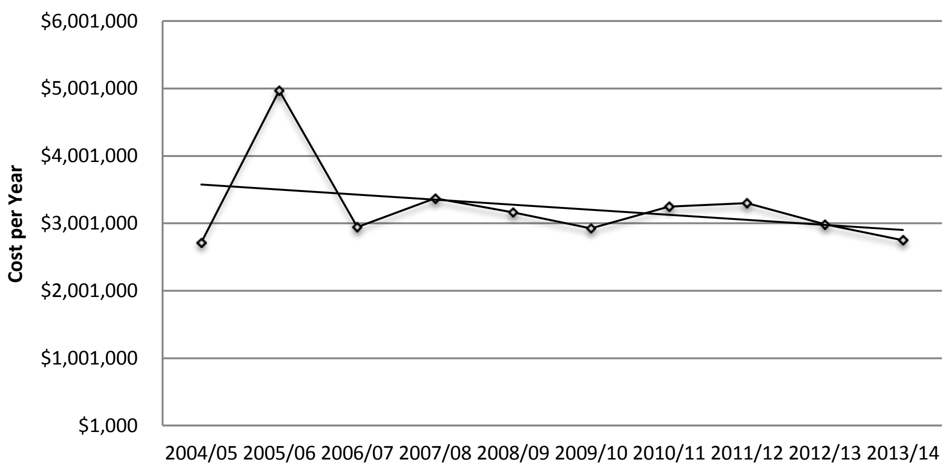
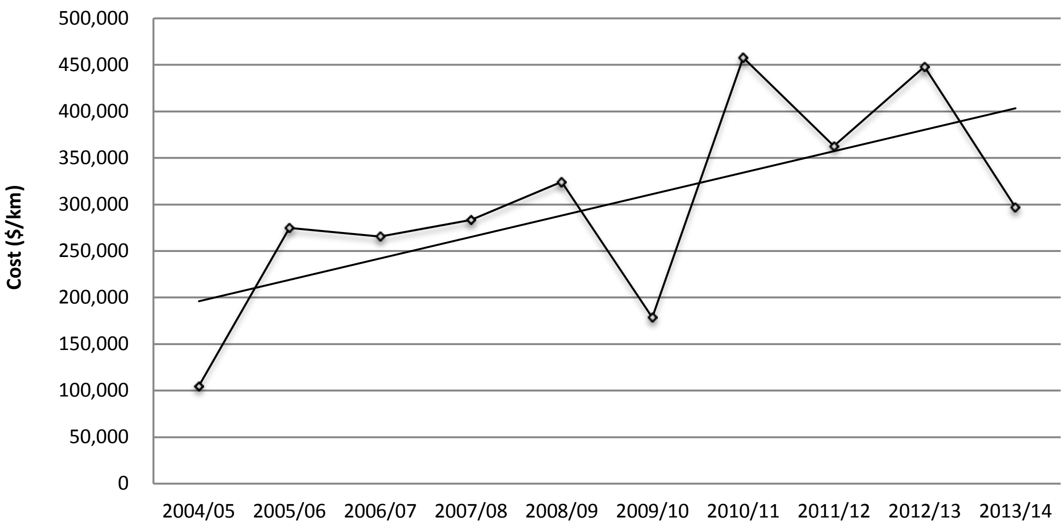


Figure 23: Pavement Rehabilitation Cost per Length



Pavement Rehabilitation costs can vary significantly between urban and rural sites. The data above is intended to show the trend over time.

It is interesting to note that, in simple terms, based on a 796 km sealed network with a 75-year lifecycle, the average annual renewal demand is approximately 12 km. The amount of renewal work carried out over the past four years is lower than this theoretical requirement. This could suggest that the condition of the network has not warranted such a level of renewal expenditure or that the asset is being allowed to deteriorate.

Based on NZTA figures traffic growth is static across the District. However, the small percentage of heavy vehicles in comparison to light vehicles does not feature in the NZTA data. With the increasing demand for higher production from the agriculture and forestry sectors, heavy traffic movement across rural roads is likely to increase placing increasing demands on pavements to perform. The use of dTIMS will become an important tool to assess these impacts on the sealed road network and may very well show that funding needs to be increased for pavement renewal works in the future.

Full Reconstruction

This is the removal of the existing basecourse and/or sub-base and its replacement with new metal courses and a new sealed surface. This is the most likely technique used on urban streets and generally involves renewal of kerb and channel and in some cases catches pits and pipes to storm water mains, footpaths and berms. If a full reconstruction is carried out this is often undertaken in conjunction with replacement of other utility services such as storm water and sewer mains.

Renovation

This increases the strength of existing basecourse/sub-base materials by chemical stabilisation such as adding a stabiliser (hydrated lime or cement) and re-compacting the material.

This involves the pavement being ripped or broken up in-situ and re-laid in place by heavy plant. This technique can incorporate blending in new materials such as cement and stabilisation measures. This is used when the existing pavement formations can be reused in a reconstituted manner.

Smoothing

Irregularities in the road surface, where the structural condition of the carriageway is sound, are smoothed by placing additional (thick) surfacing on an existing sealed surface to smooth out irregularities. The materials used depend on traffic volumes/road geometry and road condition. The most commonly used materials are cold emulsion mix and asphaltic concrete.

NZTA Work Category 214 - Sealed Road Pavement Rehabilitation and 324 - Road Reconstruction are the specific categories that encompass these types of work. They have previously been generally referred to and categorised as Shape Corrections.

Standards and Specifications

The Council's standards and specifications for renewals reflect the best and most appropriate use of current technologies, in accordance with national standards and legislative requirements as detailed previously in conjunction with maintenance and operational activities.

7.2.4.4 Prioritisation

In addition to the pavements condition and likely remaining useful life, i.e. its ability to deliver the agreed level of service, consideration is also given to the needs of other adjacent assets that may require attention soon. For example:

- If a road is getting near the end of its life and the sewer running below it is due to be replaced in two years requiring extensive works in the road, then the road renewal works could be programmed to coincide with the sewer works. Alternatively, if the road works were more urgent the sewer works could be brought forward.
- During upgrading of older urban streets, the opportunity is usually taken to combine the renewal of all the urban Roading asset components such as footpaths, kerb and channel, street lights and the pavement. This has proven to be an economic and practical approach and is commonly referred to as a "street upgrade".

The District's roads and streets are important corridors for the location of non-Roading services and they need to be considered when planning pavement and street renewal works. In urban areas the streets take on even greater significance for these services, which can include:

- Sewers.
- Water supply reticulation.
- Storm water drainage networks.
- Electricity, telephone poles, street light poles and associated cables (overhead and underground).

Implementation of the "Code of Practice for Utilities Access to the Transport Corridor" should assist with more integrated planning of works in future.

For the purpose of allocation of available funds, a broad renewal priority order has been adopted. This is a guide only, and is varied as circumstances warrant. The priority order reflects the goals of safety and road efficiency:

- Resealing.
- Bridge replacement.
- Area wide treatment, road rehabilitation and reconstruction.
- Footpaths reconstruction and resurfacing.
- Road Signs, Markings and Control Structures.
- Car Park Resealing and other works.

7.2.4.5 Renewal Programme

Reseals

The process used to identify sites for annual resealing programmes is to:

- Identify the candidate sections of carriageway based on a comparison of age and expected life, suggested treatment or intervention from RAMM Treatment Selection and knowledge of the network.
- Examine forward works programmes, including those of other network utilities such as water and sewer, for clashes or other factors that may influence the decision to reseal.

- Confirm and prioritise sites following site inspections and inter-programme coordination.

- In selecting the most suitable surfacing material for each category of road the impact of that material on the total pavement life and the lifecycle cost are considered.

The length of sealed roads increases occasionally due to seal extensions and new subdivision roads.

Renewal Programme – Rehabilitation and Reconstruction

The following theoretical expected lifecycle and average annual long-term renewal requirements for the network were established from analysis of the Council's 2013 Roading Asset Valuation.

Table 36: Pavement Renewal Requirements

Pavement Structure	Length (km)	Average Width (m)	Expected Useful Life	Length (km/year)	Area (m^2/year)
Sealed Rural roads	712	5.6	75	9.5	53,163
Sealed Urban Roads	84	8.7	75	1.1	9,744
Unsealed Rural Roads	426	3.7	100	4.3	15,762
Unsealed Urban Roads	3	3.5	100	0.03	105
Total				**14.9**	**78,774**

The quantity of recent and projected pavement renewals is lower than the theoretical annual renewal length. As discussed earlier there are no condition indicators that suggest that the network is deteriorating from lack of maintenance, the current approach to selecting pavement rehabilitation sites is as follows:

- Identification of carriageway sections based on RAMM Treatment Selection Analysis, which analyses average life data for treatment's option, the volume and mix of traffic using the road, pavement condition, roughness and costs.

- Larger sections, and those requiring funding outside normal allocations, require justification under the NZTA's project evaluation criteria, which generally require a project to obtain a BCR greater than 4 to be considered eligible. With the network's very low roughness counts, even on pavements that are at the end of their lives, it is often difficult to obtain the required "benefit" to justify the work. Rehabilitation and reconstruction work is therefore often justified by showing that it is the least cost option for the Council and the NZTA (this approach differs from BCR in that road user benefits and costs are not considered).

- The type of treatment, its need and priority identified from RAMM outputs are confirmed through a physical inspection of all candidate sites, good knowledge of overall network condition , and technical assessment by experienced staff, and where required consultants, using sound engineering principles.

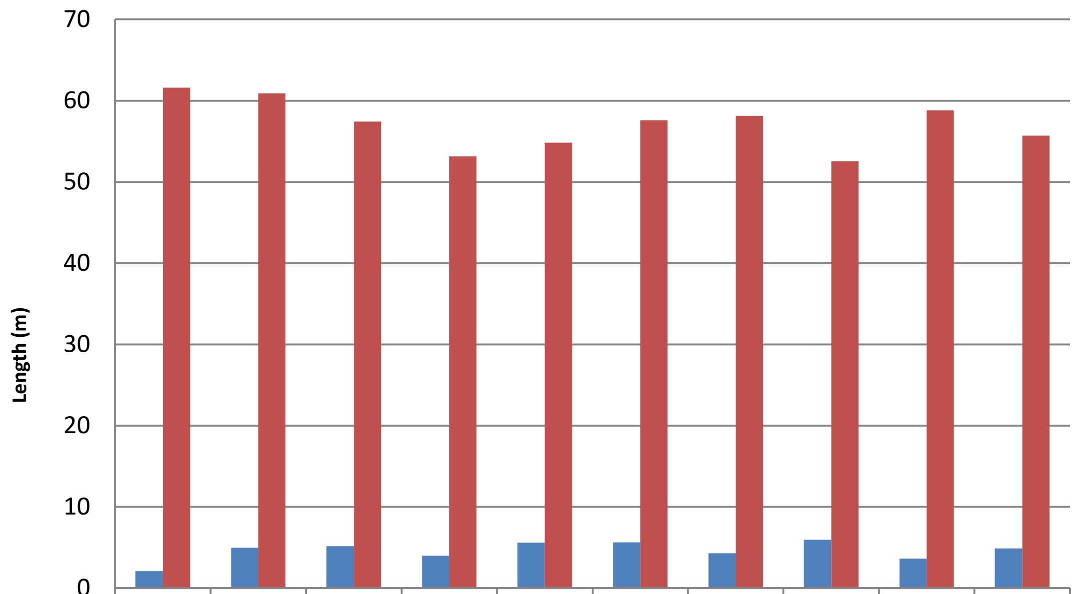
- Any works failing to attract NZTA financial assistance for specific funding are be considered for an alternative strategy of “heavy maintenance repairs” or other repair strategies to improve the pavement before resealing.

Rural roadside drainage programmes are undertaken by the maintenance contractor and have been established to improve drainage and reduce the risk of pavement structure failure due to moisture ingress. This involves a cycle of reshaping surface water channels / swales.

The following graph shows the forward works programme for both annual reseals and pavement rehabilitation works.

The Forward Work Programme plan and has been based on outputs from RAMM and RDC staff local knowledge following validation of the top surface and treatment length data in 2014. Prior to 2014, a system independent of RAMM was used to generate the annual programmes.

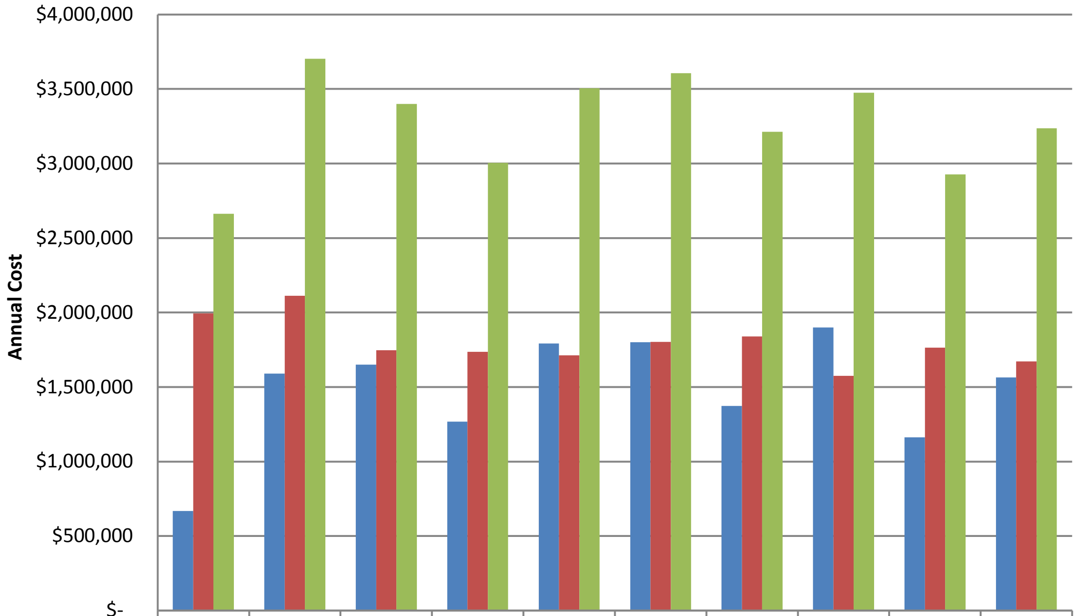
Figure 24: Forward Work Programme – Resealing and Pavement Rehabilitation



	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Rehab (km)	2.1	5.0	5.2	4.0	5.6	5.6	4.3	5.9	3.6	4.9
Reseal (km)	61.6	60.9	57.4	53.1	54.8	57.6	58.1	52.5	58.8	55.7

The following graph shows the forecasted annual expenditure of the reseal and pavement rehabilitation programmes based on current contract rates.

Figure 25: Forecast Expenditure – Resealing and Pavement Rehabilitation



	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Rehab	$669,120	$1,591,3	$1,651,5	$1,268,1	$1,792,3	$1,801,2	$1,373,7	$1,899,8	$1,161,9	$1,565,4
Reseal	$1,994,5	$2,111,8	$1,748,3	$1,735,9	$1,712,6	$1,804,0	$1,839,4	$1,576,0	$1,764,3	$1,671,0
Annual Total	$2,663,7	$3,703,2	$3,399,8	$3,004,0	$3,504,9	$3,605,3	$3,213,1	$3,475,8	$2,926,2	$3,236,4

7.2.4.6 Assumptions

Initially the need for renewal works may not be so obvious compared to those associated with maintenance but the consequences of not recognising, planning and forecasting for the appropriate interventions can create a significant and expensive long-term problem. These may include:

- Annual sealed road renewal costs will increase proportionately and annual metal road renewal costs will decrease proportionately, with the length of seal extension completed in the previous financial year.
- There will be no growth in unsealed road length. This is a reasonable assumption, as the Council's policy is all new developmental Roading shall be sealed.

7.2.4.7 Traffic Capacity

As a whole, the network is not stressed, in terms of its ability to cope with present and foreseen demands. However, there are sections where its capacity is under pressure. This is evident from the following:

- Inadequate seal width for current traffic volumes and types of traffic evidenced by the increased need to repair the edges of some roads (e.g. edge break, edge rutting repairs), by an increase in concerns over safety of passing of heavy vehicles and an inability to pull onto the shoulder on some roads. Lack of safe travelling-space for both cyclists and motor vehicles on some routes.

- Concerns over the inability of opposing vehicles to pass safely on some increasingly busy unsealed roads and the lack of visibility for following-vehicles on these roads.

7.2.4.8 Seal Widening

When assessing sites for seal widening or pavement rehabilitation RDC staff consult the NZTA Geometric Design Manual for guidance on minimum design widths this is generally for roads carrying more than 500 vpd.

There is currently there is no formal programme in place to identify carriageway sections which may require widening. Historically roads have been widened on an ad hoc basis or during pavement rehabilitation projects.

This item has been added to the RDC Improvement Plan so the need for widening roads can be assessed following a formalised process.

7.2.4.9 Seal Extensions

Based on current analysis there is little to suggest that it is economically viable to seal any unsealed roads within the District. Seal extension sites are assessed on a case by case basis and are normally initiated from ratepayer requests such as a steep inclined road.

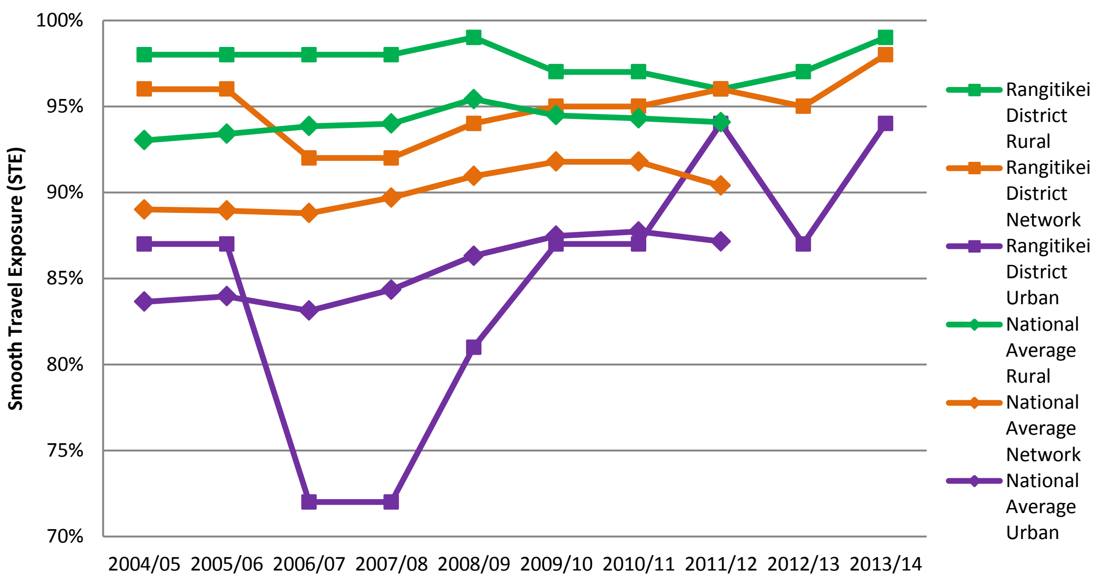
7.2.5 Condition, Performance and Capacity

7.2.5.1 Condition

The principal measure of sealed-road performance in New Zealand is “Smooth Travel Exposure”. The parameters for measuring smooth travel exposure are established by the NZTA and the Council is required to report on it annually to the Agency, as one of the conditions for receiving financial assistance for road work. The information from all local authorities is then published on the NZTA website for public use.

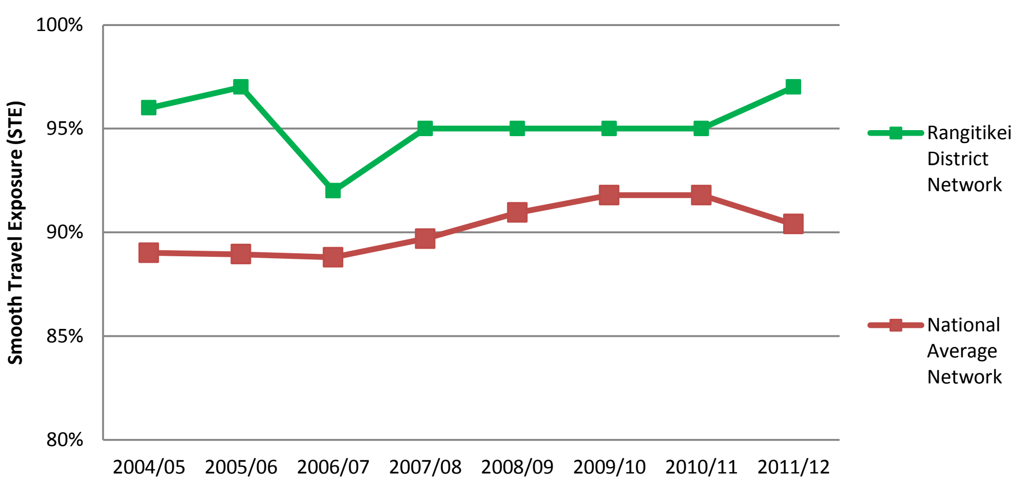
The condition of the sealed network since 2004, as measured by Smooth Travel Exposure, is summarised in the following graph. It is however, likely that the RDC urban trend line has been calculated from erroneous or inconsistent information in historic data.

Figure 26: Smooth Travel Exposure Trends



The following graph gives a less cluttered view of the comparison trends between the entire RDC network and the National Average for local authority networks.

Figure 27: Smooth Travel Exposure – Comparison with National



On the District's sealed roads the quality of ride overall is very good with high exposure to travel on smooth roads above that of the national average; or in other words, roughness across the sealed network is generally quite low.

7.2.5.2 Performance

The level of service performance measure for sealed roads is that the average roughness (NAASRA count) should be kept below a level of 100 (a NAASRA count of over 110 for a sealed road is considered as rough and may generate complaints).

In early 2014, Council engaged a specialist company to carry out a high-speed data collection survey on selected sealed roads. The survey provided data for roughness, skid resistance, surface texture and curve geometry along with a high definition video record of the roads surveyed. The last time a similar survey was carried out in the Rangitikei District was in 2011.

In comparison, the 2014 data shows improvement over the 2011 data in the average roughness readings for both urban and rural roads. Average readings are well below the defined Levels of Service.

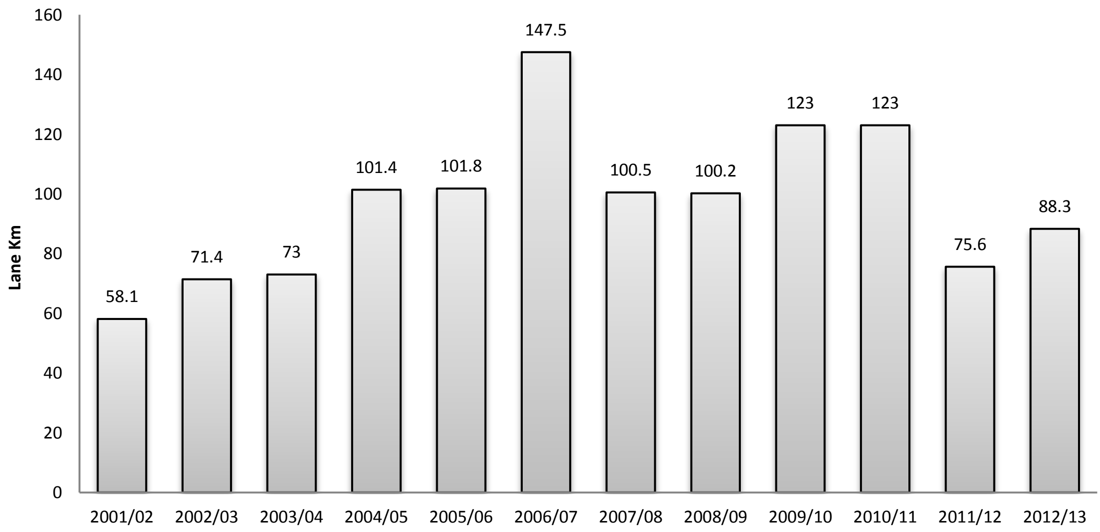
Table 37: Roughness by NAASRA Count

Survey Year	Average NAASRA Count	
	Urban	Rural
2011	99	77
2014	93	73

Higher average NAASRA counts for urban roads reflects the presence of utility trenches, manhole covers and other surface irregularities not found in such high concentrations on rural roads.

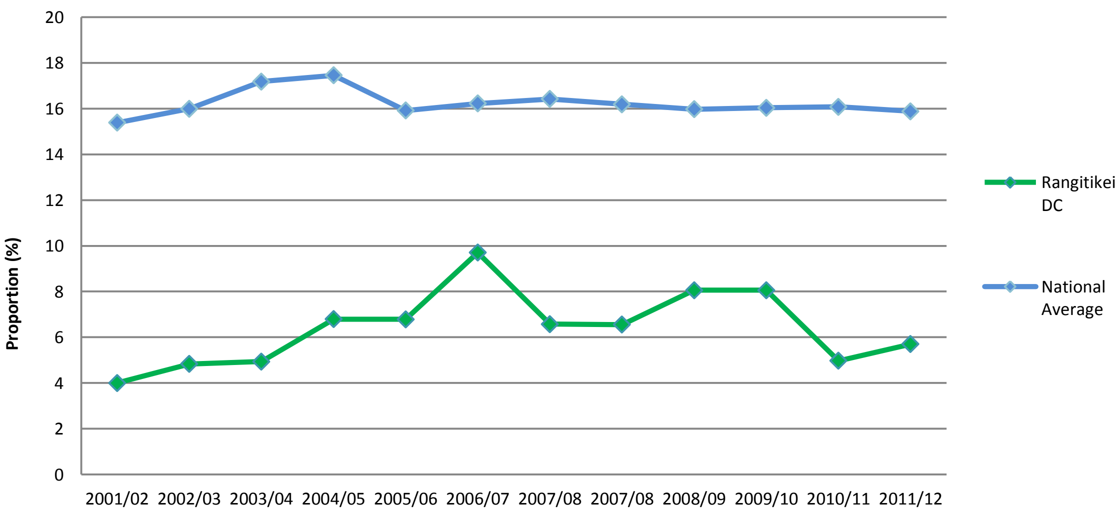
The following graph shows the number of NAASRA counts exceeding 150 per lane kilometre surveyed. This differs from the data above in that it shows how many instances per lane km that the NASRAA count exceeds 150, rather than the average of each of the actual readings.

Figure 28: NAASRA Counts > 150/lane-km



To give some context to this data, the information can be displayed as a percentage of counts exceeding 150 over the length of the network surveyed and used in comparison against the national average. The results are slightly skewed as all networks are considered in the national average, with some being predominantly urban and having a disproportionately higher percentage of rough roads in comparison to predominantly rural networks.

Figure 29: Proportion of NAASRA Counts > 150/lane-km by Length



Other measures are made of sealed road condition, in addition to roughness are:

- Shoving.
- Rutting.

- Cracking.
- Flushing.
- Potholes.
- Edge break.
- Scabbing.

Every two years condition surveys are undertaken over the complete sealed road network. These surveys, known as RAMM Rating Surveys, provide a 10 % representative sample of the complete network. They are carried out in accordance with tightly defined criteria established by the NZTA in conjunction with all road controlling authorities. The data is gathered by a visual inspection rather than by electronic equipment used during high speed data collection survey.

All rating, roughness surveys and other measurements are subject to strict quality control and are carried out by trained specialist contractors/consultants.

Ride quality assessments for the unsealed network can be difficult because of on the inherent dynamic and fluctuating nature of those roads' surfaces. The condition of the unsealed network is assessed during routine inspections rather than using the sophisticated high speed data recording equipment used to provide NAASRA roughness and other sealed surface data.

7.2.5.3 Capacity

Structural

The bulk of the network is coping well with the current traffic volumes and loadings as routine maintenance and scheduled resurfacing are required to deliver the agreed levels of service.

Pavement strength is rarely a problem on sealed roads carrying low volumes of heavy vehicles on good sub-grades.

Old sealed pavements that have had no previous rehabilitation were generally built on existing unsealed formations with no specific sub-base and a minimum of basecourse (often < 100 mm).

They are generally coping well with current volumes of light traffic, however these roads do not perform well with higher volumes of heavy vehicle use e.g. log extraction.

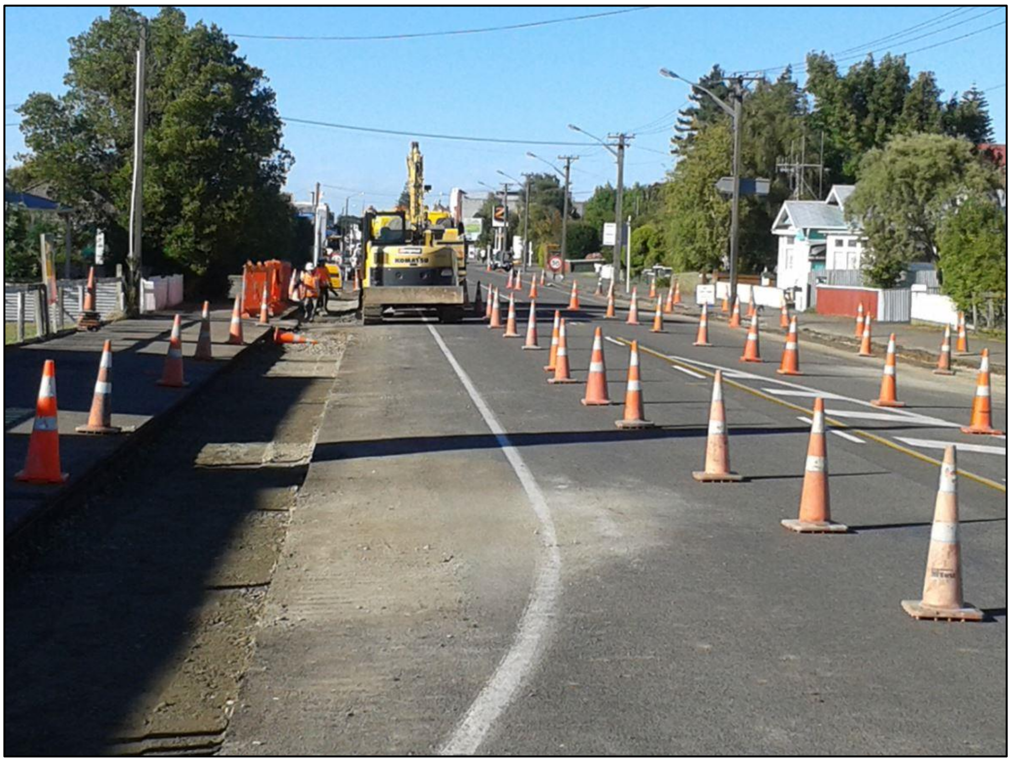
Sealed pavements in the District usually fail for one of the following reasons:

- They have an old seal with poorer quality pavement metal than acceptable.

- They are higher volume arterial roads, particularly in urban areas.
- They are on rural roads that were seal-widened 20 or more years ago when the additional width was often constructed to a lower standard than the existing sealed surface. Failure of these sections can be a driver for renewal of rural carriageway sections.

Rehabilitation usually consists of a granular overlay on rural road roads, or a reconstruction on urban roads where the additional depth of metal cannot be accommodated within the existing levels established by the kerb and channel.

Figure 30: Pavement Rehabilitation – High St, Bulls



Expected Seal Life

Surfacing information is entered in the RAMM database soon after construction, as part of the data entry process a default life and associated expiry date is generated for each surface. The default life and corresponding expiry date are based on a variety of factors including the traffic volume of the road, chip size, type of seal (first coat, second coat or reseal) and the geographical location of the road in the District. The Council expects its sealed road surfaces to perform adequately for the duration of their expected life. The default seal lives are utilised in RAMM as part of the treatment selection process and best reflect the expected lives of seals on the network. The defaults were decided upon after considerable review through RAMM and the applied experience of Roading staff. These lives are also used to value and depreciate the network's pavement surfacing and are critical for these processes.

In 2014 the expected lives of sealed surfaces were reviewed against achieved lives and optimised based on that analysis and practical experience.

An example of default seal life for a single coat chip sealed surface is shown in the table below:

Table 38: Seal Lives

Single-coat Seal		Default Life for Pavement Use (years)				
Function	**First Chip Size**	**ADT < 100**	**ADT 100 - 500**	**ADT 500 – 2,000**	**ADT 2,000-4,000**	**ADT 4,000 – 10,000**
Reseal	2	20	18	16	13	10
Reseal	3	18	17	14	11	8
Reseal	4	15	14	12	8	6
Reseal	5	12	10	8	5	4
Reseal	6	9	7	5	3	2
2nd Coat	2	20	20	16	13	10
2nd Coat	3	17	17	14	11	8
2nd Coat	4	14	14	12	8	6
2nd Coat	5	8	7	6	5	4
2nd Coat	6	6	5	4	3	2
1st Coat	3	4	3	2	1	1
1st Coat	4	3	2	1	1	1
1st Coat	5	2	1	1	1	1
Reseal	2	20	19	16	13	12
Reseal	3	19	17	14	11	10
Reseal	4	18	16	14	10	8
2nd Coat	2	20	18	16	14	12
2nd Coat	3	18	16	14	12	10
2nd Coat	4	16	14	12	10	8
1st Coat	2	4	3	2	1	1
1st Coat	3	3	2	1	1	1

Single-coat Seal		Default Life for Pavement Use (years)				
Function	**First Chip Size**	**ADT < 100**	**ADT 100 - 500**	**ADT 500 – 2,000**	**ADT 2,000-4,000**	**ADT 4,000 – 10,000**
1st Coat	4	2	1	1	1	1

The initial seal on a newly prepared basecourse formation has a much shorter life than other seal coats. Second coat reseals are carried out one to seven years after a first coat seal is applied. Where two coat first coat seals are used, the interval is at the long end of this scale, the short end being applicable when single coat first coats are applied. There is therefore a direct relationship between laying of first coat seals during seal extensions and new road construction and the need for second coat seals and reseals. Second coat seals are not used after two-coat first coats.

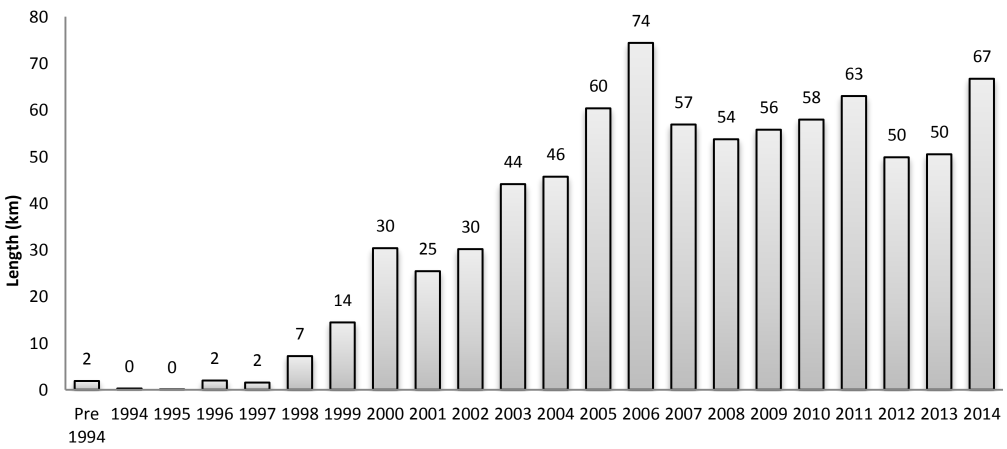
The RAMM Treatment Selection algorithm analyses expected life data for each surfacing material, the volume and mix of traffic using the road, and current condition. It applies economic analysis principles in recommending forward work programs.

Decision-making processes are aided by data from condition ratings and high speed data sets including roughness, skid resistance, surface texture and pavement rutting.

Achieved Seal Life and Age

The following graph shows the length of seal still on the top surface i.e. not resealed, plotted against the year it was placed. For example approximately 14 km of the seal that was placed during the 1999 financial year still remains and is shown as being on the current top surface.

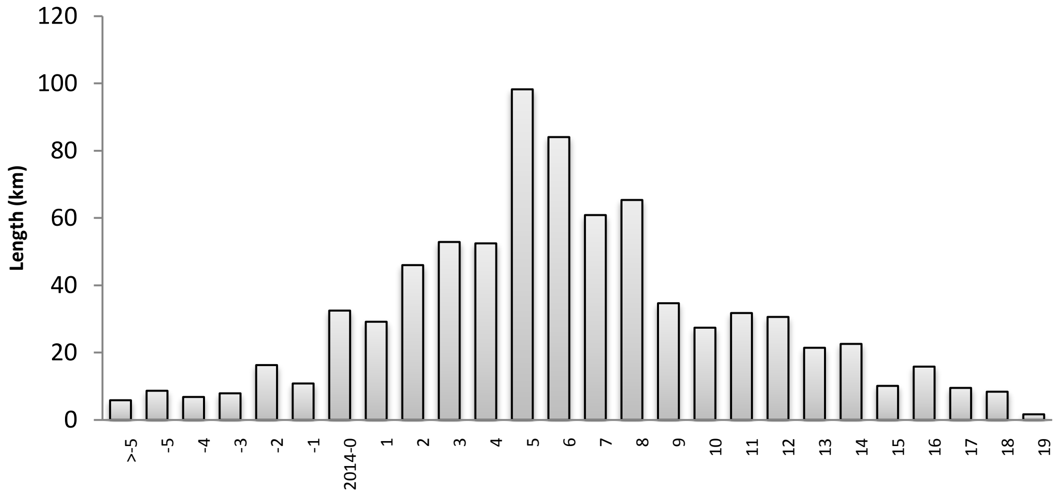
Figure 31: Current Top Surface by Year Sealed



This representation, while accurately reflecting the data, does not provide and accurate indication of possible future sealing needs as it does not consider the different effective lives of different materials as discussed above. The graph lists each year in which a current top surface was placed.

The effect of considering the remaining target life of each surface is illustrated in the graph below, which shows the area of sealed to surfaces plotted against their remaining useful lives.

Figure 32: Remaining Useful Life – Current Top Surface (as at 2014)



Negative values mean those surfaces have exceeded their expected lives. This can indicate either:

- That there has been insufficient reseals carried out, resulting in a backlog of work; or
- There are a number of sealed surfaces that are performing beyond expectations; or
- There are errors in the data.

While some discrepancy is to be expected because the expected lives are averaged, this data suggests that there is only a small theoretical amount of backlog. Overall, 3.7 % of the total area of sealed roads is reported as exceeding their design lives by more than two years and 0.7 % as having exceeded it by more than five years.

7.2.6 Current Contracts

7.2.6.1 Identification of Work

The majority of maintenance work carried out by the maintenance contractor and is identified during network inspections by the contractor and RDC staff. Roads included for reseal have all maintenance work identified and carried out prior to reseal, this is to ensure the pavement is in its best condition to receive the new surface. Pre-reseal repairs are discussed further under Pre-Reseal Repairs below.

The Engineer and the road maintenance contractor work together to ensure that the road network is maintained to the specified standard while staying within the approved budgets.

Seasonal conditions and the need to coordinate routine and planned works may mean a carriageway is below the specified standard for a time. However, this is only accepted or tolerated if the road user is not unduly or adversely affected. For example, some minor patching may be held over until a full repair is done, or grading of a metal road may be deferred due to adverse weather conditions (either wet or dry).

Generally, the budgets are set at a level that permits the maintenance work necessary during the financial year.

A schedule of proposed reseals is given to the Contractor and inspections made to identify repair work necessary to prepare the carriageway for the reseal. The preliminary schedule of reseals is usually given to the contractor in September of the financial year prior to the work being undertaken. Pre-seal repairs are carried out over the next 12 months then the reseal work is programmed for completion prior to the end of January. Pre-reseal repairs can cost up to one third of the total value of the reseals carried out that year.

The Contractor also identifies maintenance work such as dig out repairs, edge breaks, culvert, renewals, minor bridge repairs and shoulder removal during the routine course of normal activities and network inspections. A schedule of work is submitted for approval to the Engineer, then once approved it is programmed and completed by the contractor.

The Contractor is required to undertake network inspections to maintain the levels of service specified in the contract so that all activities are carried out within the response times and to the quality specified

Additional monitoring and surveillance is carried out by the Council's Roading staff and this is used to determine trends and to monitor performance.

Table 39: Fault Response Times

Fault	Level of Service	Response Time
Potholes	There shall be no potholes exceeding 30 mm in depth or 120 mm in diameter in sealed surfaces.	That all works are completed for both the specified quality parameters and within appropriate timeliness to meet the above standard.
Repair of Surface Deformation	Repair of surface deformations shall be carried out on sealed roads on the approval of the Engineer to both the specified timeliness and quality parameters.	All works shall be completed within the timeframes set out in the three month rolling programme

Fault	Level of Service	Response Time
Repair of edge break	There shall be no edge break exceeding 100 mm from the nominal edge of seal or encroaching on to the white edgeline.	That all works are completed for the specified quality parameters and shall be completed within the timeframes set out in the three month rolling programme.
Sealed Pavement Repairs	Repair of failures shall be carried out on sealed roads as approved by the Engineer.	All works shall be completed to the following timeframes: A pavement defect that may cause a safety hazard to vehicles or the pavement surface has broken and rapid deterioration is evident– within 1 working day of identification. Pavement defects with the potential to deteriorate rapidly under traffic loading and/or adverse weather – In the 1 month programme. Pavement defects with the potential to deteriorate over the next 30 days – within 30 working days of identification.
Unsealed Shoulders	There shall be no: Edge rutting exceeding 30 mm in depth. Potholes exceeding 200 mm in diameter or 35 mm in depth Deviation from the widths and crossfalls of the shoulders, feather edges and tapers shown in Appendix 17 of the Contract. High shoulders that would cause the ponding of water on the sealed carriageway either during or after rainfall.	That all works are programmed and completed to the specified quality parameters in the 1 month programme
Potholes – Unsealed Roads	There shall be no potholes exceeding 35 mm in depth or 200 mm in diameter.	That all works are programmed and completed to the specified quality parameters in the 1 month programme.

Fault	Level of Service	Response Time
Digout Repairs – Unsealed Roads	Repair of failures shall be carried out on the approval of the Engineer on unsealed roads as soon as practical so as not to jeopardise the safety of the travelling public.	Repair of surface deformations shall be carried to the specified timeframe: a) Deformations exceeding 100 mm measured with a 2 metre straightedge – within 3 working days of identification by the Contractor or others. b) Deformations 50 mm to 100 mm measured with a 2 metre straightedge – to be repaired in the 1 month programme. c)Deformations 25 mm to 50 mm measured with a 2 metre straightedge – to be programmed and completed in the 3 month rolling programme
Unsealed Surface and Shape Maintenance	There shall be no corrugations exceeding 20 mm from crest to trough. There shall be no rutting exceeding 50 mm in depth. The depth of loose maintenance gravel on the running surface shall not exceed 20 mm. The pavement profile shall be maintained with crossfalls between 5 % and 8 % and maximum superelevations of 10 %.	That all works are completed to maintain unsealed surfaces with the above specified quality parameters.
Supply and Place Maintenance Aggregate	Maintenance aggregate shall be placed as required to maintain a dense and trafficable running surface free of patches of sub base or subgrade material.	That all works are completed for both the specified timeliness and quality parameters.

7.2.6.2 Maintenance Programme

The nature and frequency of the work is consistent with the maintenance strategies outlined above and the age, condition and performance of the Roading asset. The majority of maintenance work carried out by the Contractor is identified through routine patrols of the network. Monthly programmes are submitted by the Contractor to the Engineer for approval before the work is carried out. Other maintenance tasks originating from service requests or from RDC staff are also added to the monthly programmes.

Forward work programmes are developed and maintained so the scope of up and coming work is known and quantified. The work is identified from RAMM data, the Engineer and the Contractor. These programmes are used to track progress and the costs of work in relation to the budgets available. The forward works programmes are updated regularly due to reprioritisation as other work is identified, arising from more recent network inspections or public service requests.

From 2014, RAMM will be used to manage the Forward Works programmes for reseals and area wide pavement rehabilitation work.

7.2.6.3 Deferred Maintenance

On a network basis there is generally no significant backlog of routine maintenance at current funding levels.

The aspect of pavement maintenance that typically has the highest levels of perceived deferred maintenance is that associated with the maintenance metalling of unsealed roads; however this is not necessary seen as deferred work, rather it is most commonly a difference in level of service expectations.

Adverse climatic conditions such as a wet winter or a storm event can create additional pressures that mean that scheduled maintenance metalling work may need to be deferred to address the more urgent problems that arise from these types of events. If an event is serious enough, and creates repair and reinstatement that cannot be sensibly met from normal funding allocations, road controlling authorities can apply additional funding from the NZTA under Work Category 141 – Emergency Reinstatement.

7.2.6.4 Prioritising Work

Maintenance work identified by the Contractor is either:

- Prioritised as immediate - in which case it is programmed and completed by the Contractor forthwith. This includes routine work such as pothole repairs, short sections of edge break, small areas of surface levelling, and removal of surface detritus; or

- Scheduled as part of identified work submitted to the Council's Engineer for approval monthly. Once approved by the Engineer it is included in the schedule of all approved work.

Work is generally programmed in accordance with the following priorities, but may be scheduled differently if requested by the Engineer to meet non-Roading priorities e.g. utility services installation or repairs:

- The safety of road users or adjacent property owners is, or is likely to be, compromised.

- The structure or integrity of the road or road component is or is likely to be compromised.

- The areas of distress may expand or the method of repair change, such that the cost of any repair may increase significantly.
- Other programmed work depends upon the completion of the work in question.
- The order in which it was approved approval.

At times, there is a greater value of work approved than budgets will allow to be done. The Engineer keeps the Contractor informed monthly on how the expenditure relates to the budget and will request certain types of maintenance work to be put on hold if expenditure is close to the budget. Generally, this applies to the work types with the larger budgets such as maintenance metalling, digout repairs and drainage.

Calls from ratepayers, road users and the Council's staff are another, less formal, form of network surveillance and a gauge on contractor performance. These calls are logged into the Council's Service Request System with relevant items passed onto the Contractor, with instructions where necessary, for assessment and/or remedy. Other defects or works required are noted as part of any additional inspections following Service Request enquiries.

Cost increases caused by inflationary pressures such as oil price increases can affect the ability to carry out all necessary work and stay within budget. Cost increases resulting from inflation cannot be economically written out of contracts and all the Council's period contracts therefore include them. Cost escalation adjustments are regularly applied to contract rates and prices.

The maintenance budgets for each year are adjusted to reflect the previous year's inflation in that particular part of the industry. This is done using standard construction cost indices compiled by the NZTA. Failure to increase annual budgets to match the costs of inflation over the previous period will usually result in failure to achieve the agreed levels of service, and a loss of service potential.

Urgent work is generally completed even if this means that there is expenditure over the budget or other work has to be deferred to keep overall expenditure within budget. This is particularly relevant to safety related works and other works that are needed to restore roads affected by adverse weather events like storms that result in wind damage, flooding, slips and snow. As discussed in Emergency Works, if the extent of this becomes too severe the Council can apply for NZTA Funding for additional funding.

7.2.6.5 Sealed Pavements - General Maintenance

Sealed road pavement maintenance includes:

- Pothole repairs;
- Digout repairs;
- Surface levelling;

- Repairs to seal edges (edge break and shoulder wear); and
- Trimming of high shoulders to ensure drainage off the carriageway.

Details of the various types of defects and the method of repair are in detailed in the Road Maintenance Contract specifications. In general, small repairs such as potholes, short sections of edge break and small areas of surface levelling, are completed by patching trucks as part of their routine circulation around the District. Other routine maintenance activities are carried out as needed by the Contractor.

The maintenance of private entranceways within the road reserve is carried out as part of the carriageway maintenance. This is subject to the entranceway being previously formed and sealed to match the carriageway. Unsealed entranceways are only maintained at the seal edge, unless there is significant damage to the seal edge in which case the entranceway will be sealed to 1.5 m from the carriageway edge in conjunction with the Roading work, this is to ensure that the edge of the sealed carriageway is kept intact.

7.2.6.6 Pre-Reseal Repairs

Pre-reseal repair work is carried out under the road maintenance contract. The purpose of this work is to ensure that all defects are repaired prior to the reseal. It includes high-shoulder removal, which consists of the trimming of the existing shoulder and berm to remove the build-up of soil, vegetation and chip at the edge of the carriageway. The formation of shallow drainage-swales to move runoff away from the pavement formations is also done at this time.

The coordination of shoulder maintenance and re-seals ensures that over time the entire network will have improved drainage that is regularly attended to, as part of the reseal cycle. This work also helps to prevent or minimise damage to the carriageway that can occur from remedial shoulder maintenance works.

The majority of the shoulder removal and dig out repair budget is spent on the roads being resealed. By doing this as pre-reseal work the entire network will get shoulders trimmed and the failed area of pavement dug out during the reseal cycle.

7.2.6.7 Unsealed Road Pavements

Maintenance of unsealed roads consists of the routine work such as grading, pothole patching, isolated gravelling, the removal of high shoulders, placement of basecourse to provide the normal camber of 4.5 to 6.0 % and placement of running course. Pothole patching, removal of corrugations and rutting is carried out as needed by the Contractor.

The performance standards associated with this is detailed in the road maintenance contract, the performance measure states:

> *The running surface of the road shall remain smooth with a safe and acceptable shape, true to grade maintenance aggregate shall be placed as required to*

maintain a dense and trafficable running surface free of exposed patches of sub base or sub grade material.

Grading and Pothole Repairs

Grading is done at a frequency required to meet the contract levels of service for unsealed pavement maintenance as stated previously.

Additional grading is done, outside the set grading frequencies, if the condition of the road falls below the stipulated performance standards. The grading frequency is based on that historically needed to maintain the carriageway to the required standard. This is based on information obtained from long-serving staff, observation of the roads, and from the contractor who also recommends changes to the frequency if necessary.

The grading frequencies are routinely reviewed. Corrugations are cut out as part of routine grading. The specification requires corrugations greater than 15 mm high (trough to crest) to be cut out.

Some corrugations shallower than this can still cause concern to road users and the contractor is usually asked to cut these out as part of the next grade.

Drainage work to reduce surface water on or at the edge of sealed and unsealed carriageways is carried out following identification and approval.

Pothole patching and isolated gravelling are done by the contractor where needed and generally to coincide with the grading cycle, repairs being done prior to the grading. This is done to maintain a carriageway that is becoming worn but does not yet need major renewal.

Maintenance Metalling

The purpose of consistently applying metal to unsealed carriageways is to protect to the base formation of the road by providing a quality material suitable for ongoing grading and compaction. This will extend the total useful lifespan of the unsealed pavement.

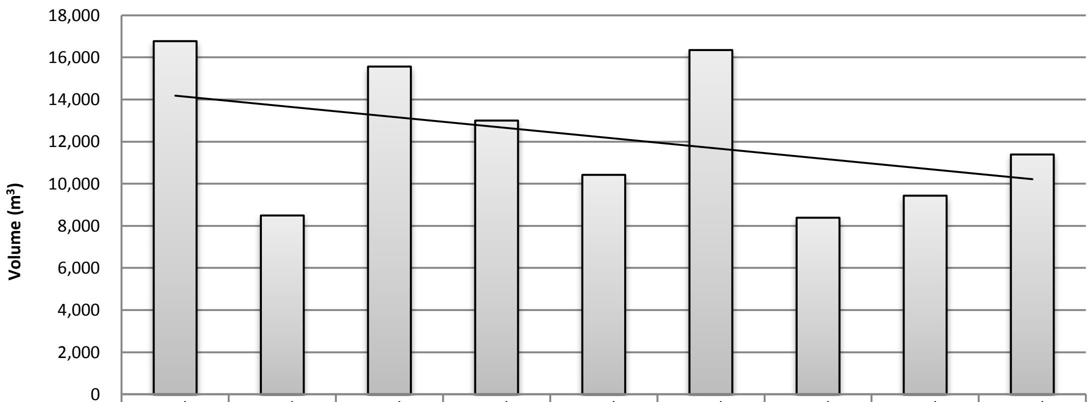
Carriageways that cannot be maintained to the required standard through regular grading and patching are scheduled for approval of the work necessary to overcome the problem. This may include trimming of high shoulders, or replacement or reformation of all or part of the basecourse and running course.

Four main types of maintenance works are undertaken:

- Stabilise Existing Running Courses.
- Repair Sub-base and Reform Carriageway.
- Reshape Existing Carriageway.

- Place Running Course.

Figure 33: Re-metalling Volumes (2005-2014)



	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Volume	16776	8496	15568	13003	10425	16352	8389	9436	11392

Programmed Application

There is currently no formalised prediction model in place to estimate gravel loss. The decision process for the application of metal is based on the local knowledge of the contractor and engineer. Network inspections, traffic volume, rainfall and historic trends are factors considered to establish the need for application of metal.

Based on this knowledge the theoretical gravel loss across the unsealed network is estimated to be approximately 10 mm per square metre. This equates to 16,000 m^3/year of gravel application.

The annual application quantity has been less than this figure over the past three years; this in part is due to seal extension work. There is no evidence to show that unsealed pavements are deteriorating due to reduced metal application, however, the general philosophy behind maintenance of unsealed roads is that metal should be applied at such a rate that equals or exceeds the predicted gravel loss.

Isolated re-metalling is also carried out as needed. The roads in need of upgrading are identified by the Contractor and by the Engineer by observation or following complaints from ratepayers and road users. These roads are listed and prioritised by the Engineer and programmed in accordance with the most effective use of the available funds.

It is intended that future programmed application of maintenance metal is to be based on a theoretical gravel loss prediction model to be developed by RDC engineering staff. This will provide a consistent approach regardless of whether in house or external knowledge is available. This is an item which has been added to the RDC improvement plan.

7.2.6.8 Maintenance Forecast

The forecast cost of maintaining pavements is summarised in the Financial Management section of this Plan.

7.2.6.9 Pavement Improvements Plan

The factors driving the development of the transportation network were outlined earlier in this section of the plan. Pavement improvement projects include the following activities:

- Seal extensions, rural and urban.
- Seal widening.
- Minor works and safety improvements.
- New works to meet the needs of expected development and growth.
- Road realignments.
- Intersection improvements.

Development projects are derived from the following sources:

- Agreed Customer Levels of Service.
- Crash records.
- Network performance.
- Network deficiencies.
- Network use.
- Concerns expressed by Councillors and communities.

7.2.7 Disposal Plan

Pavement assets are considered for disposal when they become uneconomic to own or operate, they become surplus to current and excepted needs, or through rationalisation of the asset group.

The most common reason for disposing of part of the pavement asset is when part of a road or an intersection has been realigned or closed, and the disused road becomes surplus to requirements.

The Council is not free to dispose of Roading assets as it wishes. The principal controls on its ability to do so are:

- Section 342 of the Local Government Act 1974. This gives The Council authority to remove a road from the network and for title to it to be granted to the Council. The Council may then retain or dispose of the title to an adjoining landowner (but see "The Public Works Act" below). The procedure is legally described as "stopping". The Council's ability to stop a road is tightly circumscribed by legislation and common law. In summary they require the intention to stop the road to be advertised for public submission in accordance with Schedule 10 of the Act.
    - If there are any public objections that cannot be resolved, the matter must be decided by the Environment Court.
    - The Minister of Lands must give prior consent to the stopping of any rural road.
- Part 6 (Sect 75 ff.) of the Local Government Act 2002. This stipulates how the Council must make decisions. To meet its requirements The Council must have a "Significance" policy and consult the public, using the "Special Consultative Procedure" on significant matters.
- The Public Works Act 1981 contains provision relating to the sale of land and offering surplus land back to the original owners, which also affect these processes.
- Every land parcel held in a separate title must have a legal access to it. This is usually provided by a road, whether formed or unformed, but it may be by a legal right of way. The access does not have to be practical, merely legal.
- Council Policy Road Stopping – Disposal of Surplus, which outlines the Council's minimum requirements for consideration of a request to stop a road.

If a road is diverted or realigned, rather than being removed from the network, the particular provisions around road stopping may not apply.

For smaller realignments in rural areas, the administrative and legal costs to stop a small, disused, portion of road reserve are usually uneconomic when compared to any perceived benefit obtained by the stopping. In these cases, the Council may allow the adjoining farm property to be re-fenced to include the surplus land. This benefits the Council, as it does not need to maintain the area in perpetuity (especially around intersections relating to vegetation control and maintaining sight lines), and the adjoining landowner who benefits from the additional grazing or pastoral area obtained.

In other situations, where significant private land is needed for new Roading realignment works, any resulting disused portion is offered as part compensation for the new land if it benefits the landowner, thus offsetting the direct cost of the work.

In most situations road stopping occurs after landowners request to have unformed and unmaintained legal roads stopped. The resulting titles are usually amalgamated legally with the title of the adjoining property.

These processes apply, whether there is a specific pavement asset associated with the land or not, as such it applies to the very base layer of the pavement, the land upon which it sits.

7.2.7.1 Uneconomic Roads

The NZTA has made a formal policy determination on provision of financial support for "uneconomic Roading facilities". This is detailed in its Planning, Programme and Funding Manual. The determination defines an uneconomic Roading facility as one where the total cost of the proposed works per AADT is greater than or equal to $8,000.

The determination also states the NZTA will not normally provide financial assistance (subsidy) for uneconomic works but that it will continue to provide financial assistance for cost effective maintenance.

The Council has no expressed intentions or programme to dispose of low traffic volume roads or unformed and unmaintained legal roads (also called "paper roads") unless requested to do so. However, it may decide not to maintain them or only to provide limited maintenance – there are currently no plans do to either of these things on any road.

Unformed legal roads are not maintained by the Council for Roading purposes. Some roads have been classified as limited maintenance roads, and therefore receive only sufficient maintenance to provide a minimal level of service.

The Council's practice is that it will generally not carry out any upgrading of a paper road or uneconomic road. It may be prepared to carry out specific uneconomic projects if it reaches agreement with potential users over cost sharing. The Council may agree on a case-by-case basis to maintain a road if it has been upgraded to a suitable standard by others at their cost, with its prior permission.

7.2.7.2 Surplus Land

Land is usually declared surplus when land designated as legal road is not required for Roading purposes now or in future. This usually affects paper roads. The Council will facilitate a road's closure and disposal, where requested by an adjacent property owner who wishes to incorporate the road into their adjacent land title in the following circumstances:

- When this process is requested. The Council undertakes an evaluation on a case-by-case basis to determine if there is any strategic value in keeping the land for another transport purpose, for example as a pedestrian walkway, an off-road cycleway or as part of more extensive future route. If this there is no benefit evident in retaining the road for a future Roading purpose, the disposal process is initiated, but because of the legal process required (see the preceding discussion) the result cannot be predicted or guaranteed.

- It has been purchased under the Public Works Act for future road development and is no longer required.

In some places there is land parcels that were intended to be roads when originally surveyed in the early days of European settlement, but were never formally declared to be roads or vested in the Council or the Crown as roads. In these situations, the Council may hold titles to these parcels as ordinary freehold (fee simple) land.

7.3 Drainage

The purpose of drainage assets is to contain and then convey surface water away from the carriageway keeping the road surface and sub-surface dry to minimise water damage. Poor drainage has been shown to lead to more long-term weaknesses or failure within pavement structure than any other form of damage.

Figure 34: Road Sump

Effective drainage will move water quickly away from the road surface, along a controlled channel at the edge of a road and into a road sump or gully. From there, any sediment carried with the storm water will settle in the lowest point of the sump called the silt trap. The water will gradually fill the sump and from there flow down a pipe connection to a connecting manhole.

Based on current replacement costs RDC Drainage assets account for 9% of the total transportation asset group valuation. Asset details for the following types of drainage assets are stored in the Council’s RAMM database.

Table 40: Drainage Assets

Drainage Type	Quantity
Catch pit 1	956
Catch pit 2	9
Culvert	4,660

Drainage Type	Quantity
Dam	1
Drop Chamber	1
Manhole	6
Side Culvert	1
Side Drain	5
Sump	101
Total	**5,740**

7.3.1.1 Culverts

The purpose of culverts is to convey natural watercourses or storm water across the road without adversely affecting the pavement or surface of the road or disrupting its use. They are distinguished from bridges by surface area and sometimes having formed bases in place of the streambed (water flowing under bridges flows in a natural bed).

Figure 35: Culvert

According to NZTA standards, which are utilised by this plan, a culvert has a waterway area less than or equal to 3.41 m^2 (equivalent to a diameter of 1.04 m or 42 inches). Culverts larger than this are classified as bridges and are often referred to as either “bridge culverts” or “major culverts”.

Culverts are generally long life assets that show little sign of deterioration until failure if they have been correctly installed. The exceptions can be:

- Armco (galvanised steel) culverts carrying peaty or swampy water, which is often quite acidic. In these circumstances, the acidity attacks the galvanising and removes it over time, leaving an unprotected steel surface thus shortening the culvert's life.

- Older butt jointed concrete culverts that do not have the modern spigot and socket rubber-ring sealing system between the pipes. Butt jointed pipes can allow water to escape, eroding the surrounding pavement formation, which can, in turn, create subsidence of the carriageway or can contribute significant land slope failures causing sections of road to drop out on hillsides.

7.3.1.2 Sumps and Catch Pits

Sumps and catch pits are used to remove storm water from kerb and channel or other surface water channels when there is no suitable open watercourse available. Sumps by definition connect to a pipe, which will flow to a manhole and usually contain a silt trap. Sumps are also referred to as "catch pits" as a generalised description.

Where there are no reticulated storm water systems or natural flow paths storm water is sometimes disposed of through soak holes. In urban areas "bubble up" sumps may be used to transfer water from a private property to the kerb and channel if there is no reticulated storm water system available. These systems use water pressure to force the storm water up through the sump to the kerb and channel.

With the advent of the water quality requirements detailed the Horizons Regional Council One Plan; a considerable emphasis has been placed on enhancing the quality of water runoff from roads and streets, before it discharges into the ground and in time infiltrates the water aquifers.

In rural areas carriageway drainage is purely a Roading responsibility as there is little threat to subsurface water quality from any carriageway runoff, due to the inherent treatment systems that occur with the side swales and open drains that are commonly present.

The design of urban sumps has changed in recent times, to improve the trapping of sediments and contaminants. This has required the use of submerged outlets and other techniques before discharging to other treatment and disposal systems like swales, soakage basins and wetlands alongside the carriageway.

7.3.1.3 Kerb and Channel

This classification includes other surface water drainage channels maintained as Roading assets. These can be concrete channels or formed unlined drains. Although their main purpose is the same, the characteristics of construction and maintenance are significantly different so these drainage channels are discussed separately.

Kerb and channel is a specific type of surface water channel. Its purposes are to:

- Provide a path for storm water runoff from the carriageway, footpaths, berms and adjacent properties, protecting the pavement from water ingress, and consequential structural deterioration; and

- Allow the convenient and safe movement of pedestrian and vehicular traffic.

It also has an important secondary purpose:

- To enhance the convenient and safe movement of pedestrians and traffic by separating these two streams of road users.

The use of concrete kerb and channel, as opposed to earthen surface water channels (also referred to as swales) is a recognised and accepted sign of urban development. With the flat profile of the District's towns, ponding can occur if well-formed channels are not used. Apart from its functional role, kerb and channel also protects the carriageway seal edge from the higher exposure to traffic within the urban area. It is a requirement of the District Plan that all new urban subdivisions have formed kerb and channel. In some of the smaller and more rural orientated townships, kerb and channel may be seen as unnecessary or not required by the residents.

Figure 36: Standard Kerb and Channel

Kerbing is also installed at some rural intersections, bends and corners in conjunction with other road improvement works, such as minor improvements at intersections, seal extensions and seal widening. Kerbing in these situations protects the edge of seal from edge break problems in these high-wear areas while also providing positive drainage for storm water runoff. In addition, kerbs delineate corners of an intersection to a higher degree than a plain seal edge.

All new kerb and channel is either standard profile kerb and channel or mountable kerb and channel and is generally slip formed in situ. This involves the existing road edge being saw cut or simply broken away, to leave a work space to cast the new channel. Road pins are driven into the road edge, marked with tape and string line, which define a line and height for the new kerb to be cast to. Concrete is poured into the slip-forming machine as it is run along the string line to form a standard concrete kerb and channel. The road pavement material is then reinstated and compacted up to the new kerb and channel. It is then chip sealed up to the channel edge to complete the road drainage construction.

Mountable kerb and channel is occasionally used within the Rangitikei District, although it does not have the carrying capacity of standard kerb and channel. It is generally selected for situations such as roads with narrow lane widths, where mounting the kerb may be required. It is also used in areas where parking on the kerb is acceptable.

Standard profile kerb and channel is used if there is a wish to match it with existing installations or if there is a requirement to have a higher storm water capacity.

The mountable kerb and channel profile channel is less obtrusive than standard kerb and channel and allows normal residential vehicle access without the need to cut the kerb and install a dedicated vehicle crossing.

Kerb and dish channel is difficult for pedestrians, especially the elderly and mobility impaired to cross. It can trap cycles and car tyres, is difficult to clean, its bridge crossings trap debris and are sources of ponding during heavy rain, which is unsightly. Nevertheless, the Council regards it as filling a function and its policy is to replace it only when condition dictates, or as part of a street upgrade project.

The key issues relating to kerb and channel are:

- Implementation of a kerb and channel extension strategy that identifies missing sections or sections that need to be provided;
- Determination of the amount of deferred maintenance and renewals of kerb and channel;
- Provision of appropriate stormwater collection, treatment and discharge facilities where necessary;
- Compliance with Resource Consent conditions imposed when maintaining, renewing and providing stormwater facilities;
- Resource Consent conditions imposed on developers that will become the Council's responsibility when the assets themselves are vested in the Council by the developers and any resource consents transferred to it; and
- Asset data integrity (e.g. lack of accurate construction dates.

7.3.1.4 Other Surface Water Channels

The primary purpose of all surface water channels (SWC) is to provide a path for stormwater runoff from the carriageway, footpaths, berms, and sometimes the adjacent properties, to:

- Protect the pavement from water ingress, and consequent structural deterioration.
- To allow the convenient and safe movement of pedestrian and vehicular traffic.

Kerb and channel, a specific subset of surface water channels, is discussed above. This section of the plan discusses other types of surface water channels, being shallow and deep channels. These channels are invariably unlined except in very exceptional circumstances where there is a requirement to prevent sub-surface water infiltration/ exfiltration or erosion of the channel.

The Council's RAMM database records information on shallow and deep surface water channels. The information is stored in the same database table as for other surface water assets but they are identified separately as they have differing attributes, maintenance requirements and valuation methodology.

Shallow surface water channels are shallow trafficable depressions formed with the invert 2.0 to 3.0 m from the carriageway edge and 150 to 300 mm below the edge of the carriageway. Their sides are tapered back to the existing berm with a target slope of around 1:10. These types of channels are referred to as swales.

Deep surface water channels are often referred to as drains.

Both types of surface water channel are predominately found in rural areas with the use of swales and drains being common in the outlying urban settlements.

Land drains are part of a wider public drainage network. Their primary function is to drain private land and to convey drainage water and storm water to receiving water bodies. The proportion of storm water originating from roads and ending up in land drains is very low.

The majority of these systems are located within legal road reserves. This is generally because it is easier to maintain and operate these systems on road reserve administered by the Council compared to private property. Land drains are included in the Utilities Activity and are not included in this Plan.

7.3.2 Asset Description

The total value of this asset is derived in the Rangitikei District Council Asset Valuation Report 2013 and is represented in the following table.

Table 41: Asset Valuation - Drainage

Asset Type	Component	ORC ($)	ODRC ($)	Annual Depreciation ($/year)
Drainage	Drainage	22,432,044	10,632,877	267,220

7.3.2.1 Culverts

Culvert asset details are recorded in the Council's RAMM database and are stored in the same table as other drainage assets. The following graphs summarise the asset holdings for culverts by length for variances in diameter and material selection.

Figure 37: Culvert Diameter by Length

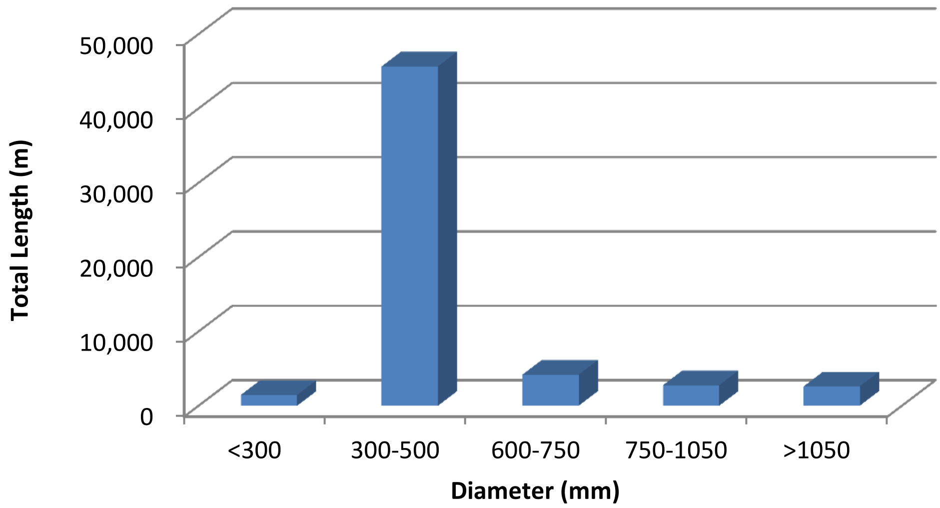
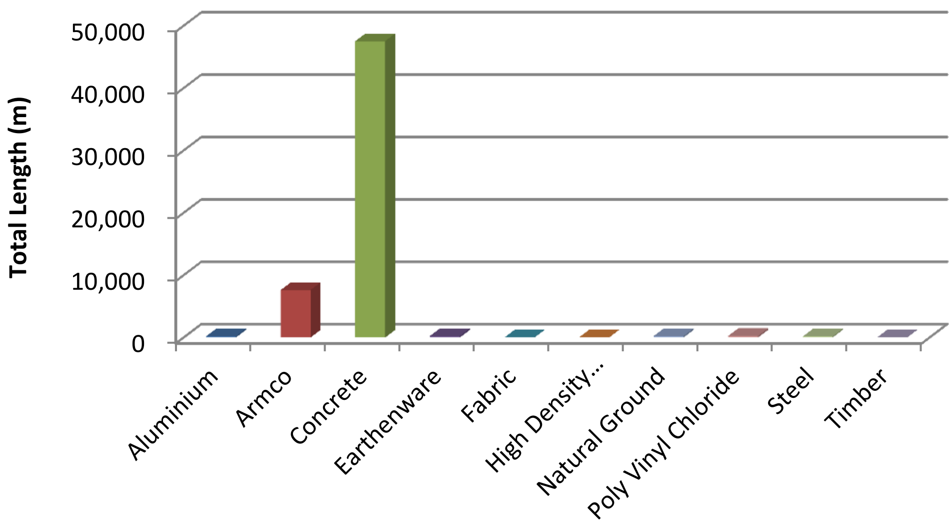


Figure 38: Culvert Material by Length (m)



The value of the culvert sub asset is derived from the 2013 Rangitikei District Council Road Asset Valuation Report is represented in the following table; more details are in Part 9 — Financial Summary.

Table 42: Asset Valuation - Culverts

Asset Type	Component	ORC ($)	ODRC ($)	Annual Depreciation ($/year)
Drainage	Culverts	20,931,610	10,408,505	248,465

7.3.2.2 Sumps and Catch Pits

Sumps and catch pits are recorded in the Drainage Table of the Council's RAMM database. The following table summarises the asset holdings.

Table 43: Asset Description – Sumps and Catch Pits

Type	Quantity
Catch pit type 1	956
Catch pit type 2	9
Sump	101
Total	**1,066**

Data has been collected at different times with the different terminology used for similar assets. Assets details for those identified as sumps needs to be validated and added to the appropriate catch pit category, this is an item in the improvement plan.

These details were collected in conjunction with other Roading data. The value of this sub asset is derived in the Rangitikei District Council Asset Valuation Report 2013 and is represented in the following table:

Table 44: Asset Valuation –Sumps and Catch Pits

Asset Type	Component	ORC ($)	ODRC ($)	Annual Depreciation ($/year)
Drainage	Sumps and Catch Pits	1,500,434	224,372	18,755

7.3.2.3 Surface Water Channels

The value of the surface water channel is derived in the 2013 Rangitikei District Council Transport Asset Valuation Report and is represented in the following table:

Table 45: Asset Valuation – Surface Water Channels

Asset Type	Component	ORC ($)	ODRC ($)	Annual Depreciation ($/year)
SW Channel	Surface Water Channel	15,561,957	3,631,014	194,524

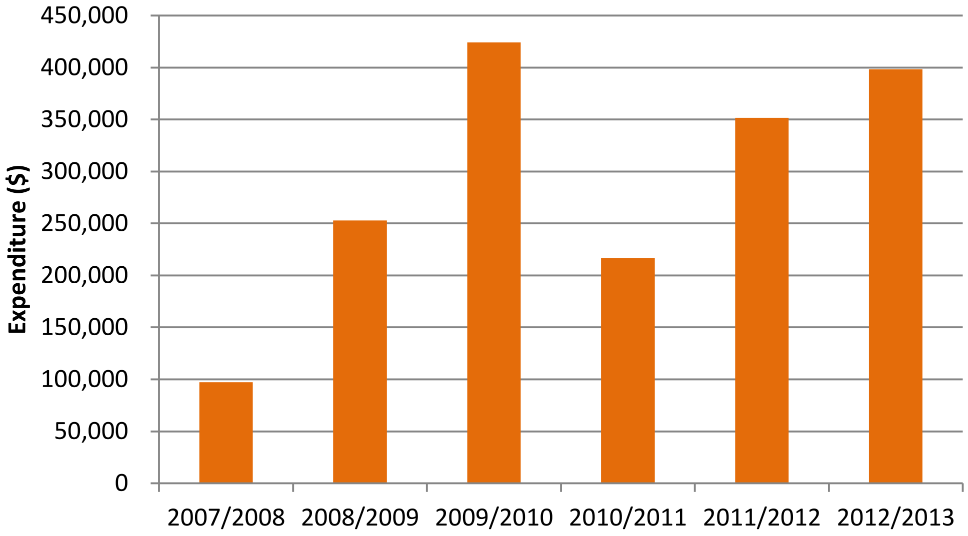
The following types of kerb and channel are utilised in the District, asset details are recorded in RAMM in the Surface Water Channel table:

Table 46: Asset Description – Surface Water Channels

Type	Length (m)
SW Channel (Shallow)	31,640
SW Channel (Deep)	1,162,760
Dished Channel (Concrete)	934
Kerb & Channel (Concrete)	125,871
Kerb Only (Concrete)	120
Mountable Kerb & Channel (Concrete)	3,422
Mountable Kerb Only (Concrete)	578
Other Type	632
Total	**1,325,957**

7.3.2.4 *Expenditure History*

Figure 39: Historic Expenditure - Drainage



The graph above shows both historic expenditures and the values of renewal works and new improvements funded by the Council.

7.3.3 Service Delivery

7.3.3.1 *Roading/Utilities Split*

Urban

The Council has made a clear distinction between the storm water collections, treatment and disposal requirements of the Utility Networks and Roading Networks assets in urban areas. This is explained as follows:

- ***Roading Drainage Assets*** - These are the initial carriageway collection facilities within road reserve associated with catering for drainage from the carriageway that deliver the storm water to a point of mains reticulation, treatment and/or disposal, they can also carry storm water from roofs in some urban areas. These assets include:
    - Kerb and channel*
    - Surface Water Channels (mostly rural drains)*
    - Culverts*
    - Catch pits (sumps)*

- Bubble up sumps*
- Piped connections between assets
- Manholes (Riser within road reserve)

- ***Utility Storm Water Assets*** - These are the reticulation, treatment and disposal facilities both inside and outside road reserves and include:
  - House lot laterals (reticulation)
  - Manholes (reticulation)
  - Main disposal pipe work (reticulation)
  - Formed swales or drains (treatment)
  - Soak holes (disposal)
  - Interceptors (treatment)
  - Wetlands, retention ponds (treatment)
  - Discharge from wetlands, retention ponds etc. (disposal)

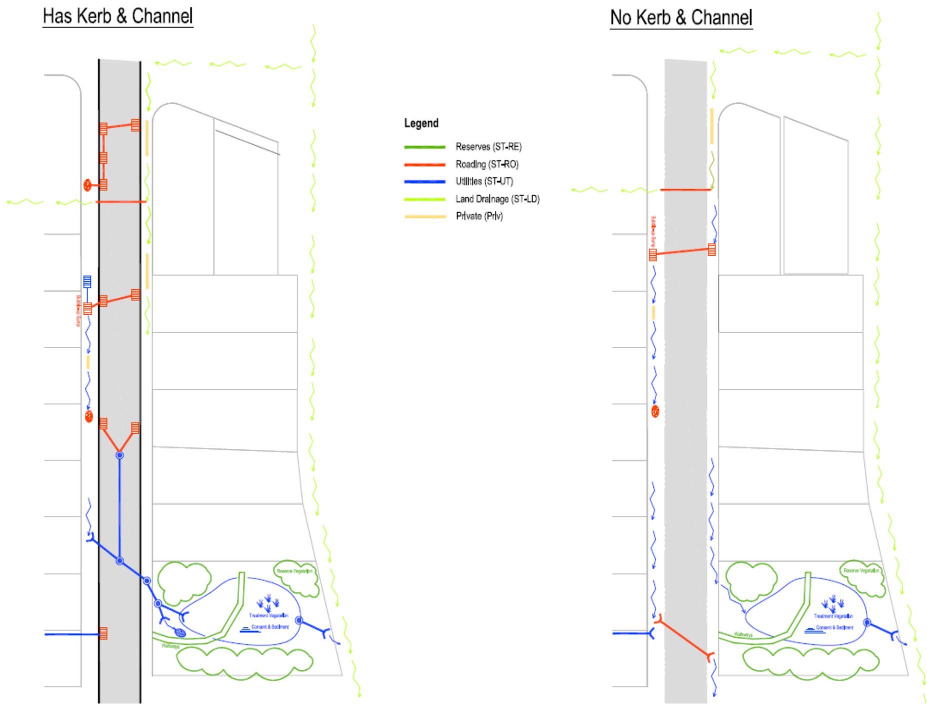
NOTE: Assets marked * are currently recorded in RAMM and are considered to be Roading assets.

There are no performance issues with sumps as long as they are regularly cleaned. Maintenance requirements are easily accommodated under the road maintenance contract and respective street cleaning operations, therefore it is sensible to have these retained and managed as Roading assets.

Most facilities located beyond the boundary of the legal road reserve in an urban areas are assumed either to be utility storm water assets or owned privately, for example systems within private rights of way. However, compliant discharges from these systems are accepted into road drainage collection systems.

The diagram below illustrates the distinction between Roading and utility storm water assets diagrammatically and in more detail:

Figure 40: Delineation – Roading vs. Stormwater Activities



Rural

In rural areas, carriageway drainage is purely for transportation of surface water and a Roading responsibility. There is little threat to subsurface water quality from any carriageway runoff due to the inherent treatment systems that occur with the side swales and open drains that are commonly present. The exception is any rural or rural-residential subdivisions where a specifically consented storm water system occupies legal road reserve.

7.3.4 Operation and Maintenance Plan

Good drainage performance generally requires:

- ***Catchment coverage*** - In urban areas surface water channels and ponding areas should have kerb and channel and piped storm water systems installed. Kerb and channel at the edge of the carriageway protects and defines the seal edge as well as collecting storm water.

- ***Storm water carrying capacity*** - Capacity of the kerb and channel is not a problem as long as sufficient sumps and outlets are installed. This is one of the reasons low profile kerbs can be used as the standard profile for new construction, unless a specific storm water design requires the use of a standard high profile channel.

- ***Water tightness*** - The channels need to be able to carry the water to the sumps and outlets. Old or damaged channels allow water to get into the subgrade, and over time cause failures to the adjacent pavement, these channels need to be repaired or replaced before serious pavement damage occurs.

- ***Conformity with current standards*** - Deep channels cause safety problems in urban areas as they are not easily negotiated by pedestrians or other footpath users e.g. mobility scooters and wheel chairs.

- ***Ease of cleaning*** - Channel covers used for crossings over deep kerb and dish channel can cause problems when cleaning as debris can be caught underneath the covers. Dish channel and non-standard channels also cause problems when cleaning with mechanical cleaners.

- ***Ease of crossing installation*** - Non-standard profiles cause problems with crossings. The shape of the channel is often such that a cut down cannot be used or standard sump-covers do not fit. As a result, special covers need to be made or standard covers are installed with the approaches modified to allow their use, in both these cases costs increase.

The Road Maintenance Contract stipulates the following general performance measures for drainage facilities:

> *The Contractor shall inspect all sites and programme the necessary work to ensure that the specified level of service is met at all times. All work undertaken shall be recorded and reported through the specified Achievement Reports.*
>
> *Routine Works shall include:*
>
> - *Cleaning of culvert inlets & outlets, slot drains, subsoil drains, shoulder cut outs (or placing as required), flumes, sock drains and roadside drains other than water channels.*
> - *Cleaning of minor blockages in water channels that can be accomplished (in the opinion of the Engineer) with hand tools.*
> - *Cleaning of vehicular access culverts.*
> - *Cleaning of grates and sump tops.*
> - *Cleaning of sumps, manholes, cesspits, and catch pits/soak pits.*
> - *Cleaning/replacement of culvert markers including placement of the relevant culvert number.*

Further information relating to street cleaning is in the located at the end of this section under the Environmental Management heading.

7.3.4.1 Strategy

Culvert maintenance is the work necessary to keep the waterway clear of debris throughout the length of the culvert, its approach and discharge channels. The maintenance specifications require that 90 % of the waterway is clear of debris for the length of the culvert, including 5 m in front of the inlet and outlet.

The Council takes a proactive approach to culvert maintenance, through regular inspections and appropriate maintenance. Otherwise, considering the nature of the asset, culvert replacement and renewal can be considered as more reactive — based on problems that may arise.

7.3.4.2 Processes

Inspections

The contractor is required to inspect all culverts annually and keep their entranceways clear and free of vegetation and debris. The inspections identify issues that may need to be considered as part of the forward works programme for future maintenance repair or complete renewal.

Occasionally the Engineer may direct a culvert replacement as part of an upgrade of a storm water drain or water race system.

Culverts are cleaned where possible in conjunction with each inspection. Debris, including all litter, rubbish, detritus, flotsam and vegetation is removed from culverts so that normal water flow is maintained and care is taken so that the culverts are not damaged during cleaning operations. Culvert inlet and outlet structures and the areas immediately adjacent to these are also cleaned.

- ***Unplanned maintenance***: The road contractor is required to maintain an effective communication system and level of preparedness to ensure emergency works are undertaken as soon as possible after notification.
- ***Planned maintenance***: Damaged and malfunctioning assets identified by Council staff, contractor reports or the public are programmed for repair according to the following criteria:
    - Public safety.
    - Accelerated deterioration of the adjacent pavement is occurring, or is likely to occur.
    - Inconvenience occurring to road users, pedestrians and/or property owners.
    - Untidy appearance.

- Optimisation of complementary work scheduling.

Culverts that cross private entranceways, or side culverts, are the responsibility of the property owner, however, these are maintained at Council discretion if blockage poses a threat to the carriageway.

Standards

All maintenance standards for culvert maintenance are specified within the maintenance contract. Work is carried out in accordance with good work practice using materials and profiles that conform to the adjacent sections of channel to ensure all culverts remain in good working order at all times. They must also comply with the relevant current standards and specifications for materials and construction practice e.g. angle of slope to carry water.

Deferred Maintenance

The impact of deferred maintenance is accelerated deterioration and gradual blockage of culverts. A partial or complete blockage of a culvert would encourage storm water runoff to flow over the road surface, not under it, potentially scouring the road surface and affecting the pavement sub base beneath the seal. This may then affect the structural integrity of the road pavements.

7.3.4.3 Sumps and Catch Pits

The contractor is required to maintain the following levels of service regarding maintenance and cleaning of sumps and catch pits:

> *Sump tops shall have 90 % of their grate waterway area clear of the debris, detritus, or other material at all times. Sump tops, vehicle crossing culverts, and slot crossings shall not be allowed to block with debris such that flooding occurs or has the potential to occur, all times cesspits, catch pits and sumps shall be clear of debris and detritus to a level at least 100 mm below the level of the outlet invert level.*

Maintenance Forecast

The forecast cost of sump maintenance is included in the sums provided for street cleaning unless the sump is damaged or crushed.

Street Cleaning activities are only partially funded under NZTA Work Category 113 – Routine Drainage in the Council's Land Transport Programme. Only 30 % of the total expenditure of street cleaning within 2m of the edge of carriageway is eligible for funding. The remaining 70 % must be fully funded by Council.

Deferred Maintenance

The impact of deferred maintenance is the inability to carry the design flows with a corresponding decrease in levels of service with respect to storm water control.

The maintenance contract is structured to ensure the level of service is maintained, there is currently no deferred maintenance.

7.3.4.4 Surface Water Channels

Clean hard-surfaced channels carry storm water more efficiently. Kerb and channel cleaning is therefore an important activity and is not just done for aesthetic reasons i.e. to make the channels look tidier. This work is carried out as part of the overall road maintenance contract, which specifies the frequency and standard of cleaning.

Strategy

- ***Condition inspections***: The Council's engineering staff and the road maintenance contractor report any defects observed in day-to-day road maintenance activity. RAMM rating surveys on sealed roads record whether high shoulders are present, which provides a good indication of the current effectiveness of the corresponding surface drainage systems.

- ***Unplanned maintenance***: The road contractor is required to maintain an effective communication system and level of preparedness to ensure emergency works are undertaken as soon as possible after notification.

- ***Planned maintenance***: Damaged and malfunctioning assets identified by Rangitikei District Council staff, contractor reports or the public are programmed for repair according to the following criteria:

    - Public safety.
    - Accelerated deterioration of the adjacent pavement is occurring, or is likely to occur.
    - Inconvenience occurring to road users, pedestrians and/or property owners.
    - Untidy appearance.
    - Optimisation of complementary work scheduling.

Inspections

The Council's staff and the road maintenance contractor report any defects observed in day-today road maintenance activity. Condition surveys are undertaken annually by an independent contractor with results stored in the RAMM database.

Unplanned Maintenance

The road contractor is required to maintain an effective communication system and level of preparedness to ensure emergency works are undertaken as soon as possible after notification.

Planned Maintenance

Damaged and malfunctioning assets identified by Council staff, contractor reports or ratepayers are programmed for repair according to the following criteria:

- Public safety.
- Accelerated deterioration of the adjacent pavement is occurring, or is likely to occur.
- Inconvenience occurring to road users, pedestrians and/or property owners.
- Untidy appearance.
- Optimisation of complementary work scheduling.

Shallow SWC – Swales

To address the performance issues, high shoulders on the carriageway sides of swales are periodically removed. This is done on a cyclic basis in conjunction with pre-reseal repairs on sealed roads and metalling, grading and other pavement renewal works on unsealed roads. The swales themselves are also reformed and improved as part of this complementary work.

Currently high shoulder removal work and swale reformation is classified as maintenance. However, because of its longer-term cyclic nature it can also be considered a renewal.

Deep SWC – Drains

Adequate maintenance will keep these channels functioning indefinitely. They are cleaned by mechanical diggers when the build-up of detritus is sufficient to impair their performance. Some drains are also sprayed to control vegetation, especially woody weeds. When these drains are permanently wet, this work is subject to Horizons resource consents, which are obtained by the contractor.

Figure 41: Deep Surface Water Channel (Watson St, Bulls)

Cut-outs

Cut outs are channels cut through sections of high shoulder to allow water to drain off the carriageway. These are in place on sections of road that require shoulder removal but have not yet had the work approved, usually along unsealed roads. The cut outs should be shaped so that vehicles are able to drive through them if necessary. This is usually done by the grader while maintenance grading in the area.

Maintenance Forecast

The maintenance of unlined surface water channels is budgeted under NZTA Work Category 113 - Routine Drainage Maintenance in the Council's Land Transport Programme

Deferred Maintenance

The impact of deferred maintenance is accelerated deterioration of unlined surface water channels and the adjacent pavements, with a corresponding lower level of service with respect to ride and storm water control. It can also be a safety issue if water is sufficiently wide spread and deep to cause vehicles to aquaplane and lose control.

There are currently no specific areas of deferred maintenance on the Rangitikei road network as the maintenance contractor carries out this type of work on a continual basis. However, surface water channel maintenance along roads requires constant inspection and can quickly deteriorate. This becomes most apparent after heavy rainfall, when puddles begin to form on roads that may be reduced in size or eliminated, by the removal of a high shoulder or localised improvements to the surface water channels.

7.3.5 Renewal Plan

7.3.5.1 Assumptions

When considering road drainage such as kerb and channel, specific assumptions can be categorised into two main points:

- An appropriate renewal programme will be funded – maintenance costs will increase if renewals are deferred.
- Maintenance costs will increase in proportion to the increase in kerb and channel length.

7.3.5.2 Strategies

Street upgrade projects are usually seen as township projects, and as such become part of the identification and prioritisation processes that the Council engages in with Township Committees and Community Boards when it prepares its forward programmes. However, there are usually good engineering reasons supporting such programmes, often related to the state of the kerb and channel, and that can be significant contributors to the prioritisation process.

7.3.5.3 Standards

While much of the old channel is located at approximately 3 m from the edge of the road reserve, its replacement is optimised to meet current engineering and planning standards. This can require the width of the adjoining carriageway to be reduced from the existing width to a more appropriate sealed width, relevant to the volume of traffic using the road assessed by annual average daily traffic counts.

Older streets also often have an area of metal or grassed shoulder between the edge of the formed carriageway and the old channel e.g. Main Street, Marton. In these circumstances, the replacement kerb and channel is likely to be positioned at the immediate edge of the carriageway and a new berm and footpath created behind it. This will create a lower asset life cost and is more practical and aesthetically pleasing.

Replacement kerb and channel is installed to the same standards as new, using appropriate engineering standards and the same cross-sectional profiles.

7.3.5.4 Programme

To establish a renewal programme there is a need to undertake specific inspections of the worst channels as identified by the annual RAMM condition rating. The economics of renewing these lengths should then be reviewed and the renewals programmed appropriately. Renewal of kerb and channel is justified when more than 30 % of the length of the channel is broken or damaged beyond practical, repair or there is extensive damage to the adjacent carriageway.

There is also a need to validate existing data to enable renewal forecasting, this is discussed later in this section of the AMP.

Under the current NZTA criteria, renewals can only generally be considered for funding if the condition of the kerb and channel is contributing to the deterioration of the adjoining pavement formations and the work will reduce future maintenance costs. On these bases, there currently are few renewals that can be justified for funding.

A renewal programme is to be developed as described above and is an identified task in the Improvement Plan. An element of this task is to maximise any potential to fund renewals through the subsidised Land Transport Programme using NZTA Work Category 213 – Drainage Renewals.

7.3.5.5 Culverts

Culverts are renewed when they are unable to perform their functions safely and satisfactorily to the agreed level of service. This can occur through blockage from detritus, corrosion, change in run off characteristics requiring a greater waterway length or capacity etc.

Each culvert has a condition rating assessment to provide a general overview of culvert quality within a street or town. The monthly culvert inspection report submitted to Council provides a basis for assessing which culverts should be considered as part of a renewal strategy. Currently, road culvert renewals are assessed on an individual basis taking into consideration:

- Appropriate diameter size culvert for volume of water runoff.
- Suitable length of culvert to ensure culvert stretches far enough outside of road edge.
- Surrounding vegetation and risk of blockage.
- Other factors specific to each location.

Renewal of large culverts, being greater than 3.4 m^2 in diameter, is discussed in the Bridges section of this plan.

7.3.5.6 Sumps

Sump renewals, because they are so closely tied to kerb and channel renewal, and are relatively low cost items, are not programmed or budgeted separately.

Occasionally the need for replacement is determined by inspection and the monitoring of drainage performance during periods of heavy rainfall, however, sumps are normally renewed when the kerb and channel they serve is renewed. Parts of the original sumps may be reused, e.g. the piped outlets, this is done on a case-by-case basis and generally for practical rather than cost reasons.

The primary reason for renewing sumps is usually a consequence of street upgrade projects. As the sumps are unlikely to be replaced in their existing positions when kerb and channel are realigned and it could be argued that in this circumstance the new improvement works category is most appropriate. However, as the capability to receive stormwater in the approximate location that is being renewed, it is more appropriate to consider this work renewal.

7.3.5.7 Kerb and Channel

Replacing isolated sections of kerb and channel can be impractical, as it is likely also require the partial reinstatement of the adjoining footpath and pavements, and it is therefore best performed as part of an integrated programme. Kerb and channel renewals therefore usually take place in conjunction with the upgrading or reconstruction of the adjacent pavement sections, footpaths and berms, usually as part of street upgrade projects.

Current condition rating data shows that almost 1 % of kerb and channel is due for replacement as it is in very poor condition. As this length is represented as a percentage of broken channels per length surveyed, the actual length that is replaced may vary due to site specific requirements. For example, it may be sensible to replace an adjoining length in poor condition or to extend the replaced length for growth or aesthetic reasons.

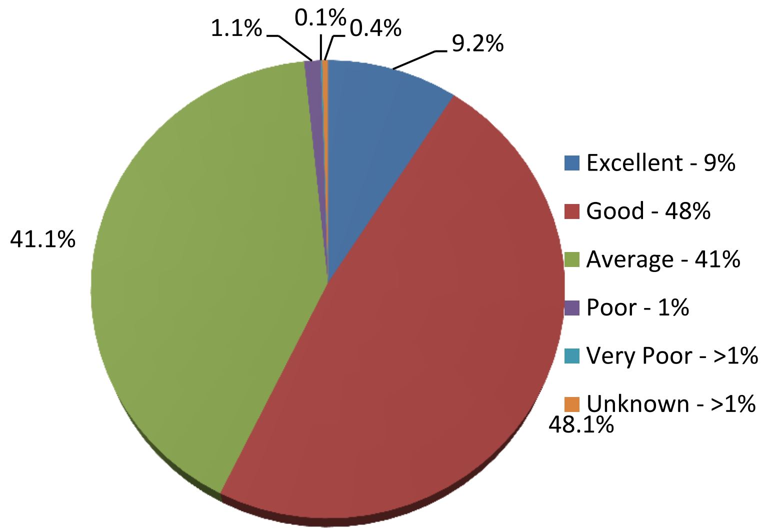
7.3.6 Condition, Performance and Capacity

7.3.6.1 Culverts

Condition

Culverts are fully inspected for any form of damage on an annual basis throughout the District, with inlets and outlets being checked for detritus build up or blockage much more frequently to meet the required level of service. Condition is assessed and results are stored in the RAMM database. The current condition of all culverts within the District is detailed in the chart below.

Figure 42: Asset Condition - Culverts



The chart suggests that almost 90 % of the culvert assets are in an average or good condition with 9 % rated as excellent. This demonstrates that the drainage systems are currently working to an acceptable standard with a need for gradual improvement over time.

As a subsurface asset, problems are often not apparent until these manifest themselves indirectly. For example, a breakage under the carriageway may result in localised settlement or slumping of the road surface. Usually when this occurs, it is evidence of a fault or defect that has been developing over some time. Problems are aggravated and failure rates increase when traffic loadings increase over a given stretch of road.

Performance

Performance issues for culverts relate to:

- Pipe capacity;
- Variable performance caused blockages;
- Downstream channels being impeded by fences and debris build up beyond the road reserve;
- The adequacy of supporting storm water collection and disposal systems; and
- The types of pipes and jointing systems used.

In addition, there can be safety issues around the lack of adequate barrel length restricting the flow of traffic by narrowing the carriageway.

Expected Useful Life

Drainage assets have default service lives of approximately 80 years. Differing operating conditions often dictate premature failure, high volumes of heavy traffic movement over culverts for example, as would be the likely cause of the failure of the culvert in the image shown.

Figure 43: Large Culvert Approaching End of Useful Life

The expected life calculation is reliant on an accurate construction date for each asset so its end of life can be assumed. Most RDC culvert data lacks accurate construction dates so this assumption cannot be made with certainty. An arbitrary date is added to assets with no construction date for valuation purposes, but as this is added across the board, there is little confidence in the valuation data for these assets. An item is included in the improvement plan to construe construction dates from known information for other assets in similar locations.

7.3.6.2 Sumps and Catch Pits

Condition

Sumps are generally in serviceable condition throughout the District. RAMM does not currently carry in depth information regarding the condition assessment of road sumps. They are not subject to any condition rating inspections but are inspected and cleaned regularly which ensures they remain in a serviceable condition.

Performance

Sumps are performing well in most conditions. The greatest issue is build-up of leaf debris on their grates in autumn. This can be a particular problem when strong winds and heavy rain coincide. This is a maintenance issue and is resolved through additional road maintenance at the appropriate times.

More regular cleaning also results from their increasing function to trap sediments and contaminants as part of a consented storm water treatment and disposal system in urban areas.

Expected Useful Life

As detailed above, the replacement of sumps and catch pits is normally dependent on the associated Kerb and channel. The expected life of sumps and catch pits is aligned with Kerb and channel and is set at 80 years.

The expected life calculation is reliant on an accurate construction date for each asset so an end of life assumption can be made. Historic sump and catch pit data lacks accurate construction dates so this assumption cannot be made with certainty. An arbitrary date is added to assets with no construction date for valuation purposes, but as this is added across the board, there is little confidence in the valuation data for these assets. An item is included in the improvement plan to construe construction dates for kerb and channel assets, once this information is obtained construction dates for the associated sumps and catch pits will also be added.

7.3.6.3 Surface Water Channels

Condition

The extent of deterioration of kerb and channel depends on age, method of construction, the quality of materials and location (damage can be caused by heavy traffic driving over kerb, tree roots etc.). The main factor causing deterioration is age, with the bottom of the channel failing (in particular in the older dish channels), allowing water to soak into the sub-grade and the adjacent basecourse of the pavement.

Table 47: Condition Ratings – Surface Water Channels

Grade	Condition	Length Broken (%)
1	Excellent	< 5
2	Good	≥ 5 and < 10
3	Average	≥ 10 and < 20
4	Poor	≥ 20 and < 30

Grade	Condition	Length Broken (%)
5	Very Poor	≥ 30

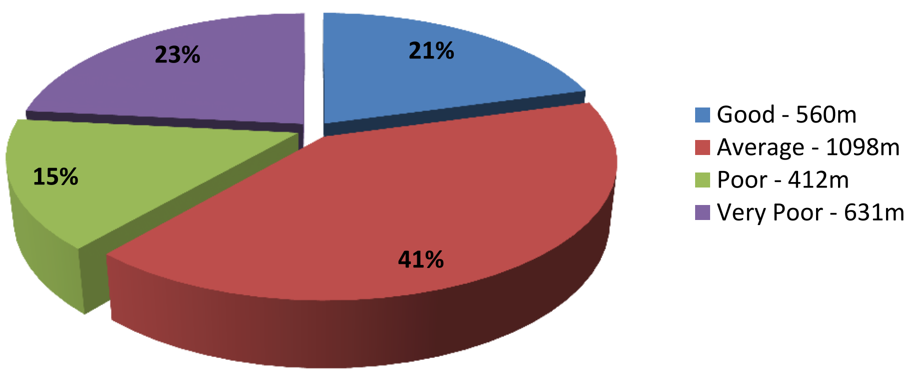
Physical inspections of sealed carriageways are undertaken at regular intervals and a rating system is used to quantify defects, including kerb and channel defects. Using this system, an indication of the general condition of the surface water channel along any given road is assessed from rating data using the fault “broken channel”.

Each surface water channel is given a condition rating based on the percentage of the channel length that is broken, as detailed in the following table. The condition rating is based on selected fundamental fault types; it does not take account of other defects such as cracking, spalling of concrete and poor vehicle crossings that can detract from the level of service.

Kerb and channel in excellent condition with no visible defects cannot be shown, as there is no value recorded in the data.

The following chart shows defects found during a recent sealed road condition rating survey. Defects shown are detailed as a percentage of each section of kerb and channel and the length of defects found totals, which is approximately 2 % of all kerb and channel.

Figure 44: Kerb and Channel Defects (2013 Survey)



The chart above shows that on this scale:

- The kerb and channel is generally in excellent condition – This is expected as most was constructed within the last 40 years to good standards and quality.
- Renewal / repair of the assets in very poor condition are needed, followed by renewal of the assets in poor condition as their condition deteriorates.

Shallow SWC – Swales

Swales generally maintain their shapes reasonably well. However, there is a gradual deterioration over time because of the build-up of vegetation, soil and sometimes road metal along the edge of the carriageway known as high shoulder. This occurs on both rural sealed and unsealed roads but is more rapid on the latter where it is exacerbated by normal maintenance grading.

The effect of grading is to build up the edge of the berm, which then retains a proportion of the storm water on the road surface for longer than would otherwise occur. This allows a greater opportunity for water to seep into the pavements' structural layers. On unsealed metal roads, it combines with passing traffic to develop large potholes rapidly.

Vegetation in the invert of the swale has little direct effect on a channel's performance, except it is now recognised that vegetation such as grass can filter out contaminants and improve water quality before it goes sub surface either naturally or via soak holes.

Based on knowledge and condition assessment, the current condition of swales is:

- They are generally in good condition where recently formed.
- High shoulders are present on smaller, less trafficked roads to varying extents where the seals are in the last part of their lifecycles.

Deep SWC – Drains

Deep drains within the road reserve can serve one of the following functions. They can be:

- ***Road Drains*** - built to carry large volumes of water running off the road or to protect the road from high ground-water levels.
- ***Land Drains*** - draining adjacent farmland but not serving any additional road function. These are generally found in Drainage Districts and the road network often pays a contribution to their maintenance in recognition of the benefits it receives.
- ***Shared Drains*** - as the name implies the benefits are shared between the property owner and the road.
- ***Private Drains*** - sometimes built on the road in the early days of settlement as a matter of convenience; they allow more secure fencing of the land and are often easier to clean. Maintenance is the responsibility of the landowner.

Drains generally deteriorate slowly. The major issue they face is slow accumulation of sediment as material is precipitated from storm water and loss of capacity through growth of vegetation.

Based on knowledge the current condition of drainage assets, the deep SWC are generally in good condition, with no known recurring problems caused by inadequate maintenance.

Expected condition is based on condition ratings, as the overall percentage of faults found is just over 1% of the entire length of the asset, the assumption that kerb and channel assets are in very good condition can be made with confidence.

To forecast expected condition accurate construction dates are required, as this information is not currently available.

Performance

Performance issues for kerb and channel assets relate to:

- The profile of the channel – older dish channel has more capacity but is more prone to disintegration and blockage;
- Variable performance caused by different and substandard vehicle crossings on older styles; e.g. blockages and breakages;
- The integrity of the channel, which is dependent on standard and quality of construction. Older types are more likely to be substandard;
- The effects of impact damage associated with vehicles at entranceways, and heavy vehicles elsewhere;
- Poor gradient or other alignment problems;
- Blockages from debris build up; and
- The adequacy of supporting storm water collection and disposal systems, e.g. sumps and pipe reticulation.

Sub-standard sections are identified for repair or reconstruction together with footpath rehabilitation works, to complement adjoining work. Kerb and channel condition and footpath condition are major factors in the consideration of street upgrade projects. Renewal of both of these assets is considered complementary work and there are practical and economic advantages in renewing both at the same time and in conjunction with street upgrading works whenever it is reasonable to do so.

Expected Useful Life

When new kerb and channel is constructed, the associated RAMM record is assigned a default service life of 80 years. Condition is monitored regularly with renewals and maintenance work based on condition rather than age.

Older assets do not have accurate construction dates so forecast based on age is not possible. An item has been added to the improvement plan to estimate construction dates for older assets based on other known construction dates for assets in the same area.

7.3.7 Asset Improvement and Development

7.3.7.1 Culverts

The need for new culverts generally arises from the need to improve or resolve identified drainage issues such as pooling of water around the outlet or inlet. When drainage issues are identified at a culvert, it is common to upgrade to a larger pipe diameter if possible to address the current, inadequate capacity. The upgrade process may also take into account an adjustment in slope of the pipe to allow a quicker or slower transition of water through the culvert. This upgrade process is commonly carried out in combination with water tabling clearing at the inlet and outlet of the culvert to ensure water is free flowing upon completion of the upgrade.

7.3.7.2 Kerb and Channel

New sections of kerb and channel are acquired when:

- New sections of kerb and channel are constructed in townships by the Council where there was no kerb and channel previously (kerb and channel extension).
- New kerb and channel constructed by the Council as part of rural intersection improvements (quadrant kerbing).
- New kerb and channel is vested in the Council after it has been constructed in new subdivisions by private developers.

Criteria used for justifying new kerb and channels include:

- Evidence of ponding/flooding.
- Incompatibility with agreed urban standards.
- High cost of maintaining existing stormwater control.
- The need for carriageway edge definition and/or separation of footpath/pedestrian areas from a carriageway.

Priorities are allocated following evaluation of pedestrian usage, safety issues, stormwater control needs and the number of residential properties to be served. However, Township Committees play a significant role in determining relative priorities when township improvement projects are considered.

New kerb and channel extension can be combined with new footpath extension, and associated berm improvements, to provide an integrated and comprehensive upgrade to a section of berm. This type of work mostly comes about where Roading upgrade contributions have been applied on consented subdivision developments.

The timing of new subdivisions, and the amount of kerb and channel that is constructed in them, is dictated by respective private property developers and is strongly influenced by market forces. This work is not funded by the Council unless a Roading upgrade contribution has been sought as part of a consented subdivision or a Council activity or project eventuates from the consent.

Apart from those works associated with street upgrades, other opportunities to provide new kerb and channel include improvements to the carriageway such as seal widening in urban areas, area wide pavement rehabilitation projects and as part of subdivision commitments.

7.3.7.3 Other Storm Water Channels

Priorities are allocated following consideration of costs, effects on pavement life, other programmed works, safety issues, and storm water control needs. As work is so intimately bound with other maintenance activities, development of storm water channels has traditionally been regarded as a maintenance activity. This may be subject to change in the future if deemed more necessary however; the Improvement Plan does not contain an item to review the present practice.

The location of new swales in the carriageway cross-section is determined largely by the road’s hierarchy and the associated width standards.

The specification for this work requires shallow trafficable swale to be formed with the invert 2.0 to 3.0 m from and 150 to 300 mm below the edge of the carriageway where possible. The tapered slope is generally set at approximately 1:10. However, modifications are often made to these specifications based on the specifics of a given road and the required result.

All cut material is removed from the site and care is taken to ensure that access to mailboxes and farm gateways is not impeded by the formation of swales. There may also be a need to place metal and/or a small culvert at these sites to provide access or occasionally to relocate letterboxes.

The procedure employed where the existing roadside is maintained to a high standard by the adjacent property owner, is to reinstate the trimmed area to a condition that allows it to be mown to the previous standard once vegetation re-establishes. Rural roadsides are not re-sown with grass after high shoulder removal. However, the removal of high shoulders and the formation of any swales in these situations still need to accomplish a continuous well-draining profile to ensure good drainage along the whole section of the road.

Roadside berms, when disturbed by Roading activities are generally left in a condition that allows mowing with a tractor mounted mower.

The timing of new rural subdivisions, and thus the swales they contain, is under control of the respective property developers and is strongly influenced by market forces. This work is not funded by the Council and is not programmed in this, or any other Council plan.

7.4 Bridges

The purpose of road bridges is:

> *To provide continuous all weather access over rivers, streams and uneven terrain, and grade separation over railway lines and other roads.*

While the plain English definition of a bridge is applicable for the purposes of this Plan, information in this section also includes major culverts, in accordance with standard NZ practice, which in turn utilises the definition adopted by the NZ Transport Agency (NZTA). This states that the definition of a bridge includes structures such as major culverts if they have a waterway area greater than 3.41 m^2, for a round pipe this is equivalent to a the pipe having a radius of greater than 1.04 m or 42 inches.

The Council maintains 253 bridges (this total includes 96 major culverts) ranging in size from small timber bridges to the 140 m long Mangaweka Bridge over the Rangitikei River on Ruahine Road.

Figure 45: Mangaweka Bridge

There are eleven bridges that straddle the District's boundaries. Three are state highway bridges which the Council has no responsibility for. Responsibility for the other eight bridges is shared as follows:

Table 48: Boundary Bridges

Road Name	Bridge Name	Plate Year	Responsibility
Taihape Napier Road 2	Kurapaponga Bridge	1961	HDC / RDC

Road Name	Bridge Name	Plate Year	Responsibility
Mangamahu Road	Whylies Bridge	1955	WDC / RDC
Kauangaroa Road	Kauangaroa Road Bridge	1974	WDC / RDC
Otara Road	Otara Bridge	1962	MDC / RDC
Mangarere Road	Mangarere Bridge	1966	MDC / RDC
Kawhatau Valley Road	Powerhouse Bridge	1975	MDC / RDC
Ruahine Road	Mangaweka Bridge	1899	MDC / RDC
Halcombe Road	Kakariki Bridge	1968	MDC / RDC

Some significant bridges provide access for agricultural transport while others provide for tourism and recreational activities. Other significant major river bridges in the District are on state highways administered by NZTA.

Bridges range in age from those constructed in the last decade to those constructed in the late 1800s.

The majority of older bridges are constructed of timber and are relatively short in length, being over small natural and formed watercourses. These bridges receive the majority of routine maintenance attention.

Most original bridges over the larger rivers were replaced with modern concrete and steel structures in the latter 30 to 40 years of the 20th Century.

The majority of larger culverts are constructed of concrete of varying quality depending on their age.

Figure 46: Bungy Jumping at Mokai Bridge

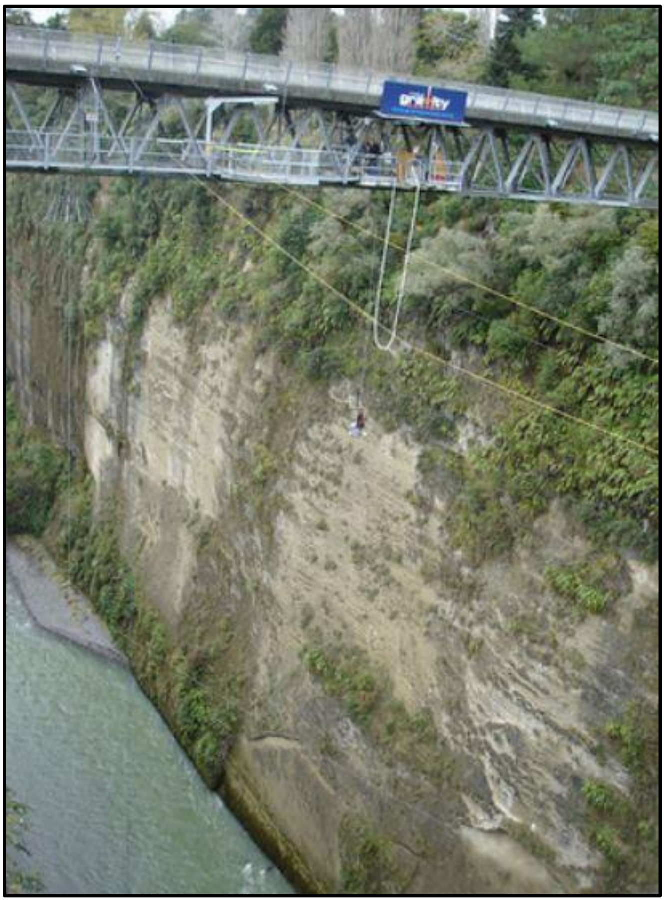
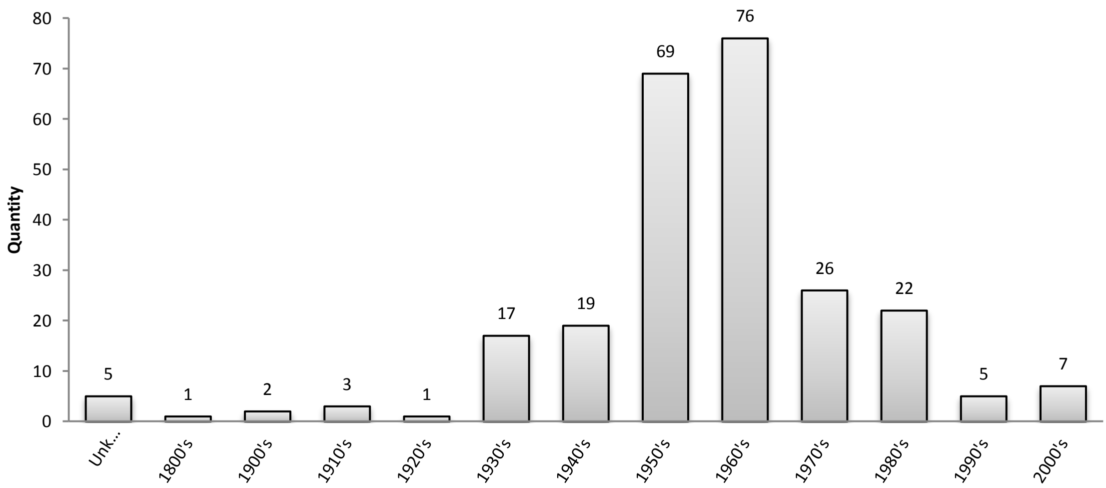


Figure 47: Installation Years – Bridges and Large Culverts



Bridges are constructed from various materials including timber, steel and concrete. As the District was colonised smaller bridges were made of timber. As time progressed larger bridges were made of steel, composite structures of both timber and steel were also constructed.

Typically, timber was used for decks and steel for the superstructure. Piles utilised either material. This has created some difficulty with the long-term maintenance of bridge structures, as the different materials age and deteriorate at different rates.

Nearly all bridges are now constructed from concrete, utilising high quality precast components. Smaller timber bridges are being replaced with precast box culverts that can be quickly put into position.

Timber, including Australian hardwood that was the early material of choice for most bridges, is the least durable of all the materials available and is prone to rot, insect attack and natural defects such as cracking, splitting and in the case of timber decks, surface abrasion. Steel is more durable but is subject to rust and consequently must be well protected by surface coatings to prevent deterioration.

Concrete structures while potentially the most durable can suffer from carbonation and chloride attack, which can allow internal reinforcing steel to rust or concrete to degrade. Poor or inappropriate structural detailing and construction of concrete structures can significantly influence their longevity and the potential for expensive rehabilitation work during the life of the structure.

This is more prevalent in older structures where these types of defects have become evident by the passage of time.

Key issues relating to the management of road bridges are:

- Older timber bridges reaching the ends of their practical and serviceable life spans;
- Higher demands on older bridges from heavier and more traffic than originally anticipated when built, e.g. forestry, dairy, stock transport at 44 t and 50 t gross compared with 16 t to 20 t 40 years ago;
- Maintenance liabilities with some types of older bridges from poor detailing and construction methods;
- Increasing awareness of safety related issues with older bridges, e.g. one lane, inadequate approaches, guard railing;
- Striking the correct engineering and social balance between an appropriate level of service and cost, e.g. bridge replacements or refurbishments;
- Obtaining financial assistance (subsidy) for replacements or new bridges; and

- Obtaining resource consent for major works in or adjacent to watercourses under the Resource Management Act and any subsequent on-going obligations this can result in.

Bridge data is stored in Councils RAMM database in the Bridge Table. Although large culverts are maintained as bridges they are still deemed to be drainage assets with the asset information being stored along with other drainage assets in the Drainage Table. For ease of maintenance there is a link between the two tables, so large culverts appear in the bridge table along with bridges. There are some data integrity issues with the waterway area information, which distinguishes large culverts from smaller culverts. Desktop validation of data was carried out prior to the 2013 Asset Valuation which uncovered some duplication between assets identified as normal culverts and large culverts, overall confidence levels in large culvert attribute data is low. This information needs to be validated from on-site inspection and will be reviewed and corrected as part of the RDC improvement plan.

Table 49: Asset Description - Bridges

Type	Number
Large Culvert (Drainage Assets)	96
Comp Beam and Slab	80
Deck Arch	2
Deck Truss	13
Non Comp Beam & Slab	3
Portal frame	1
Precast Units - Slab	17
Precast Units Only	29
Suspension	4
Through Truss	2
Unknown	3
Other	3
Total	**253**

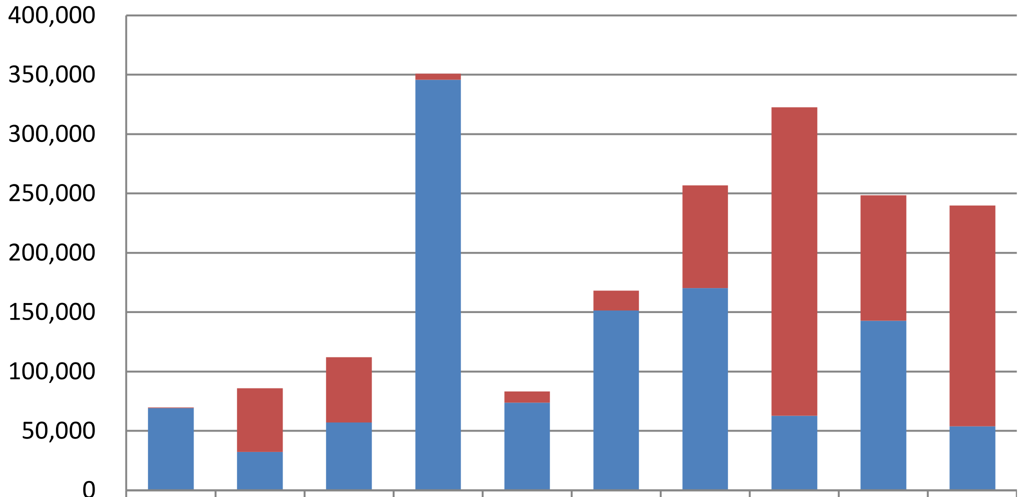
The value of the bridges asset is derived from the Rangitikei District Council Asset Valuation Report 2013. The Bridge assets account for 16 % of the total transportation asset group with large culverts representing a further 2 %, figures are based current replacement costs and are summarised in the following table:

Table 50: Asset Valuation - Bridges

Asset Type	Component	ORC ($)	ODRC ($)	Annual Depreciation ($/year)
Bridge	Bridge (Culvert)	11,155,988	5,042,040	112,641
	Bridge (Deck)	87,383,742	42,946,614	800,063

The graph below shows both historic expenditures and the values of maintenance and renewal works funded by the Council.

Figure 48: Historic Expenditure - Bridges



	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13
Bridge Renewals	$680	$53,861	$54,876	$5,166	$9,359	$16,686	$86,472	$260,000	$105,536	$185,878
Bridge Maintenance	$69,093	$32,120	$57,052	$345,633	$73,771	$151,346	$170,297	$62,688	$142,826	$53,832

7.4.1.1 Hazards

Bridges, culverts and structures are at risk from natural hazard events such as earthquakes, floods and the failure of attached and adjacent services e.g. water mains. It is only in recent times that adequate earthquake resistance has been incorporated into bridge designs.

The following table lists the strategic and other bridges considering their susceptibility to risk, difficulty or expense to replace and impact of loss. Bridges that do not create isolation problems and are not difficult to repair or replace are not listed. Nevertheless, all bridges are subject to risk from natural hazards. The failures or losses of bridges that support other services, like water mains and fibre optic cables, can also attract significant risks for the operators of those utilities.

The information in the table draws from the Manawatu-Wanganui Regional Lifelines Project. There is more information on critical routes in the Risk Management section of this plan.

Table 51: Risk Summary - Significant Bridges

Road Name	Bridge Name	Length (m)	Replacement Cost ($)	Risk Score		
				Flood	Quake	Volcanic
One Lane						
Mangatipona Rd (88)	Churnsides	65	1,347,884	467	10	498
Ruahine Rd	Mangaweka (BDY)	139	2,177,351	991	991	50
Mangarere Rd	Mangarere (BDY)	100	1,524,146	991	991	50
Otara Rd	Otara (BDY)	109	1,679,671	991	991	50
Two Lane						
Kakariki Rd	Kakariki (BDY)	96	5,474,508	173	58	1
Kauangaroa Rd	Kauangaroa	93	2,983,179	467	10	498

With a combined length of 602 m, these bridges comprise 15 % of the total length of the bridge asset. Based on a combined replacement cost of $15 million they comprise 15 % of the 2013 valuation of the bridge asset. Thus, on this financial basis alone, there is a reasonable exposure to risk from adverse events to bridge assets.

7.4.2 Operation and Maintenance Plan

7.4.2.1 Performance Deficiencies

RDC holds poor data on stock underpasses. The RDC Policy Manual states that in order to monitor the structural integrity of the underpass the Council will arrange for inspections of all stock underpasses as part of its bridge and culvert inspection programme. The owner must carry out (and pay for) any maintenance work identified during the inspection which is attributable to the use of the stock underpass by the property owner. An item has been added to the RDC Improvement Plan to locate and record data on all stock underpasses so that the required inspections can be included in the bridge inspection programme with the results recorded as they are for RDC owned assets.

RAMM contains unreliable data relating to culvert inlet area which identifies large culverts and dictates their inspection and maintenance requirements. There is also some duplication between standard and large culverts. Correction of this data will require on site validation of data it is intended that this is to be a requirement of the next bridge inspection contract.

The correlation between current condition and reaming useful life could be more closely aligned. Currently the remaining useful life is assigned when assets are valued using a standard table relating to construction dates and type of construction. Improvement could be made in this data so it is more aligned with condition rather than the construction date.

Currently boundary bridges are valued independently of neighboring local authorities; this could result in distorted valuation figures if both authorities are valuing the entire asset rather than their respective portion. An item to align valuation figures between the authorities has been added to the improvement plan.

7.4.2.2 Strategy

Scheduled bridge inspections are undertaken in accordance with NZTA requirements; this is done under contract by specialist bridge inspectors. Bridge inspection staff undergo structured training to ensure consistent results are reported. The inspection cycle is bi-annually for general inspections and on a six-year cycle for detailed structural inspections. The reports supplied include recommendations for any required maintenance or structural repairs.

Routine visual inspections are undertaken by the road maintenance Contractor under the Road Maintenance Contract and occur as part of the Contractor's general network inspection cycle. Inspections are also undertaken during and after events that might threaten the safety or performance of bridges, such as floods, earthquakes or overloading.

The following tables detail the bridge attributes checked during bi-annual inspections:

Table 52: Bridge Checks

General	
1	Appearance
2	Approach Adequacy
3	Signs
4	Vibration
5	Bearings
6	HD Bolts and Linkages
7	Expansion Joints
8	Footways
9	Road Safety Barriers / Handrails
10	Deck Drainage
Superstructure - Concrete	
11	Cracking

12	Spalling
13	Reinforcing Corrosion
14	Other Defects
Superstructure - Steel	
15	Condition of Paint
16	Corrosion
17	Joints
18	Rivets / Bolts
19	Other Defects
Superstructure - Timber	
20	Decay
21	Warping and Cracking
22	Deck Wear
23	Bolts & Spikes
24	Other Defects
25	Date of last boring
Foundations and Substructure	
26	Settlement
27	Cracking
28	Spalling
29	Abrasion
30	Corrosion of Steel
31	Other Defects
Scour and Waterway	
32	River Aggrading
33	River Degrading
34	Waterway Inadequate
35	Erosion or abutments & approaches

36	Embedment of Foundations
37	Other erosion scour risks

Each applicable category is checked and assigned a condition rating based on the following standard. The structure is also given an overall condition rating using the same standard to enable a network overview of asset condition.

Table 53: Condition Ratings - Bridges

Grade	Condition
1	Excellent
2	Good
3	Average
4	Poor
5	Very Poor

The bridge inspection report includes recommended repair options, which are prioritised by the bridge inspector.

RDC engineering staff assess the report findings and the required work is either given to the road maintenance contractor to programme, or to price and action once approved by the RDC engineer, or contracts are let for more specialist structural repairs to be undertaken. Low priority repairs are either programmed or deferred.

The Engineer is in the position of being able to coordinate the amount, type and cost of more complex and expensive work over the whole asset.

Maintenance programmes are developed from the schedules of defects identified during the inspections by both the Contractor and the Engineer. Repair treatments and priorities are determined by considering the impact on:

- Public safety (top priority);
- Traffic movement and road hierarchy;
- Maintaining structural integrity and serviceability; and
- Future costs if the work is not done.

The works in the bridge maintenance programme are the most cost effective responses to the needs identified.

From an asset management perspective, the additional criteria are also required, and are applied to:

- Protect the investment in assets by extending the life of the structure.
- Minimise repair costs.

In addition to the work identified through the routine inspections discussed above, other types of maintenance work can include:

- Repairing structural defects, e.g. concrete spalling, corroded fastenings, rotten timber, undermining of foundations.
- Repairing or replacing damaged components, e.g. wheel guards and handrails.
- Restoring protective coatings, e.g. painting.
- Restoring or cleaning deck expansion joints.
- Watercourse training.
- Repairing road approach and abutment settlements.
- Cleaning around bearings.

7.4.2.3 Deferred Maintenance

The impact of deferred maintenance is:

- The inability to carry the design flows with a corresponding decrease in levels of service with respect to stormwater control; or
- The inability to carry normal traffic loads.

The results of the current detailed structural inspection to be undertaken will determine with improved certainty the extent of any possible deferred maintenance.

7.4.2.4 Standards

- The NZTA Bridge Inspection and Maintenance Manual.
- Relevant New Zealand and other standards for design, construction and workmanship.

Figure 49: Dalzell's Bridge, Kawhatau Valley (Post 2013 Flood Damage)

Figure 50: Dalzell's Bridge, Kawhatau Valley (Maintenance Completed)

7.4.3 Condition, Performance and Capacity

7.4.3.1 Condition

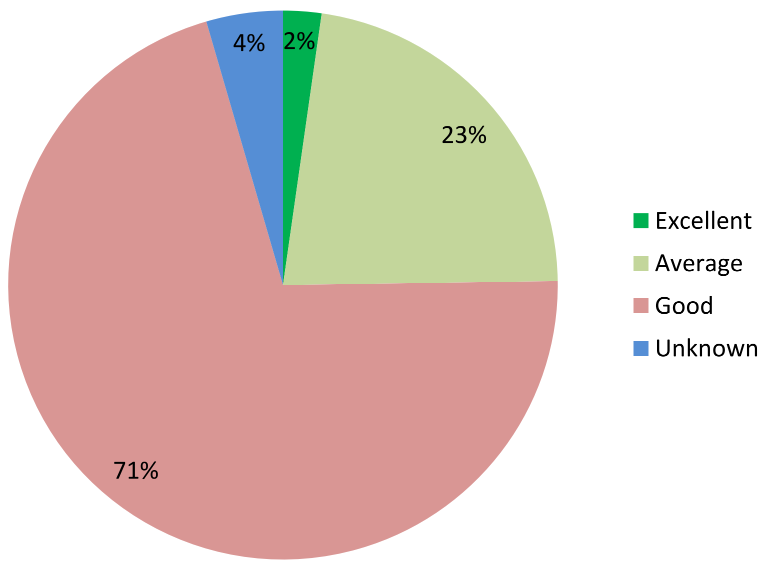
All bridges are maintained a safe condition appropriate to their location, the road hierarchy and posted carrying capacity.

Condition inspections are undertaken in accordance with the NZTA Bridge Inspection & Maintenance Manual as detailed previously.

Current condition assessment information shows bridge assets are generally in good or average condition. The following graph shows results from the latest bridge inspection programme.

The assets in the unknown category comprise of stock underpasses and some assets that were not located during the inspection. A noted previously RDC intends to gather more accurate information on stock underpasses, and investigate duplication of culvert inventory data.

Figure 51: Asset Condition – Bridges (2014)



Further work identified in the Improvement Plan is required to produce a more accurate correlation between condition rating data and remaining useful life. One option for doing this is to structure RDC requirements for information collected whilst carrying out inspections so that asset related data is checked and updated along with the collection of condition related data which may correspond to amendment of the remaining useful life of the bridge.

Note that:

- Bridges complying with older design classifications such as H20-S16-T16 have been categorised as having adequate load capacity unless they have posted restrictions.
- One lane bridges are not classified as deficient purely because they are one lane.
- Where no confirmed loading or posting is recorded, and in the absence of any obvious structural inadequacy or defects, it is assumed that these bridges are performing to at least Class 1 loading.

7.4.3.2 Weight Capacity

The imposition of weight and/or speed restrictions extends the remaining life until renewal or replacement is possible. It should not be expected that restricted bridges would be replaced just because a restriction has been imposed. For some bridges other solutions may be appropriate, because replacement may be uneconomic or unnecessary, especially if they provide access to a single property or very few private properties.

7.4.3.3 Restricted Bridges

In 2010 the Vehicle Dimension Mass Rule was introduced to allow the freight industry to move freight safely, on fewer vehicles, within an appropriately regulated and permitted environment. This was proposed as part of Central Government's direction to make the freight industry more efficient, free up capital for increased economic productivity and create more jobs. An increase of maximum vehicle loading from 44 t to 50 t was approved under the new rule.

In 2013, Rangitikei District Council undertook a review of all bridge structures to ensure they complied with the revised heavy vehicle weight limits. The table below summarises the restricted bridges located within the Rangitikei District. The nine Posted bridges were already identified and have pre-existing Class 1 restrictions, which remain in place.

Table 54: Restricted Bridges

Road Name	Bridge Name	Construction Date	Length (m)	Acceptance of 50MAX
Brandon Hall Rd	Brandon Hall	1958	38	No
Christopher's Rd	Public Trust (Suspension)	1963	43	Posted bridge
Colenso (Makino)	Colenso	1966	19	Posted bridge
Gorge Rd	Knights	1963	51	No
Mangamahu Rd	Whylies (BDY)	1955	80	No
Mangaohane Rd	Mangaohane	1979	90	No
Mangarere Rd	Mangarere (BDY)	1964	98	Posted bridge
Ongo Rd	Blundell's	1960	42	No
Otara Rd	Otara (BDY)	1962	108	No
Porewa Rd	Maungaraupi No. 2	1937	15	Posted bridge
Porewa Rd	Maungaraupi	1937	23	Posted bridge
Pungatawa Rd	Pungatawa	1959	31	No

Road Name	Bridge Name	Construction Date	Length (m)	Acceptance of 50MAX
Ruahine Rd	Mangaweka (BDY)	1898	139	Posted bridge
Scott's Rd	Scott's	1911	10	Posted bridge
Taihape-Napier Rd 1	Kurapaponga (BDY)	1961	59	No
	Springvale	1970	88	No
Te Kapua Rd	Greens	1978	24	No
Te Moehau Rd	Moawhango	1955	42	No
Toe Toe Rd	Toe Toe	1962	81	No
Torere Rd	Taoroa	1956	32	No
Turakina Beach Rd	Cameron's	1961	35	No
Turakina Valley Rd 2	Mcleay's	1972	59	Posted bridge
	Mangara	1958	35	No
	Whareroa ½ Bridge	1975	34	No
Turakina Valley Rd 3	Concrete Ford	1959	42	No
Waikakahi Rd	Pokaka	1912	32	Posted bridge

With a combined length of 1350 m these bridges comprise 34 % of the total length of the bridge asset. Based on their current replacement cost they comprise 22 % of the current valuation of bridge assets.

7.4.3.4 Traffic Capacity

Most one lane bridges are on low volume rural roads. Current and projected traffic demands show no significant issues that warrant bridge replacement or upgrading from one to two lanes, although from a safety perspective two lane bridges are preferable. Usually the additional cost in providing two lanes is not warranted on roads with low traffic volumes.

One lane bridges have less traffic volume capacity and provide a lower level of service than bridges with two lanes. However, not all one lane bridges are deficient in terms of the level of service they provide; on many roads a one lane bridge is all that is required. The current distribution of one lane bridges, by hierarchy, is shown in the table below.

Table 55: One Lane Bridges

Hierarchy	Count	Length (m)
Strategic	2	113
Arterial	3	195
Collector	27	786
Local	105	2176
Total	**135**	**3157**

In total, there are 135 one lane bridges and large culverts owned by RDC. The majority of these structures are located on roads with very low traffic volumes. Notable exceptions are bridges on Ruahine Road, Te Moahau Road and Taihape-Napier Road and Mangarere Road, which are either Strategic or Arterial roads.

The increasing emphasis being placed on providing for other modes of transport, such as walking and cycling, is highlighting potential safety problems with some bridges. These typically arise on longer bridges on rural roads (or road bridges on popular recreational routes) when the bridges are not wide enough to enable pedestrians / cyclists to safely traverse them in conjunction with other traffic.

In some instances, the design of replacement bridges needs to consider whether any additional width is warranted to allow for the passage of over width farm machinery in remote areas where there is no practical detour. To avoid safety problems, care is required in these circumstances to ensure that the replacement bridge is clearly either single or dual lane.

Smaller bridges in rural areas are susceptible to increased traffic volumes and weights from the developments in these areas e.g. forestry and dairy farming. This could potentially have a flow through effect when logging operations are carried out when forests reach maturity.

7.4.3.5 Waterway Capacity

There are no significant problems with waterway capacity and any minor problems are generally isolated to the smaller bridges. As with traffic capacity, any upgrading in waterway capacity warrants consideration only when these bridges are replaced at the end of their serviceable lives.

In the hill country areas, river channels are well contained in gullies and other natural low points. Peak flows can arrive at some sites very quickly and at high velocity, dependent on the intensity and duration of the storm event in the contributing catchment area. This can put significant pressure on waterway protection works and abutments, which can result in damage or losses. The unstable nature of silty soil types found in the northern parts of the

District also has an impact on the bridge structures located in those areas during severe weather events.

In the southern low lying parts of the District, low grades dictate meandering rivers and streams which are susceptible to flooding after high rainfall in the northern catchment areas.

7.4.4 Renewal Plan

Asset renewal is undertaken when a bridge, or a significant component of a bridge, has reached the end of its economic life. This is measured by either its condition or performance.

The types of renewal works undertaken include:

- Replacement of an entire bridge.
- Replacement of individual major bridge components e.g. deck beams, piers.
- Rehabilitation of bridge components that restores the structural integrity of components, e.g. reinforcing repairs.

Renewals are undertaken for the following reasons:

- The entire bridge has deteriorated to the extent that it no longer has the strength to carry its design loads (normal traffic) safely. (As all bridges were built to carry the normal maximum legal load that prevailed at the time, current lack of capacity is generally the result of deterioration or government imposed increases in axle and vehicle weight limits).
- Major components have worn or decayed to the extent that they are preventing the bridge carrying its design loads.
- The waterway's characteristics have altered to the extent that the bridge can no longer pass the design flood flows.
- Flood or earthquake damage has displaced or irrevocably damaged the bridge.
- Major vehicle impact damage.

When a bridge is replaced with a significantly wider or stronger structure the portion of work that is effectively increasing the level of service is classified as an improvement work.

Renewal and replacement needs are identified, and renewal priorities allocated, from inspections and in particular specific structural inspections. The economics of renewing these bridges are then reviewed by looking at the net present value of the various options, including the "do minimum" option, for a 25-year analysis period.

Up until the late 1990s, it was often impossible to obtain the NZTA subsidy to replace small timber bridges using the traditional benefit cost ratio approaches to justify funding, as there were few tangible road user benefits.

The NZTA recognised the problem of the increasing amount of deferred bridge renewals and developed evaluation criteria relating to “Bridge Replacements on Low Volume Roads” allowing easier and simpler funding justification of individual bridge replacements. These requirements are detailed in SP2 of the NZTA EEM. Funding of the Council’s individual bridge replacements, up to a value of $250,000, is now more easily justified. Despite this, some bridge replacements may not be justified, for example if a detour less than 5 km long is available. NZTA have also indicated that from 2012, bridge works of less than $250,000 including the costs of consents, are to be funded from the Minor Improvements budget. This will require a thorough review of the priority of items to be funded from that budget.

7.4.4.1 Uneconomic Bridges

The NZTA, in addition to the criteria allowing funding of bridge replacements on low volume roads, also has a general policy regarding uneconomic bridge renewals. A bridge is considered uneconomic by the NZTA “where the ratio of the total cost of the work to be undertaken per AADT is greater than or equal to $8,000 per vehicle”. However, under this policy financial assistance will be provided for the most cost effective maintenance option.

Economic assessment of bridge renewals also requires the corresponding portion of road serving the bridge to be considered. The NZTA policy goes on to state: “On application, the [NZTA] will consider the eligibility of non-maintenance activities on uneconomic Roading facilities for financial assistance on a case by case basis.”

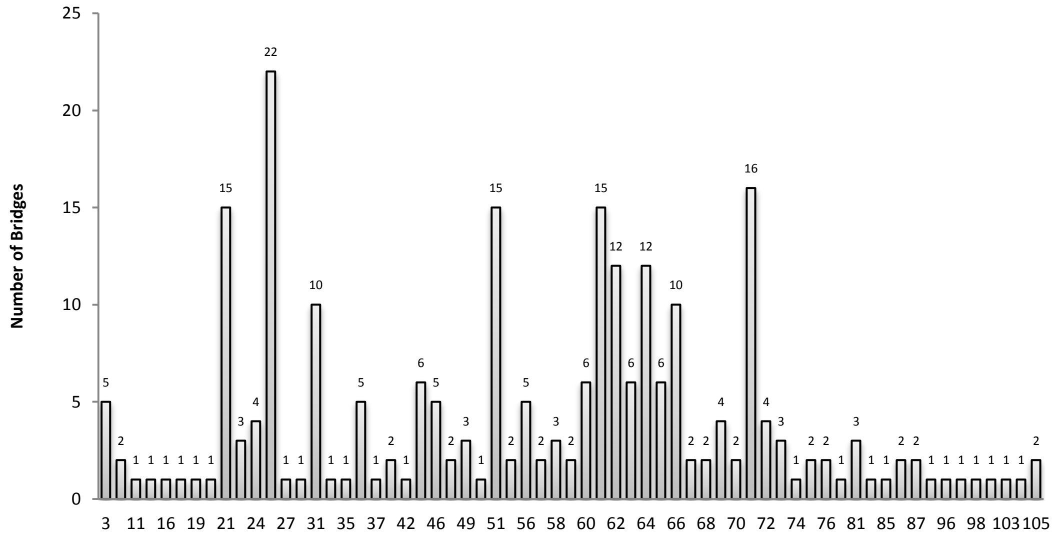
There are no bridges currently considered uneconomic in the Rangitikei District.

7.4.4.2 Bridge Replacements

Bridge replacements are assessed on a “case by case” basis. The Council is aware that ratepayers do not appreciate a bridge not being replaced, as it is deemed an unacceptable reduction in level of service. In rural areas, bridges in more remote areas are used for moving stock and farm machinery along public roads, and are seen as vital for this purpose. In the case of moving stock, the use of fords or long detours is usually not an acceptable alternative.

The graph below shows basic renewals determined using a simple analysis based on an average expected life. While useful for putting the issue of bridge renewals in some context it does not take into account the individualistic and specialist nature of this asset, compared to more routine programmed asset type renewals, for example kerb and channel.

Figure 52: Remaining Useful Life – Bridges (2014)



Theoretical Average Annual Bridge Renewal Requirements

The assessment of long-term renewal needs requires an understanding of the performance and condition of each of the bridges, especially those of the larger and more complex structures.

7.4.4.3 Bridge Renewal Forecast

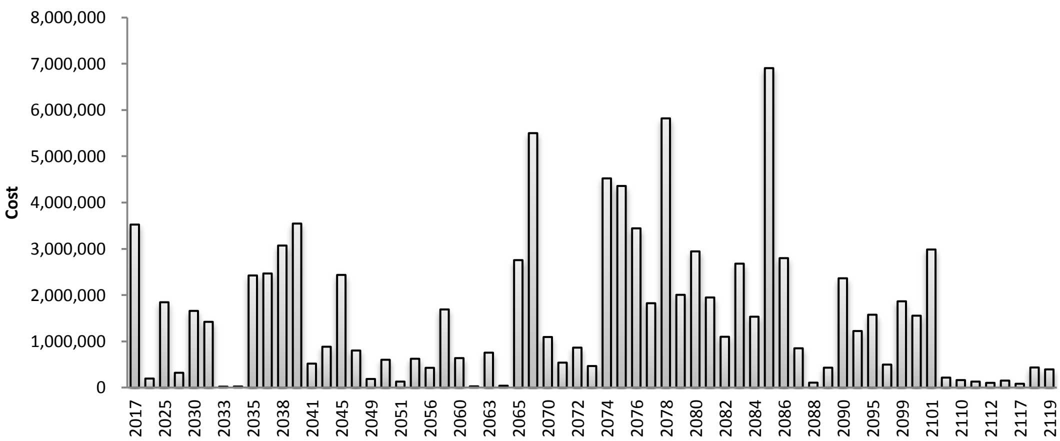
From analysis of the Council's most recent Roading valuation the following long-term theoretical renewal requirements for the bridge network were established. The expected useful lives used to establish this data are detailed in the 2013 Rangitikei District Council Road Asset Valuation Report and are generated in the RAMM database.

The assessment of renewal needs is based on the currently assessed expected useful life; however, these may alter depending on how the structure is managed long-term. For example, a renewal of a particular component of the bridge may extend its effective life beyond that assessed at this time.

The following graph shows predicted long-term renewal patterns based on the currently assessed useful lives, which reflect the bridges' default replacement date based on the expected life which ranges from 75 to 120 years for bridges (dependant on construction type) and 80 years for large culverts. As discussed previously, this approach is used as a network overview and does not necessarily represent actual replacement requirements. For example, the oldest bridge in the District is the Managaweka Bridge on Ruahine road which has a construction date of 1898 with a default life of 75 years making its theoretical replacement overdue by 41 years. Monitoring condition through regular inspections and increased maintenance costs along with social and economic factors will dictate the replacement of this bridge.

The RAMM Asset Valuation Module assigns a minimum remaining life of 3 years to assets that have reached the end of their default life span; this explains why the minimum value in the graph is 3 years and not -41 years to reflect the replacement of the Mangaweka Bridge.

Figure 53: Replacement Cost (2014)



The peak anticipated in 2017 is mostly caused by anticipated renewal of the Mangaweka Bridge, there are also a further 4 bridges which have reached their theoretical end of life and are included the 2017 figure. The cost of replacing boundary bridges will be shared between the neighbouring local authority and Rangitikei District Council so the actual cost to RDC for replacement of the Mangaweka Bridge, for example, will be far less than the figure stated.

As the replacement cost of bridges and large culverts is significant it is important that future financial forecasts for their replacements are as accurate as practicable. The Improvement Plan includes an item to investigate the likely renewal dates for bridges and large culverts in detail, so renewal costs can be more accurately forecasted with higher value based on expected condition rather than an arbitrary replacement date based on the year of construction.

7.4.5 Improvement and Development Plan

7.4.5.1 New Improvements

The background influences and methodologies applying to bridge new improvements are essentially the same as those detailed for pavements.

New Improvement works fall into the following categories:

- Construction of new structures to allow land development or to achieve traffic efficiencies by providing links across significant features (waterways, grade separation – roads under and over, etc.).
- Upgrading of existing structures to carry increased traffic or heavier loads than they were originally designed for.
- Provision of new bridges as part of land developments. These are normally fully funded by the site developer.

7.4.6 Asset Disposal

A bridge may be disposed of if it is uneconomic, unsafe or becoming so, and it is not in the public interest to maintain it in an appropriate safe condition. Disposal of bridges can be carried out in the following ways:

- Sale; or
- Demolition without replacement.

Sale usually involves realigning the section of road served by the bridge, stopping the existing alignment, and selling the stopped road, together with the bridge to the adjacent landowner. The circumstances when all factors for a sale are possible, let alone achieved, are rare. These sale processes must comply with the Council's legal obligations under the Local Government Act 1974, which covers:

- Public notification required prior to sale;
- Restrictions on the minimum value recovered; and
- Use of revenue received from asset disposal.

Bridge demolition is much simpler than sale. The process may require resource consents from Horizons Regional Council and the Rangitikei District Council, this need can only be satisfactorily determined on a case-by-case basis.

When a bridge is demolished any worthwhile materials such as hardwood beams are retained where possible and stockpiled for reuse as repair and maintenance stock for other bridges or for other purposes such as landscaping. Other materials are salvaged by the contractors – the value of this salvage is reflected in the cost to the Council of the bridge demolition tenders or quotations.

No decisions have been made on disposal of any bridges. These will be considered when the need arises for substantial renewal works or replacement, considering all which are defined as "uneconomic" bridges as discussed earlier.

7.4.7 Development Strategy

Ideally, the Council will generally only consider constructing a significant new bridge if the project is subsidised by the NZTA.

The total benefits to road users and the land transport system, cost benefit ratios and first year rates of return are all calculated using the economic evaluation procedures found in the NZTA's Economic Evaluation Manual. If prioritisation is required it will normally be by ranking projects in terms of the NZTA's funding criteria.

The Council may contribute to the cost of a non-subsidised bridge on a public road if there are strong reasons why it should be built, and provided the cost to the Council does not exceed its share if the bridge had been subsidised, though the Council may contribute less where there is reduced benefit to the wider public.

New bridges can also be funded through Development Contribution and Financial Contribution levies on new land development and subdivisions. These can be required in situations where a bridge is necessary to improve the Roading connectivity between and within new and expanding development areas.

7.5 Retaining Walls

The purpose of a retaining wall is:

- To provide structural support and lateral restraint to the carriageway.
- To provide structural support to land adjacent / above the carriageway, preventing material slipping down and blocking the drainage channel or road.

If the land directly above a road carriageway collapses due to bad weather or a serious weather event, the slip material is cleared away and the adjacent bank reshaped at an appropriate gradient to prevent further collapse. This is known as a road retreat. In certain circumstances, such as a confined road width on a hillside, a retreat is not possible and a retaining wall may be constructed to either prevent material from further collapse or support the roads from collapsing to a lower level. This is more common in the northern parts of the District where the terrain is often unstable and susceptible to land slips.

Emergency response and reinstatement work such as this is normally managed separately as it qualifies for a higher subsidy rate than general maintenance. Most retaining wall installations form part of an emergency reinstatement programme created after a serious weather event.

Construction of a new retaining wall follows the following process:

- ***Identification of the site*** - normally from inspection by Council staff or the maintenance contractor.

- ***Design*** - this usually involves appointment of a structural engineer and sometimes geo technical reports on land stability.
- ***Compliance*** - resource consent applications are lodged if required.
- ***Tender*** - following a weather event where multiple walls are required, Council will release tenders for individual sites or bundled work as is seen fit at the time. Contracts for individual or smaller value walls may be given to preferred contractors by direct appointment.
- ***Construction*** - contractors are supervised by RDC staff during the construction phase.

Information held for retaining walls dates back to 1990, there are retaining walls that were installed before this time but RDC does not hold any data for these assets. Existing retaining walls, constructed before accurate asset management was adopted, become increasing difficult to identify and accurately maintain due to vegetation growth and further minor land slippage. RDC plans to validate existing data and as part of this process, some older retaining walls may be discovered. However, due to the difficulties in locating old sites this is not a specific task identified in the improvement plan.

Key issues relating to retaining walls are:

- ***Carriageway drainage*** - poor drainage is a major factor in destabilisation of the land supporting the carriageway, or the land above the carriageway.
- ***Emergency response*** - generally when a severe weather event occurs there are many sites where new retaining walls are required, this involves a coordinated approach for emergency and long-term reinstatement.
- ***Construction time*** - new walls need to be designed by structural engineers and the time between the need arising and a new wall being completed can be lengthy. Temporary reinstatement can be costly and disruptive to road users.
- ***Resource consent*** - often retaining walls are required in riverbeds and their installation can affect waterways. Resource consent requirements and applications can cause further delays to construction.
- ***Maintenance of unknown walls*** - old walls can be difficult to locate when no data is held, as these walls are not included in any inspection programme, their maintenance or renewal requirements are unknown.
- ***Unstable terrain*** - the nature of the terrain in the northern part of the District causes an ongoing need for walls in some areas.

Occasionally a new retaining wall needs to be built on land outside the Council owned road reserve. Generally, land owners are cooperative and allow the construction; however, land can be acquired under the Public Works Act 1981.

The Council holds data for 363 retaining walls, which equate to 2.5 % of the total transportation asset group based on the current replacement cost. Differing methods of design and construction are adopted for new retaining walls depending on the requirements for the site. Asset details for the following types of Retaining Walls are stored in Councils RAMM database.

Table 56: Asset Description – Retaining Walls

Retaining Wall Type	Number
Block	1
Concrete	2
Earth	38
Galvanised Steel	10
Rail and Timber	67
Steel	1
Steel and Timber	164
Steel and Wire Mesh	18
Stone	53
Timber	9
Total	**363**

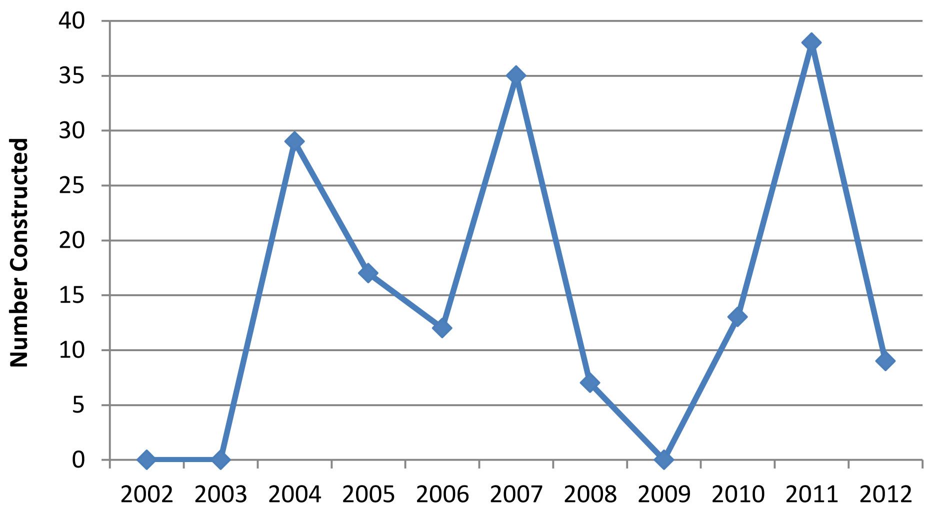
Retaining wall information is stored in a separate database table, which generates a separate valuation figure. Valuation figures from the RDC 2013 Transport Asset Valuation are shown in the table below, complete valuation figures are shown in the Financial Section of this plan.

Table 57: Asset Valuation – Retaining Walls

Asset Type	Component	ORC ($)	ODRC ($)	Annual Depreciation ($/year)
Retaining Wall	Retaining Wall	14,206,947	10,724,551	177,587

From the graph below, it is evident that most investment in the construction of retaining walls occurs after severe weather events.

Figure 54: Retaining Walls Constructed by Year



7.5.1 Service Delivery

7.5.1.1 Operation and Maintenance Plan

Once retaining walls are established they generally require little maintenance. As retaining walls are constructed to stabilise land, the nature of the stability of land surrounding them is inherently poor. Therefore, visual inspections are occasionally carried out by the road maintenance contractor; a more thorough inspection may be performed by a Roading engineer if any subsidence or movement is noted during these inspections.

Currently there is no specific inspection regime in place, however, the maintenance contractor inspects the entire network regularly and this identifies any retaining wall failures. There is an item in the RDC improvement plan to implement a specific inspection plan, validate existing data and assess the requirement for a renewal works programme.

If any significant structural maintenance is required, this will be tendered to and undertaken by, a contractor who specialises in structural repair work.

The road maintenance contractor is required to undertake regular inspections of the entire road network. Slips and dropout sites (where the land supporting the carriageway slips away) are identified from these inspections.

After assessment, reinstatement of a site identified from these inspections may require design and construction of a new retaining wall.

7.5.1.2 Strategy

Maintenance needs are normally identified by contractor inspections or by RDC staff who actively monitor performance of existing retaining walls during their own network inspections.

Retaining wall maintenance is tied closely to drainage maintenance, as poor drainage contributes to erosion and undermining of the carriageway structure. Drainage requirements are assessed for each retaining wall during the design phase and this must be monitored to ensure further damage does not occur. Good drainage can prevent slips and dropouts and the need for reinstatement with retaining walls.

7.5.1.3 Emergency Response

During a severe weather event, RDC staff monitor rainfall and rising river levels of the Rangitikei River and Whangaehu River and their tributaries. The road engineers will accompany the maintenance contractor on a thorough inspection of the entire road network during and after these events. This will ensure any sections of road that have become blocked due to the ground material directly adjacent to the carriageway slipping onto the carriageway, or flooded due to high water levels, are identified and cleared as quickly as is practicable. Further details on emergency response are located in the Environmental Management Section of this plan.

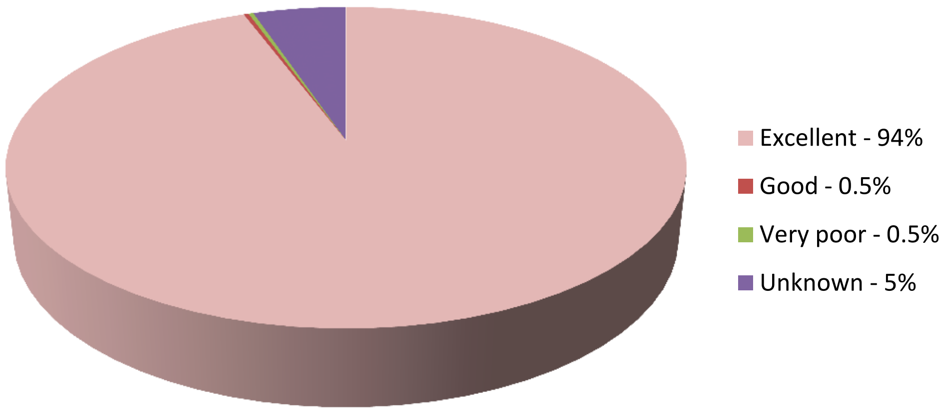
7.5.2 Condition, Performance and Capacity

7.5.2.1 Condition

As noted previously, no information is recorded in RAMM for retaining walls prior to 1990. The condition of the recorded retaining walls is very good however; the accuracy of this information may be subject to scrutiny and not a completely clear representation of the entire asset base due to the possible condition of unrecorded retaining walls.

As part of the Asset improvement plan, visual inspections of the road network will be carried out over the next few years with the intention of potentially locating and recording any existing retaining walls within the road network, not currently entered into RAMM. The following pie chart shows the current information for condition ratings of retaining walls in the District.

Figure 55: Asset Condition – Retaining Walls



7.5.2.2 Capacity/Performance

When considering the selection of design for a retaining wall, an assessment and evaluation must be made by the engineer to determine the wall is fully functional but not excessively costly. Generally, as the ability of the retaining wall increases, the price will increase accordingly. The chart above shows that almost 95 % of the retaining walls currently monitored are in an excellent condition. This clearly demonstrates that when considering the current assets capacity and performance, their design criteria was completely adequate and the assets are fully capable of withstanding the necessary loading from road traffic.

7.5.3 Renewal Plan

No replacements are anticipated based on current knowledge.

7.5.3.1 Standards

Renewal work is extremely unlikely with retaining walls, as a loading safety factor is incorporated into the design process to ensure the wall will act correctly even under conditions more extreme than it was originally envisioned.

In the unlikely event that a wall begins to develop a horizontal movement, a full inspection of the wall will be carried out to determine if movement or failure is occurring. The inspection may conclude that movement or minor damage is within acceptable limits and further monitoring is required. If not, an individual component or member can be selected for replacement by a specialist contractor.

7.5.3.2 Expected Useful Life

All retaining walls, regardless of construction method or material, have a default useful life of 80 years. This default life is used for forecasting, valuation and depreciation purposes. In reality, once a retaining wall has stood the test of time it is unlikely to be replaced unless there is further land movement at the location, or other works dictate its replacement.

7.5.3.3 Programme

There are currently no renewal plans in place. There are five retaining walls that have been identified as being in poor condition. RDC is to undertake a detailed inspection of these sites in order to assess whether any repairs or renewal work is required to improve the condition of these retaining walls. This will form the basis of a forward works renewal programme and is an item identified in the RDC improvement plan.

7.5.4 Improvement and Development

Retaining walls are upgraded for the following reasons:

- As part of an area wide pavement rehabilitation or seal widening projects.
- Most retaining walls in the Rangitikei District are located in the northern part of the District in areas with low growth, so upgrade of retaining walls for this reason is rare.
- Further slippage or subsidence of land occurs.
- This could be as result of a previous “do minimum” option, an under designed retaining wall or failure of drainage systems.

7.6 Street Lighting

The purpose of street lighting is:

> *To ensure the Council’s street lighting and amenity installation continues to operate safely, efficiently and effectively over its economic life with minimum failures and outages.*

The first street lights were installed in the District around 60 years ago on a relatively small scale and only in town centres. Since that time, advancements in technology along with increasing ratepayer expectation and implementation of lighting standards has driven continuous improvement and expansion of the asset base. Street lighting assets account for 0.4 % of the total transportation asset group based on replacement cost; however this low percentage does not reflect the importance the Council places on lighting roads and public spaces.

Street lights are provided for a variety of reasons, ranging from lighting at specific rural intersections to improve traffic safety, lighting of high traffic volume areas, lighting residential and rural streets and roads and lighting of amenity areas such as pedestrian pathways and parks.

Lifecycle Management

Rangitikei District Council manages street light assets located on RDC roads as well as those located on urban state highways, which are managed under delegated authority from NZTA.

Historically street lights have been mounted on other utility poles like telecom and electricity network poles. Over the past 40 years some new urban subdivisions have utilised underground power and telecommunications services, requiring street lights to be mounted stand-alone lighting poles. As part of the subdivision approval process the developer must submit the proposed compliant lighting design and gain Council approval before installation of the lighting assets to be vested, this gives RDC control over the quality and type of assets it will inherit.

The key issues relating to the management of street lighting are:

- Specialist industry, most local authorities have limited in house knowledge forcing reliance on consultants and contractors.
- Rampant technology means identifying opportunities for optimising street lighting power consumption and maintenance requirements can have benefits, which are quickly superseded. For example, the evolution of street lighting in New Zealand started with gas powered lanterns, moving to incandescent lamps, fluorescent tubes, mercury vapour lamps, high pressure sodium lamps and currently LED technology – all these improvements were developed in the space of 60 years.
- Reliance on the electricity network owner to maintain the street lighting power supply cables, network outages can impact on Council levels of service.
- Lighting standards that reflect the intended use and road hierarchy,
- The need for a development of a street lighting upgrade and renewal programme which considers advancements in technology,
- The impacts of any future overhead wiring undergrounding programmes; and
- The effect of decorative urban street lights vested in the Council, by urban subdivision developers, on renewals and maintenance budgets.

As communities have become more concerned about personal safety and property protection, there has been an increase in public interest regarding the standard of lighting provided throughout the District.

Studies undertaken overseas show significant increases in perceived personal safety occur when lighting is upgraded, particularly in high-risk areas. Alternatively, there is a view that by providing no lighting, for example in some residential reserves, this will discourage their use by antisocial elements, and consequently will reduce the risk to legitimate users who will also avoid these areas at night.

The Council has adopted the AS/NZS 1158 Street Lighting series of standards. These set out requirements for lighting systems for roads and other outdoor public areas, primarily to provide a safe and comfortable visual environment for both vehicular and pedestrian movement at night.

AS/NZS 1158 addresses the safety of motorists, other road users and pedestrians with differing requirements for lighting based on the type of road or area to be lit. A compliant lighting design will improve both public perception and the reality of personal safety.

The street light maintenance contract includes a scheduled lamp replacement programme where lamps are replaced at defined intervals based on lamp manufacturer's specifications, keeping the incidence of outages to a low level. Maintained in this way, the street lighting system has a high degree of reliability.

In the past street lights were installed and owned by the local power board, with little or no involvement from the Council. These lights were installed to standards applying at the time of installation or at the whim of the controlling power company. In the late 1990's ownership of street lighting assets in the Rangitikei shifted from the power company to the Rangitikei District Council.

Urban street lights installed under the AS/NZS 1158 standard have differing purpose. On higher volume roads, or V Category roads, the road user is the main consideration and the design is based around lighting the road. On residential streets with lower traffic volume, or P Category roads, there is more emphasis placed on security and pedestrian safety, so lighting the whole road reserve is considered.

The asset base also includes some lighting in reserves and other amenity areas. Although costs for these lights are administered by different Council departments the maintenance and management is undertaken under the same contract as for all other RDC street lighting assets.

Rural lights are primarily for flag lighting at road intersections and other significant locations such as rural halls and schools. In some cases, residents of the smaller more rural townships in the District prefer to have little to no street lighting, which is more in keeping with the rural environment.

All inefficient fluorescent, mercury vapour and low-pressure sodium luminaires have been replaced with high pressure sodium luminaires and the asset base is generally in very good condition.

The broad use of the term "street light" when referring to the asset includes the following three main components:

- ***Pole***, this can be a utility network owned pole or a standalone street light pole.

- ***Bracket***, the steel arm mounted to the pole to support the luminaire, in the case of steel standalone poles the bracket is an integral part of the pole but it is still identified as a separate component.

- ***Luminaire***, lighting unit which comprises of control gear and lamp.

7.6.1.1 Ownership

The Council owns the majority of the dedicated stand-alone street light poles, others are owned by NZTA and some are some privately owned. Where a street light is supported by a utility company's pole or by another other structure not owned by RDC, the light and its bracket are included in the RDC asset register, but not the pole or building. However, in these cases the nature of the support and its owner are noted.

Brackets and Luminaires are predominantly owned by RDC and NZTA with some privately owned street lights identified.

The street light inventory is maintained in the RAMM database. This allows continual updating of asset information as maintenance and renewal work is undertaken and provides accurate information to predict future maintenance and renewal requirements.

Asset ownership is identified in the database so costs associated with NZTA street lights can be separated, and so owners of other assets which are not maintained by RDC, are easily identified. This is also the case for lights under stewardship by different branches within Council. For example, Amenity and Parks and Reserves assets, which do not qualify for NZTA subsidy, are identified separately so costs can be portioned correctly.

Table 58: Asset Description – Street Lighting[3]

Component	Quantity
Poles	1,862
Brackets	1,863
Lights	1,903

The following table details the owners identified in RAMM, brackets do not have owners specified as the bracket normally has the same owner as the luminaire.

[3] Includes assets not owned by RDC.

Table 59: Street Lighting by Asset Owner

Asset Owner	Pole	Luminaire
Maintained by RDC		
Amenity Lighting	8	8
Car parking	0	1
Parks & Reserves	23	30
Properties	9	10
Roading	281	1,651
NZTA	108	182
Sub-total	**429**	**1,882**
Maintained by Others		
Line Company	1,411	0
Private Owner	21	21
Telecom	1	0
Sub-total	**1,433**	**21**
Total	**1,862**	**1,903**

The breakdown of Council Roading owned luminaires, lamp types and poles are identified in the following tables:

Table 60: Asset Description - Luminaires

Luminaire Model	Quantity
Ambar 2 CG 1975 70W HPS	4
Ambar 3 CG1975 150W HPS	9
Arc 80	4
Belisha Beacon	7
Cree LEDway	8
Goughlite 500	1,267
Goughlite 600	258
Goughlite 700	49

Luminaire Model	Quantity
Goughlite 700 / Ped conf	1
Nova	11
Old Shovel Enamelled Flood	7
Pedestrian Light	3
Promenade	14
RYB Beacon	8
Solar LED no Gear	1
Total	**1,651**

The value of the street lighting asset is derived in the Rangitikei District Council Asset Valuation Report 2013. The valuation figures are for Council Road Lighting Assets only and are represented in the following table:

Table 61: Asset Description - Lamps

Lamp Model	Quantity
100W High Pressure Sodium	231
100W Incandescent BC	5
150W High Pressure Sodium	91
150W Metal Halide	4
20 LED at 525Ma	8
250W High Pressure Sodium	8
250W Mercury Vapour ML	7
50W High Pressure Sodium	204
65W Traffic Light	12
70W High Pressure Sodium	1080

Table 62: Asset Valuation – Street Lighting

Component	RC ($)	ODRC ($)	Annual Depreciation ($/year)
Pole	926,226	474,823	13,232

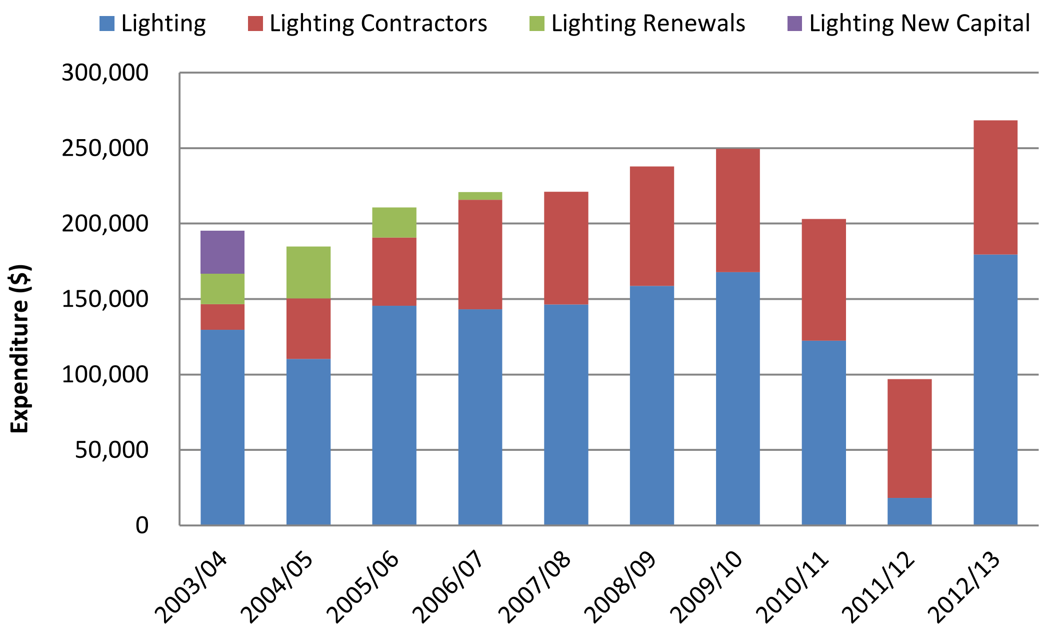
Component	RC ($)	ODRC ($)	Annual Depreciation ($/year)
Bracket	651,989	330,254	13,039
Luminaire	536,710	372,004	10,734
Total	**2,114,920**	**1,177,081**	**37,005**

Table 63: Pole Materials

Pole Material	Quantity
Concrete	81
Hard Wood	9
Soft Wood	8
Spun Concrete	78
Steel	105
Total	**281**

The graph below shows historic expenditure including maintenance costs, renewal works and new improvements.

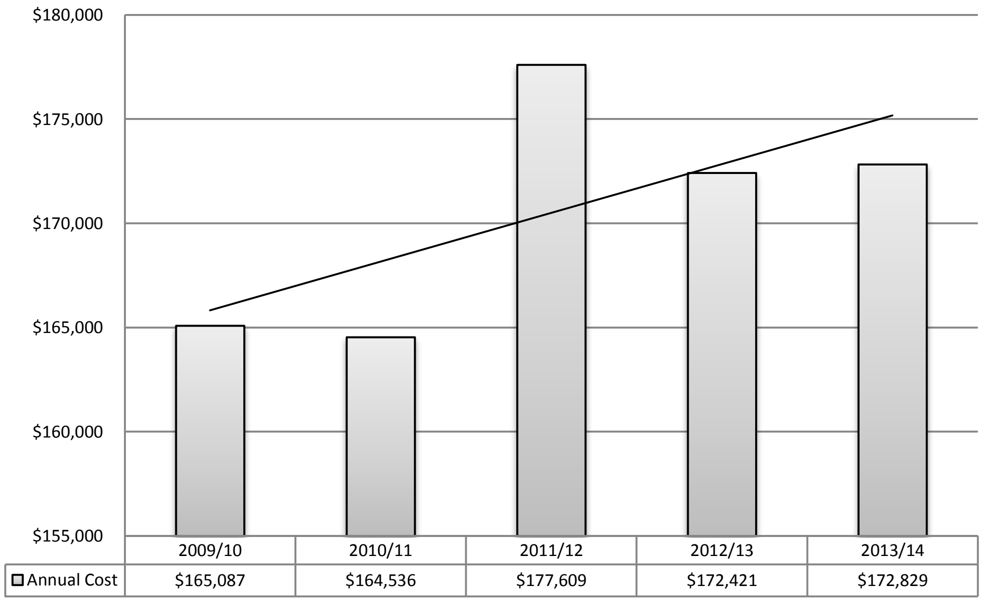
Figure 56: Historic Expenditure – Street Lighting



Street Lighting Energy Costs

Taking consideration of installation cost, maintenance costs and energy charges, the cost of ownership of a single 70w HPS luminaire is approximately $15 per month (this is the standard type light used for majority of residential lighting). Approximately 65 % of this the cost is energy alone. The graph below shows the operating costs for a single 70 W HPS luminaire over a 20-year lifecycle.

Figure 57: Energy Costs – Street Lighting



Street Lighting Energy Costs

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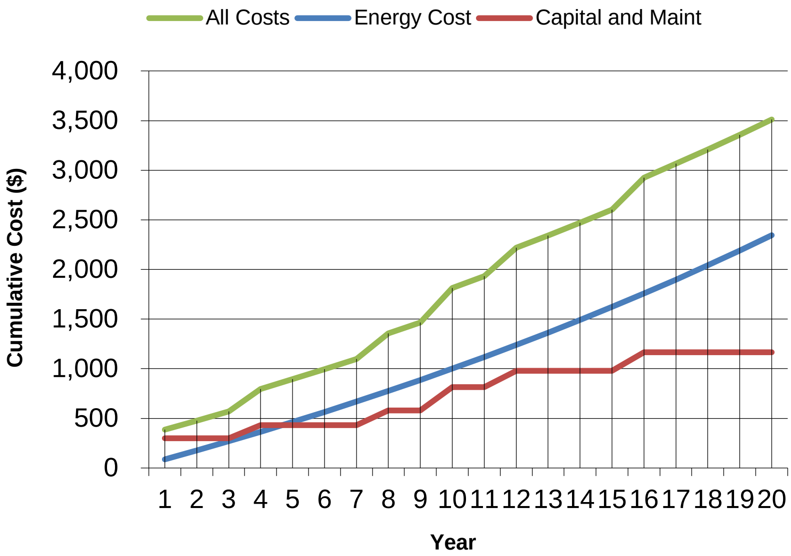
Figure 58: Lifecycle Cost – 70 W HPS Luminaire



7.6.2 Service Delivery

7.6.2.1 Operation and Maintenance Plan

The street light maintenance contractor is required to:

- Provide an immediate response to hazards.
- Undertake monthly inspections of the entire network at night, to ensure all luminaries are operating, undertake necessary repairs to non-functioning lights.
- Develop maintenance programmes from the schedules of defects identified during the inspections.
- Monitor asset condition by undertaking planned daytime inspections, action routine maintenance and report on any unexpected maintenance requirements.
- Undertake routine shear base pole maintenance to ensure correct security of mounting bolts.
- Ensure no lights malfunction continuously and that there are no areas where continual intervention is necessary.
- Repair, on demand and within the specified response timeframes, faulty, accident damaged or vandalised lanterns, lamps, control gear, columns (poles) and associated equipment.
- Repair options and priorities are determined by considering the impact on:

1. Public safety (top priority);
2. Traffic movement; and
3. Future costs if the work is not done

- When street lighting assets are renewed, any components that can be used as spare parts are retained in storage. Other surplus assets generally have no commercial value and are disposed of by the contractor.

It is noteworthy that there have been no specific legislative requirements for manufacturers to supply spare parts for the lanterns beyond any given period. The Council will attempt to account for this in their design review, to ensure products are of suitable quality and that they are sourced from reputable suppliers.

The selection of protective coating on steel poles can be galvanised or painted. With painted poles, the paint is applied over an already galvanised surface. Although paint deterioration is not detrimental to the life of the pole, painting is carried out periodically to maintain the aesthetic look of the pole, as most are decorative.

Pole life expectancy is also influenced in part by the soil conditions. Acidity and water in particular can reduce pole life significantly; the resulting underground corrosion can go unnoticed if not checked by excavation around the pole base.

New poles have a thick enamel type coating covering the entire ground planted section of the pole. This is a significant improvement over previous pole coatings. The manufacturer supplies a limited replacement guarantee period of 20 years for the pole coating system that pushes the expected life of these poles out from 30 to 50 years.

In order to ensure the Principle's lighting remains in effective operation, the contractor shall be required to adhere to the following response times for service, repairs and maintenance. Road categories are defined in the maintenance contract and refer to the usage of the road.

Table 64: Response Times – Street Lighting

Description	Road Category		
	A	B	C
As a result of a vehicle accident or similar type accident in which electrical safety is an issue or structural / mechanical issues could render the fitting/support unsafe	1.0 hr	1.0 hr	1.0 hr

Description	Road Category		
	A	B	C
As above but where the above safety issues are not the overriding factor and this can be reasonably established: major intersections & important lights required for safety purposes	4 hrs or first thing next day if occurs at night	4 hrs or first thing next day if occurs at night	8.0 hrs
Lamps out or defective: General & Road, Intersection and Flag lights, Amenity lights	1 working day	3 working days	5 working days

7.6.2.2 Strategy

The NZTA has recently created projects to support the long-term transfer of local street lighting to LED systems to create long-term savings in power costs. This is currently not being carried out within the Rangitikei; however a business case model may be discussed and created in the future to fully assess the cost-benefit ratio of initial capital expenditure compared to long-term energy savings.

7.6.2.3 Maintenance Programme

All lights, brackets and poles are maintained under Contract 908 Street Light Maintenance by Alf Downs Street lighting Ltd. For economy and efficiency reasons, the contract includes the lights on urban state highways administered by NZTA and lights under stewardship by other Council departments. The NZTA reimburses the Council with the cost of maintaining and operating these lights on its behalf and costs associated with other Council departments are portioned as identified by the asset owner.

Lamps are changed at regular intervals under the scheduled lamp replacement as detailed previously. The Council considers that this proactive approach is more effective and efficient than a reactive maintenance in which non-functioning lamps are replaced on an ad hoc basis when they fail.

Other maintenance is undertaken to:

- Ensure safety to the public;
- Protect the investment in assets by extending the life of the assets; and
- Minimise future repair costs.

The contractor is required to carry out a range of works and other functions including:

- Receiving and actioning complaints, either directly or via the Council's Service Request System;
- Maintaining the RAMM Database;
- Carrying out day and night inspections and actioning faults and failures identified;
- Replacing failed lamps;
- Repairing and maintaining light fittings and poles;
- Straightening poles and support arms;
- Scheduled shear base pole maintenance;
- Refurbishment of decorative lights e.g. repainting poles;
- Carrying out the scheduled lamp replacement programme;
- Installing new lights;
- Recycling and disposing of hazardous substances found in some lights and fittings.(All known PCB's were removed from the Council's assets in the 1990s); and
- Checking the design and installation of street lights for compliance, e.g. new urban subdivision street light installations.

Energy consumption for street lighting is based on meter readings, each lighting circuit is metered and the energy is invoiced accordingly. Some street light circuits may have a single light connected while others have large numbers of lights operating from the same control point. The history of street light power costs is detailed previously in this section.

7.6.3 Condition, Performance and Capacity

7.6.3.1 Condition

The overall assessment of asset condition is undertaken using the following condition grading criteria.

Table 65: Condition Ratings – Street Lighting

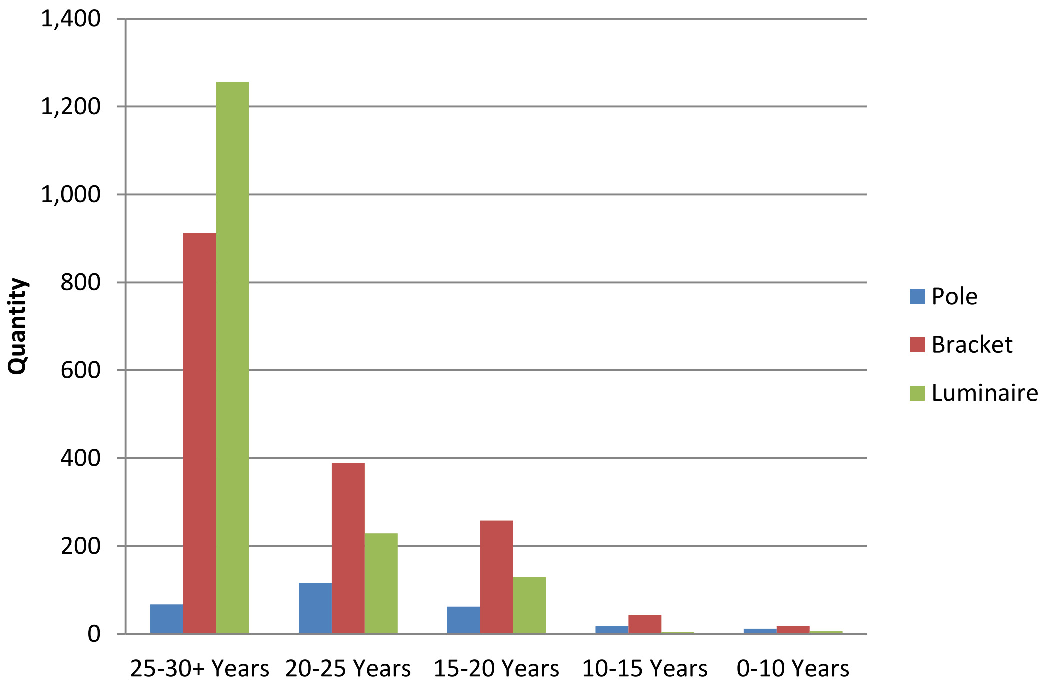
Grade	Useful Life Remaining (years)
1	25+
2	20-25
3	15-20

Grade	Useful Life Remaining (years)
4	10-15
5	0-10

The maintenance contractor is tasked with undertaking daytime inspections where the condition of poles, brackets and luminaires is assessed and recorded in the RAMM database. Remedial repair work is programmed as necessary from the results of these inspections.

The last condition rating survey was undertaken earlier in 2014, the following graph shows the results.

Figure 59: Remaining Useful Life – Street Lighting

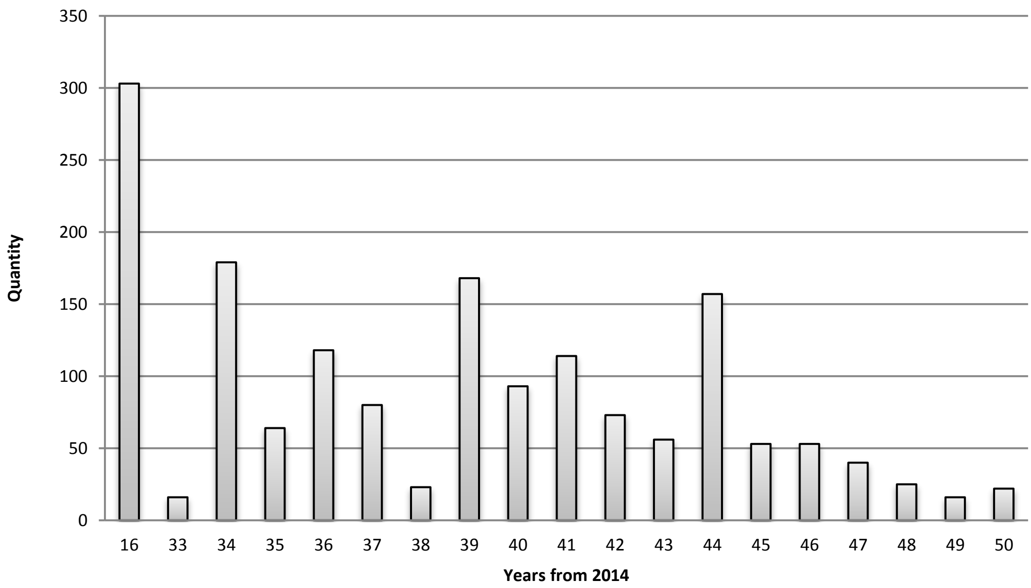


The main cause of deterioration of street lights is related to age, which in turn is related to exposure to the elements. For example UV light affects polycarbonate lenses reducing light output of luminaires, moisture causes the breakdown of electrical connections and components and acidic or wet ground conditions can accelerate corrosion of steel poles.

Light output of high pressure sodium lamps (as is the majority in the Rangitikei District) depletes over the life span of the lamp, which ranges from approximately 3 to 5 years. Once light output deteriorates, most luminaires can be returned to their optimal or as new condition by installation of a new lamp and diffuser. In some cases, internal electrical components may also be needed, generally as a result of damage through moisture ingress.

Remaining useful life is based on the total useful life less consumed life. The calculation is dependent on accurate construction dates. The following graph shows the remaining useful life of RDC Roading luminaires. No construction dates are held for assets installed prior to 1997, for valuation purposes the RAMM Asset Valuation Module applies a default construction date of 1980 to assets without this data. This explains the high number in the 16 year bracket as approximately 300 luminaires do not have construction dates and have been given the arbitrary construction date of 1980.

Figure 60: Remaining Useful Life – Luminaires (2014)



7.6.3.2 Capacity/Performance

Street light capacity and performance issues relate to light intensity, colour, reliability, safety and the areas of the townships covered.

Performance of street lights can be a simple go/no-go test, the light either works or it does not. As luminaires are maintained under the RDC scheduled lamp replacement programme, it can be assumed that the luminaires are operating to their optimum performance level unless other factors impede function, vandalism for example. However, this approach only considers the function of individual lights and does not consider areas, which may be under-lit due to wide spacing of luminaires. This is a common issue where street lights are mounted on power poles, as the common spacing between power poles less than the optimum for most street lights. Design criteria varies between sites but to illustrate this issue an average optimum spacing between luminaires may be 60m where power pole spacing is normally around 40 m. In urban areas, street lights are often installed on every second pole at spacing of around 80 m.

The installation of lights onto existing utility poles, without the additional cost to install separate underground street light circuits and standalone poles, is very cost effective where this option is available. This option has been preferred in historic lighting upgrade projects throughout the Rangitikei District with many projects utilising each power pole giving light spacing of around 40 m, as described above this is less than the optimum spacing and lighting levels achieved are generally higher than the AS/NZS 1158 Street Lighting standards require. Roads where these types of upgrades have been undertaken are prime candidates for LED retrofit replacement where the LED luminaires could be dimmed to achieve required lighting standards while achieving significant energy and maintenance cost savings. Cost benefits will need to be assessed against early replacement of assets, which are not nearing the end of their total useful life.

All new installations, undertaken by RDC and those vested to RDC by private developers, are required to meet current standards. The standards are considered for renewal work, where the existing pole is utilised to mount a replacement luminaire, but in most cases the lighting level required is not achievable due to the pole spacing.

Deficient installations will be progressively phased out as part of wider integrated works such as street upgrades when existing overhead services are placed underground, or when outdated lights are replaced along a street.

The Council accepts that unless large gains can be made lighting installations will remain as they exist; however, rapidly emerging LED technology is likely to impact on future decisions.

The table below below lists expected minimum expected life of the lamps that are used on the network.

Table 66: Expected Useful Life - Lamps

Lamp Model	Quantity	Time to 5% Failure (hr)	Expected Useful Life (years)
100W High Pressure Sodium	231	17,000	4
100W Incandescent BC	5	1,000***	0
150W High Pressure Sodium	91	20,500	5
150W Metal Halide	4	5,000	1
20 LED at 525Ma	8	88,000*	20
250W High Pressure Sodium	8	20,500	5
250W Mercury Vapour ML	7	6,000	1
50W High Pressure Sodium	204	14,000**	3
65W Traffic Light	12	1,000***	0

Lamp Model	Quantity	Time to 5% Failure (hr)	Expected Useful Life (years)
70W High Pressure Sodium	1,080	17,000	4
Solar-powered LED	1	88000*	20

* LED module, manufacturers specify 20 years minimum life expectancy with no reference to percentage of expected failures within this timeframe.
** Lamps are included in the standard 4-5 year replacement programme.
*** Lamps are normally replaced at failure.

7.6.4 Renewal Plan

Asset renewal is undertaken when a street light or a significant component of a light has reached the end of its economic life. Renewal requires replacement of either the complete installation or individual components of the installation e.g. luminaire, bracket or pole.

Renewals have also historically been undertaken during lighting upgrades where existing luminaires have been replaced under renewals budgets along with new luminaire sand brackets a installed as part of the upgrade project.

7.6.4.1 Strategy

Scheduled replacement of lamps is carried out by the contractor based on the lamp manufacturers' specification of expected lamp life. Manufacturers advise an expected failure rate of between 5 and 10 % if lamps are left to run a specified age, for example 20,000 hours, which is approximately 5 years in service. It is considered that the policy of scheduled lamp replacement is more cost effective than responding to individual failures as they occur. This practice produces a more reliable and predictable level of service.

Renewal needs of other components are identified from the planned inspection programme. The strategy for renewal of street light assets, or components of those assets, is to:

- Renew faulty or damaged assets when renewal is more economic than repair. This includes unavailability of spare parts.
- Renew faulty or damaged lanterns that are of technically obsolescent types.
- Renew faulty or damaged assets that do not meet current design/safety standards.

Work is prioritised according to public safety, coordination with other works, eliminating obsolesce, improved light outputs and cost savings such as reduced energy consumption.

The amount of street lighting renewal work depends on:

- Age profiles;

- Condition profiles;
- Level of on-going maintenance;
- Economic lives of the materials and components used; and
- Availability of replacement parts and fittings.

A forecast for street light renewals is not currently available, it is intended that a renewal programme will be established which will maximise the advantages of LED technology.

7.6.4.2 Standards

When a number of adjacent lights are renewed at the same time, the lighting standards appropriate for that road are considered. Generally, the standard will not be met without the installation of new poles to enable luminaires to be spaced accordingly.

When individual light fittings are renewed, the new fitting is generally the most appropriate modern engineering equivalent of the failed fitting. Replacement poles will generally be lightweight galvanised sectional-steel poles (e.g. CSP Octlyte) of appropriate height. Exceptions to both of these practices occur when the adjacent poles are of a decorative type, in which case appropriate decorative poles and luminaries are used.

7.6.4.3 Expected Useful Life

Renewal of street lights is budgeted under NZTA Work Category 222 – Traffic Services. The expected lives of components are as follows:

Table 67: Asset Life – Street Light Components

Component	Expected Useful Life (years)
Luminaire	20
Lamp	4-5
Standard galvanised pole and bracket	30
Tough coat galvanised pole	50
Concrete pole	70

The RAMM Asset Valuation Module applies default lives for purposes of applying depreciation, some of these lives differ from the lives above, and there is an item in the improvement plan to review the Asset Valuation Module defaults.

7.6.5 Improvement and Development

Future development will likely be driven by the advancing LED technology and associated benefits; however, there is no current formal improvement plan in place.

7.6.5.1 Upgrade Process

Street lights are acquired or upgraded in the following circumstances:

- When new lights are provided by the Council where no street lights previously existed.
- When the Council street lights are installed and vested in the Council as part of a new urban subdivision.
- Through work to improve the level of service arising from:
    - Improvements in association with the street upgrading programme,
    - Minor safety improvements,
    - Improvements in association with undergrounding of overhead utility reticulation,
    - Recommendations from township committees, and
    - Public requests on the discretionary street lighting funds.

The undergrounding of existing overhead wiring is an important issue that can have a significant effect on the development of the street lighting asset. Utility companies rarely remove overhead wiring in the townships of their own accord. Instead, this is usually a result of the Council wanting to upgrade a street and improve its overall amenity by the removal of overhead wiring and associated utility poles.

When Council undertakes a project where new underground street light cables are installed the cost is borne by RDC but on completion, the cables are vested to PowerCo who agree to maintain the cables for the rest of their economic lives.

Urban areas throughout the Rangitikei District have been progressively upgraded over the past 15 years; the current level of lighting through the District is very good in comparison with similar sized local authorities.

7.6.5.2 Emerging Technology

The use of Light Emitting Diodes (LEDs) is becoming more prevalent for new street lighting installations in New Zealand. Their use in residential streets and open spaces is proving to be a very cost effective option due to decreased energy and maintenance costs. The cost of higher output LED luminaires used in place of higher wattage HPS luminaires does not currently warrant their use unless there are specific maintenance access issues, for example, lights on a bridge or high volume intersection where the cost of traffic management adds to the general maintenance cost.

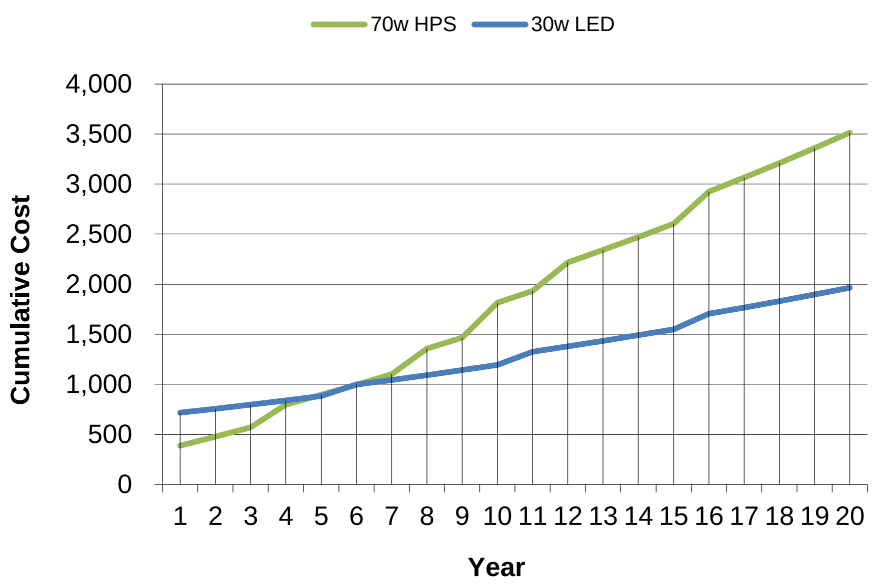
RDC has used LED luminaires on three recent projects:

- Scotts Ferry, eight x 70 W High Pressure Sodium lights were replaced with 30 W LED luminaires.
- Wailuku Road, one solar powered LED flag light was installed on the junction of Waimutu Road and Fern Flats Road. A solar option chosen as the cost of getting an electrical supply to the site was prohibitive.
- St Stephens Church Walkway, Broadway in Marton. Two 20 W LED luminaires replaced two 70 W High Pressure Sodium lights.

The use of LED luminaires can reduce wattage consumed by at least half that of equivalent HPS luminaries. There is also significant savings made through reduced maintenance as the only planned maintenance the LED fittings require is occasional cleaning of the luminaire optical surface.

The following graph compares estimated lifecycle costs between a standard 70 W HPS luminaire and a standard 30 W LED luminaire. The initial capital cost is recovered in year four of an estimated 20-year lifecycle. Manufacturers normally advise conservative figures when specifying life expectancy, so savings may well extend past the 20-year mark if the luminaires are still performing adequately. Approximate lifecycle savings of $1500 per luminaire can be achieved.

Figure 61: Cost Comparison – 70 W HPS vs. 30 W LED



7.6.5.3 Strategy

The street lighting development strategy is to:

- Install lighting to improve road safety where a lighting problem is identified.
- Investigate bulk installation of LED luminaires as a retro-fit option in place of existing HPS luminaires.
- To upgrade the lighting in residential streets to current standards when carrying out street improvements.
- To upgrade lighting in residential streets to meet current standards where possible.
- To light rural intersections, where justified by safety concerns.
- Upgrade urban lighting to meet current levels of service, especially where there are concerns relating to public safety.

When isolated lighting installations are provided on the rural fringes of townships, separated pools of light can occur. The inconsistent lighting levels this creates can cause traffic safety hazards, as motorists have to adjust to the differing light intensities over short distances. In these situations, the developer is usually required to mitigate the adverse effect of the development hazard by contributing to the cost of installing additional lighting.

Inconsistencies in the levels of service provided for township lighting networks are usually brought to the Council's attention by the relevant township committees, the maintenance contractor or a request for service. All requests are considered and if found to be a valid issue the project to is then subject to budget and funding processes as a new project.

Requests are periodically received to provide an isolated flag light at a rural intersection. "Flag" lights can improve safety of the main Roading network by illuminating intersections with local roads, indicating to motorists that they are approaching an intersection. However, these lights can prove to be expensive if there is no close supply of electricity of the correct voltage. They can also present safety concerns by creating pools of light, as discussed in the previous paragraph, and interfere with the reflectivity of modern reflective road name blades. Each situation is assessed on an individual basis.

The Council will support installation of appropriate lighting where there is a high number of turning movements or if the installation of lighting can be shown to improve the safety of the intersection. A recent example is the Wellington Road and Makirikiri Road intersection where a recent speed restriction was imposed. Lighting was upgraded to current lighting standards to provide further safety enhancement of the intersection.

Lights may also be installed to complement other road safety improvements, for example at rural to urban speed thresholds and at intersection realignments.

The improvement plan includes a task to adopt a standard for any new lighting that will be adopted by RDC.

Street lighting projects that meet NZTA criteria as minor safety projects shall not be undertaken as discretionary street lighting projects. Those projects that have an attributable road safety benefit shall be considered in the Forward Work Programme.

7.6.5.4 Standards

Light colour is an important consideration in selecting light fittings. Most luminaires in the District have High Pressure Sodium lamps installed. High-pressure sodium lights emit light in narrow spectrum bands and, although they have enhancements to broaden their spectrum these are not entirely effective. Consequently, they do not render colours well, making recognition of objects harder or slower. Preference is therefore given to lights that produce truer “white light” in situations where colour perception is important – pedestrian crossings are an example of this situation. Two recent installations of pedestrian lights on Wellington Road in Marton utilised white light, however the majority of pedestrian crossing lights have High Pressure Sodium lamps. This has been recognised as a deficiency and can be rectified by changing the type of lamp at the next scheduled lamp change.

The following standards are applicable to the renewal of existing street lights and new street lights and installations:

- Current version of AS/NZS 1158 has been adopted as standard for entire street upgrades.
- All new installations, upgrades and maintenance must comply with the Electricity Act 1993 and Electricity Regulations 1993 and subsequent revisions.
- Poles, unless located behind a kerb or other position, which is safe for motorists, must be frangible, as defined by the Standard and the NZTA.
- Lighting Design and Intensity:
  - The standard lamps to be used are 70 to 150 W HPS (SON).
  - LED technology is to be considered as an option in all new installations.
  - Street lighting design shall be in accordance with AS/NZS 1158 Street Lighting series of standards. These set out requirements for lighting systems for roads and other outdoor public areas, primarily to provide a safe and comfortable visual environment for both vehicular and pedestrian movement at night.
  - Where lighting is provided for off-road walkways in townships, lighting shall be to the appropriate standard while not being over intrusive on neighbouring properties. This may require fittings different from those on trafficable roads.

A more detailed description of the standards is as follows:

- Category P Lighting – lighting that is applicable to:
    - Roads on which the visual requirements of pedestrians are dominant, e.g. local roads.
    - Local area traffic management devices installed on such roads.
    - Outdoor public areas, other than roads, where the visual requirements of pedestrians are dominant, e.g. outdoor shopping precincts.
    - P3R and P4R categories are used when reticulation poles are utilised.
- Category V Lighting – lighting that is applicable to roads on which the visual requirements of motorists are dominant, e.g. traffic routes. Subcategories range from V1 to V5.

For urban streets in the District Category, P3 is usually appropriate. In rural residential areas a lower level of lighting, P4 is used.

The switch from a P to a V standard is based on the applicable traffic volume to the route being considered. The appropriate lighting standard is determined in consultation between the street lighting designer and the Council.

7.6.6 Disposal Plan

There are no plans to remove any street light installations or to consider any removals.

Lamp disposal costs are included in the contract rates for maintenance.

7.7 Traffic Services

Traffic Services assets consist of road signs and markings, which aid the safe and orderly movement of traffic and indicate road use restrictions or other information. A good standard of signs and markings can contribute significantly to a safer road network.

The Traffic Services asset accounts for a small proportion of the total transportation asset group based on replacement cost however, this small proportion does not reflect the importance Rangitikei District Council places on the asset.

The use and design of many traffic services assets is controlled by legislation. The current statutory regulation controlling them is Land Transport Rule: Traffic Control Devices 2004, Rule 54002/7.

The asset consists of:

- Road signs.
  - Summarising regulatory instructions that road users are required to obey e.g. Speed limits;
  - Marker posts to indicate the edge of the carriageway;
  - Chevrons to indicate abrupt changes in road direction;
  - Warning of temporary or permanent hazards that may not be self-evident;
  - Indicating directions and distances to destinations;
  - Indicating road user services and tourist features/establishments; and
  - Indicating other information of general interest to road users.
- Road markings.
  - Non-intersection markings:
    - Road centrelines and lane lines; edge lines and shoulder markings; no overtaking lines/no passing lines; median markings; cycle lanes; and parking areas.
  - Traffic Islands:
    - Line markings/raised concrete islands.
  - Intersection markings:
    - Intersection controls; centre lines/edge lines/continuity lines; lane arrows; limit lines; and cycle lanes.
  - Miscellaneous markings:
    - Messages and symbols; pedestrian crossings; railway level crossings;
    - Fire hydrants; and raised reflective pavement markers (RRPM).
- Sight and Guard Rails:
  - White Timber Posts and Boards;
  - Lightweight Steel Armco Barriers.

The key issues relating to traffic services are:

- The quality of road marking materials and application;

- Establishing relevant customer levels of service for road markings;
- Establishing economic and meaningful performance measures for signs and markings;
- Problems with markings adhering to fouled surfaces;
- Maintaining road markings in areas of high wear;
- Providing a consistent appropriate standard of road marking on all roads in the District, relative to their hierarchy and use;
- Providing a consistent appropriate standard of signage on all roads in the District, relative to their hierarchy and use; and
- Damage caused to signs by vandalism and traffic accidents.

Rangitikei District Council has over 4,200 signs, almost 300 km of road line marking and 2,600 individual pavement markings.

7.7.1 Road Signs

Most of the signs you will see on New Zealand roads are international symbolic signs. This means they use the same shapes and symbols as traffic signs all over the world.

Symbolic signs are used because they are quick to read and easy for all drivers to understand. Road signs are generally made of reflective material, making them easier to read at night.

The signs on roads within Rangitikei District can be split into 12 separate types tabulated below.

Table 68: Asset Description – Road Signs

Sign Type	Quantity
Guide	34
Hazard Markings	1,314
General Information	1,093
Local Authority	42
Motorist Services	5
Miscellaneous	10
Regulatory General	948

Sign Type	Quantity
Regulatory Heavy Vehicle	22
Regulatory Parking	101
Street Name Plates	633
Tourist Information	4
Warning Miscellaneous	16
Total	**4,222**

Inventory details for traffic services are collected and stored in the Council's RAMM database. The value of the traffic services asset is derived in the Rangitikei District Council Asset Valuation Report 2013, listed in section 7.1.2 Assets Overview of this plan. The replacement cost of the road signs and railings sub asset is represented in the following table:

Table 69: Asset Valuation – Traffic Services

Asset Type	Component	ORC ($)	ODRC ($)	Annual Depreciation ($/year)
Railing	Railing	2,380,908	531,461	55,099
Sign	Sign	1,452,666	292,359	87,651
	Sign Post	390,831	258,073	26,055

The standard of rural delineation provided over the network is aligned with the Manual of Traffic Signs and Markings (MOTSAM). The intention is to provide a consistent level of service between the Districts. This concept was enhanced in the early years of the 21st century, with the adoption of new Council policies that require markings be designed to present a seamless transition into the Rangitikei District from all neighboring Districts.

Table 70: Asset Description – Road Markings

Road Marking Type	Quantity	Length (km)
Bus Stop	-	0.245
Centreline 100 mm (3x7)	-	102.428
Centreline 100 mm Continuous	-	24.425
Combination Arrows	3	-

Road Marking Type	Quantity	Length (km)
Convex Mirror	6	-
Disabled Parking	8	-
Edgeline 100 mm Continuous	-	85.301
Fire Hydrant	641	-
Give Way	9	-
Give Way (Symbol Only)	125	-
Give Way Limit line	133	-
Hatched Shoulder	-	2.499
Intersection Continuity Lines 150 mm (1x3)	-	2.645
Keep Clear	2	-
Lane 100 mm (1x1)	-	0.127
Lane 100 mm (3x1)	-	0.087
Lane 100 mm (3x7)	-	1.459
Left Turn Arrow	7	-
Loading Zone	1	0.009
No Overtaking 100 mm Continuous	-	12.964
No Overtaking Advance 100 mm (13x7)	-	6.127
No Parking	2	-
No Stopping Line (Yellow)	-	6.131
Other Zone	1	-
Painted Highway Number	3	-
Painted Island	-	1.808
Painted Shoulder	-	1.646
Painted Speed Hump	10	-
Parking (Parallel)	-	1.422
Parking Bay (Angle)	-	1.768

Road Marking Type	Quantity	Length (km)
Parking Limit Line	149	-
Pedestrian Crossing	19	-
Pedestrian Crossing Diamond	36	-
Pedestrian Crossing Limit Lines	33	-
POLICE Parking Area	-	0.019
Rail Crossing	6	-
Rail Crossing Limit Lines	10	-
Right Turn Arrow	5	-
Right Turn Bay	20	0.522
RRPM (non reflective)	-	1.240
RRPM red (edge line) mono-directional	-	0.180
RRPM white bi-directional	-	24.011
RRPM white mono-directional	-	6.095
RRPM white/yellow bi-directional	-	7.625
RRPM yellow bi-directional	-	1.225
RRPM yellow mono-directional	-	1.534
School	8	-
Speed Circle 50 km/h	5	-
Stop	38	-
Stop Ahead	31	-
Straight Arrow	4	-
Turn Right	2	-
Total	**1,317**	**293.542**

7.7.2 Sight Rail and Guard Rail Systems

A sight rail is one or more timber boards, secured by posts driven into the ground, positioned approximately 500 – 1000 mm above the ground, most commonly along the edge of a carriageway bend. They act as a visual aid to road users defining the edge of carriageway around an approaching bend or a section of road with limited shoulder width. As with road line marking, sight rails are also painted white to appear clear to road users.

Unlike a guard rail barrier system, sight rails have no real structural ability and the posts will only provide a minimum amount of restraint under a vehicle collision. If a collision occurs, the road engineers will make an assessment on whether a replacement sight rail should be carried out or whether an upgrade to a guard rail system is required for improved road safety.

Figure 62: Armco Guard Rail

There are 12,506 metres of sight rail used throughout the Rangitikei District road network, spread over 843 separate locations and are maintained by the road maintenance contractor on a regular basis. Details of all maintenance work carried out by the contractor on sight rails can be found in the asset condition section.

A guard rail is a light weight steel barrier system built along the edge of a carriageway to act as a vehicle restraint. They are generally selected for construction in areas with a greater risk of an incident occurring, such as a bend with a significant speed reduction or steep drop.

If a vehicle travelling around the bend loses control for any reason, crosses the edge of carriageway line and strikes the barrier, the steel will deflect and the vehicle impact energy is dissipated. As a result, the vehicle will be pushed back towards the road, which greatly reduces occupant risk. The lightweight posts used are designed to provide a forgiving impact and minimise vehicle damage where possible.

From 1 November 2012, the nominal standard for testing of road safety hardware systems installed is the AASHTO Manual for Assessing Safety Hardware (MASH-1). This document supersedes the National Cooperative Highway Research Project Report 350 (NCHRP350).

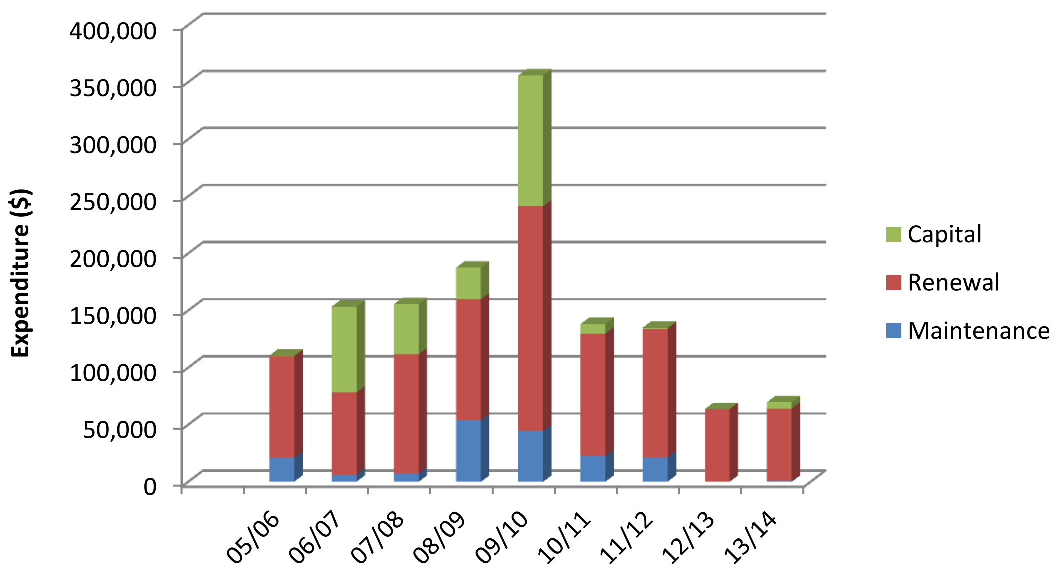
All new road safety hardware that is developed or significant variants of existing systems must be tested and evaluated according to MASH-1.

There are currently 279 guard rail barriers currently fitted and in use on the Rangitikei road network. The routine maintenance involved with crash barrier systems is minimal for the contractor as the barriers are supplied with a layer corrosion protection already applied to ensure the barrier does not rust or deteriorate in bad weather. However, due to the complicated procedure of constructing and securing the barrier, renewal work can be very time consuming and expensive. The guard rail barrier sections are designed to act as a single system, therefore damage to one section can mean several sections actually need to be replaced in order for the barrier to function correctly.

7.7.3 Service Delivery

The chart below shows the variance in expenditure between maintenance, renewals and new traffic services over the last 10 years.

Figure 63: Historic Expenditure – Traffic Services



The graph shows a steady investment in traffic service renewals and new capital works between 2005 and 2009 to cover replacements for damage and a gradual improvement in road safety and markings on the roads. Then a dramatic increase in expenditure and investment in 2010, brought about by new criteria specified by the NZTA for road safety, which must be conformed to.

Since 2005, a heavy emphasis has been placed on improving road safety, driver awareness of dangers and clear road markings and delineation. This initially requires greater investment, which can be seen from the graph in 2010 however, through effective road management, the road maintenance contractor and Council engineers can continue to maintain the improved level of road safety without continually increasing spending year upon year.

7.7.3.1 Operation and Maintenance Plan

There is essentially no difference between the maintenance and renewal of road markings however, road signs and road name plates are regularly cleaned without the need for renewal. On this basis, the service delivery and renewal / replacement sections normally expected for a sub asset have been combined in this instance.

Road signs, sight and guard rails and any other traffic services maintenance is included in Contract No.903 for road maintenance and specifies:

- Minimum maintenance standards;
- Frequency of routine inspections; and
- Response times to correct defects.

7.7.3.2 Processes

The scope of routine works within the road maintenance contract No. 903 stipulates that:

- All posts and signs be clear of dirt and grime, including spot painting where required;
- Maintaining and straightening of signs and posts to within 5 ° of the vertical;
- Removal of unauthorised signs and re-erecting of undamaged signs or posts that have come down;
- Maintenance or replacement of broken or missing edge marker posts.

The Council road engineer performs a monthly audit of the road network with the road maintenance contractor. The road engineer, to ensure the contractor is correctly carrying out their routine works, will assess the condition of all road signs within the area of the District covered. The request for service system is used by the public to report a problem with a road sign, which is directly sent to the maintenance contractor.

To ensure the speed recommendation is correct for a road chevron, the road engineer and maintenance contractor was use an instrument known as a thrust gauge.

It is essentially a ball bearing floating in water, sitting inside a curved casing, which is fixed to the front windscreen of a vehicle during testing. As the vehicle travels around the bend at a designated speed, the ball bearing will experience inertia, resistance to change of direction, and travel around the curve. The greater the movement, the greater the speed reduction required for the bend.

The passenger observes the movement that occurs over several attempts in both directions. The information is then entered into a simple computer program to generate a recommended safe speed for the bend.

7.7.3.3 Maintenance and Renewal Plans

Obsolete, damaged, sub-standard and non-conforming signs identified during inspections are programmed for replacement subject to funding provisions in the following priority order:

1. Public safety.
2. Traffic volumes.
3. Convenience of road users.

Road markings are repainted annually as part of Contract 903 Road Maintenance.

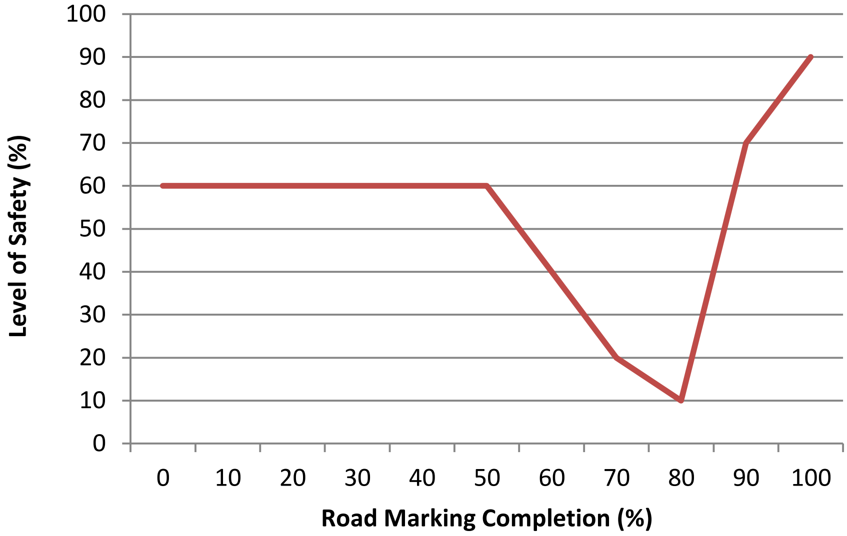
The standard of road marking in the performance specification is based on five criteria:

- Colour (daytime and night-time).
- Daytime visibility.
- Night-time visibility (dry and wet).
- Skid resistance.
- Durability.

The measurement of each of these criteria is set out in the specification, along with the values to be achieved. The contractor is required to carry out regular inspections and measurements to ensure that the road marking meets the standard set in the specification. If it does not meet the standard then the marking is repainted. The reinstatement of road markings after reseals and reconstructions is carried out as part of the resealing contract.

Figure 9-79 illustrates how the level of safety is related to the level of delineation (from NZTA Report PR3-0123 Roading Signage and Delineation) which discusses a driving model and its implications from delineation.

Figure 64: Level of Safety vs. Road Marking Completion



This shows that drivers can safely drive without any delineation, by adjusting their driving style accordingly e.g. lowering speeds. As delineation is progressively added, it will confuse drivers as little reliance can be placed on delineation being present and unmarked features can cause unexpected problems. However, when delineation is complete, the driver will use the delineation as it can be relied on, and adjust their driving load accordingly, i.e. speed up and potentially reduce concentration.

The contract also includes the maintenance of 42 km of the Council's raised reflective pavement makers (RRPMs or "cats eyes") in conjunction with the road markings. RRPMs are predominantly installed on the arterial and collector roads in the District. This includes an annual inspection to determine any missing or damaged markers. These are then replaced within one month of being identified.

RRPMs are also inspected following snowfall where they may have been damaged or removed as part of the snow clearing operations. All work with the RRPMs is in accordance with the relevant NZTA Specifications. Generally the Council does not install RRPMs above the 300m contour line, as this is where snowfalls are more likely and on that basis RRPMs could be regularly removed by snow clearing machinery such as snow ploughs and graders.

The contract stipulates the following Key Performance Indicators (KPI's):

- Spirit of partnering: including innovation and initiative.
- Safety: including safe road environment, temporary traffic control, and proactive safety culture.
- Public satisfaction.
- Contractual compliance: including new road marking.

A performance measurement system has been jointly developed by the Engineer and the Contractor that measures the KPI's above and the requirements of NZTA P/20 (road marking and quality systems).

7.7.3.4 Forecast

As road marking is not depreciated, any costs are considered a maintenance cost and therefore are met from the maintenance budget.

Sign maintenance should theoretically cover the standing costs of the inspection part of the contract and any sign cleaning, all other parts of the work being renewal, either scheduled or premature. However, to split the small amounts involved in maintenance from the bulk of the contract is impractical from a work level point of view and uneconomic from an asset management one. All sign maintenance and renewal costs are therefore classified as renewals. This is a change in philosophy from that applied previously, where sign renewals were considered as part of routine maintenance. It is considered that most signs are renewed because of needing to be prematurely replaced - ranging from collision damage to vandalism.

On this basis, the road marking costs are budgeted under NZTA Work Category 122 – Traffic Services Maintenance, while signs maintenance and renewals are budgeted under Work Category 222 – Traffic Services Renewals in the Council's Land Transport Programme.

In addition to the assumptions detailed in Section 8 regarding risk management, sign maintenance and renewal costs will increase in proportion to the increase in total road length.

7.7.3.5 Deferred Maintenance and Renewals

The impacts of deferred maintenance and renewals may lead to loss of legibility/definition of the sign or marking. In the case of missing or removed signs, information provided by the road sign is not provided. All of these circumstances lead to a decrease in the levels of safety provided by the network.

There are no significant deferred maintenance or renewal issues at present. The budgets have kept up with the actual costs of maintenance over the years.

7.7.4 Condition, Performance and Capacity

7.7.4.1 Condition

The condition of signs, sight rails, traffic islands and road markings is assessed during routine inspections undertaken by the Contractor, with the results reported to the Engineers Representative. There is no formal condition rating system for traffic services assets; condition is assessed both visually, and in accordance with the appropriate key performance indicators.

The extent of deterioration of road markings depends on age, traffic volumes, the materials used, the condition of the road when the markings were applied (oil and grit reduce adhesion), the extent of ice gritting in winter and the extent of bitumen bleeding in summer.

Sight rails are also routinely inspected to ensure cleanliness, clarity and damage. Sight rails are routinely painted every two years by the contractor and reported accordingly. Occasionally, repair work may be required due to a road traffic collision which may include replacement of timber boards or posts.

All signs and markings deteriorate through weathering, which causes both loss of reflectivity and fading of sign colours. However, anecdotal evidence is that most signs are replaced because of damage resulting from vandalism and vehicle accidents.

The majority of street name signs are in very good condition because of the large number of new signs installed over the last 10 years. This was done largely because of the lack of signs prior to this, particularly local rural roads and the extreme age or poor condition of many of the signs that were provided.

Warning, regulatory and information signs are generally in good condition because the majority of the signs are relatively new because of previous upgrade programmes. The large number of new signs that eventuated came about because of the lack of signs prior to this and because of the replacement of non-conforming or substandard existing signs.

7.7.4.2 Performance

Performance issues for signs and road markings relate to coverage, accuracy of placement, visibility, reflectivity and conformity with standards.

Further signage has been provided along numerous roads within the Rangitikei District Mangatipona Road, Makahou Road, Kawhatau Valley Roads and Taihape – Napier Road to improve navigation through these windy roads and to assist the increasing tourist activities occurring in the areas. In 2006, the Council moved to a performance based contract for pavement markings, which also introduced reflective markings to improve night delineation and safety.

The NZ Transport Agency (NZTA) recommended, following its 2002 Technical Review of the Local Roading, that the Council adopt the NZTA Manual of Traffic Signs and Markings (MoTSAM) and Road and Traffic Standard 5 (RTS5) Guidelines for Rural Road Marking and Delineation. Other issues raised were:

- Lack of edge marker posts;
- Use of bridge end marker posts;
- Use of non-standard culvert markers; and
- Utility pole marking.

Repainting on line marking is carried out on a cyclic basis over a 12 month period using the NZTA P/12 method based specification. This type of specification had the contractor putting the minimum amount of paint on the road to meet the specification. Repainting usually occurs in late summer, when painting conditions are more suitable and increased daylight allows longer working hours and a quicker overall project completion.

This was one of the reasons why a performance-based contract was adopted. The performance-based contract was also in keeping with industry trends in this area that utilised the new NZTA P/20 performance based specification for road marking. It also offered significant longer-term cost savings compared to a cyclic marking programme.

All new signs and markings are installed or painted in accordance with MoTSAM, which in turn, complies with the requirements of the Traffic Control Devices Rule.

The Contractor is required to maintain an effective level of preparedness including temporary traffic signs to ensure emergency signage works can be undertaken within the following specified response timeframes.

Table 71: Response Times – Traffic Services

Type	Response Time		
	Class A Road	Class B Road	Class C Road
Regulatory Signs	3 days	2 weeks	1 month
Warning and Hazard Signs	4 hours	1 day	3 days

7.7.5 Improvement and Development

7.7.5.1 Upgrade Process

New signs are installed to provide information and improve road safety. Problem sites are continually surveyed and appropriate signage installed, with priorities being broadly assigned in accordance with the roads' hierarchies and traffic volumes.

Regulatory signs at intersections are determined in accordance with MoTSAM as listed above e.g. visibility when approaching the intersection.

New signs and markings are often vested in the Council from new urban subdivisions undertaken by private developers. The amount is usually small and not worth specifically itemising.

7.7.6 Disposal Plan

The maintenance contractor is also obligated under routine works to remove any damaged or road signs no longer compliant with MoTSAM. In many cases, a new road sign is simply supplied by the contractor and fitted as a standard renewal. Occasionally, if the information provided by the road sign is no longer accurate or required, the sign can be simply removed and disposed of by the contractor.

7.8 Footpaths

The primary purpose of footpaths is to provide safe and convenient access for pedestrians and disabled vehicle users, around towns and communities without interfering with road traffic. NZ standards now state that any new footpath constructed should be a minimum of 1.4 m wide wherever possible to allow users to pass each other without the need to step off into the road.

The footpath asset accounts for 2.4 % of the total transportation asset group based on replacement cost.

Footpaths are mainly located along streets and roads in townships and through reserves and other areas connecting cul-de-sacs and other streets to enable increased connectivity. Footpaths are not normally found in rural-residential sub-divisions as use would be much less frequent and hence, not cost effective.

Generally, the approach Rangitikei District Council has been taking is to incorporate an appropriate road width for carriageway lanes to incorporate cyclists as part of the road network traffic.

The Council's current policy is to gradually move towards having at least one footpath on one side of the road in new developments and townships. There may be exceptions considered on a case-by-case basis in high usage areas, such as near businesses and schools. There are many streets in less developed urban areas that do not have footpaths however, these areas are gradually considered and assessed for capital works on a case by case basis.

The key issues relating to footpath and management are:

- Reviewing Council's policies and standards relating to footpath levels of service e.g. providing footpaths on both sides of the road along busy urban streets and shopping areas.
- Controlling third party damage to footpaths e.g. building sites, trucks.
- Deferred footpath renewals.
- Working in combined effort with the utility companies and providers under maintenance and renewal programs for underground services located in the RDC road reserve.
- The increasing emphasis being placed by government agencies to promote and provide more sustainable transport options, that utilise walking and cycling and the provision of infrastructure to enable this.

- Missing or heavily damaged sections of footpath and other facilities such as drop crossings, which cater for mobility scooters and/or disabled people.

The total footpath assets managed by Council, broken down into locations, lengths and proportion, is summarised in the following tables and graphs.

Table 72: Urban vs. Rural Footpaths

Location	Length (m)	Proportion (%)
Rural	2,927	4
Urban	85,067	96
Total	**87,994**	**100**

The data in the tables includes the Council's off-carriageway footpaths, which are dual use facilities shared by cyclists.

Inventory details on footpaths is collected and stored in the Council's RAMM database. The value of the footpath asset is derived in the Rangitikei District Council Transport Asset Valuation Report 2013.

Table 73: Asset Location - Footpaths

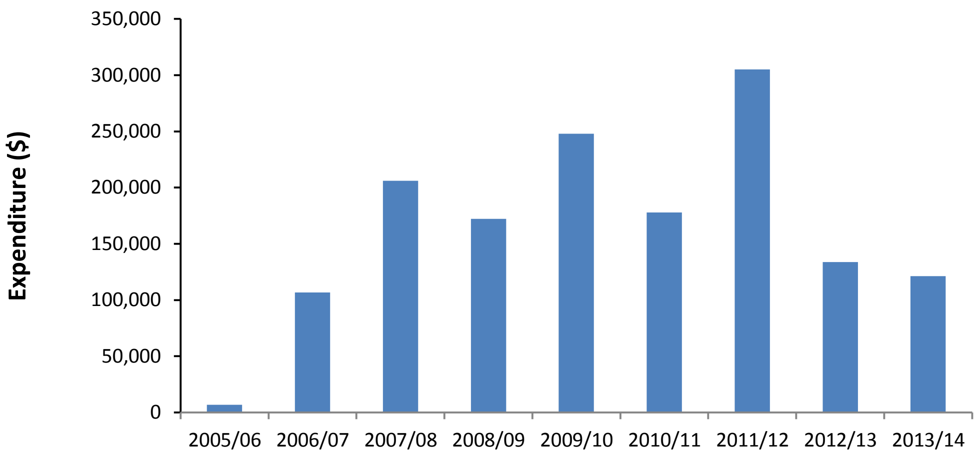
Locality	Length (m)	Proportion (%)
Bulls	12,850	14
Hunterville	3,569	4
Koitiata	60	< 1
Mangaweka	1,028	1
Marton	44,585	50
Ratana	2,473	3
Rural Hunterville	253	< 1
Taihape	15,038	17
Turakina	5,227	6
Whangaehu	1,047	1
Other Rural Areas	1,864	2

Table 74: Asset Valuation - Footpaths

Asset Type	Component	ORC ($)	ODRC ($)	Annual Depreciation ($/year)
Footpath	Footpath	12,205,728	5,490,586	190,996

The graph below shows the historic expenditure for footpaths in the Rangitikei District since 2005.

Figure 65: Historic Expenditure - Footpaths



7.8.1 Service Delivery

Maintenance is carried out under Contract No. 903 Road Maintenance. The contractor is required to carry out inspections as follows:

> *The inspection as required to identify areas of surface displacements greater than 5mm for cobblestone surfaces and 10mm otherwise. These areas shall be prioritised and reported in the RAMM system.*

The contract includes all footpath maintenance work including safety repairs or other minor ordered repairs as required. Ordered work includes:

- Pothole repair;
- Replacing footpath battens;
- Grass edge trimming;
- Weed control;
- Cleaning (removal of moss/lichen);

- Repair of surface defects prior to footpath resurfacing; and
- Filling depressions and slumps and the reinstatement of utility trenches.

7.8.1.1 Operation and Maintenance Plan

Footpath maintenance work is reported to the Council, using the RAMM system by the road maintenance contractor, on a monthly basis as noted on site. The work presented is assessed by Council on a priority basis and approved accordingly. The amount of work carried out on footpath maintenance is based on the Council's approved non-subsidised budgets.

7.8.1.2 Strategy

The road maintenance contractor and Council mainly identify maintenance needs during inspections. Council maintains a footpath maintenance and renewal schedule to record and programme ongoing and deferred works. Other sources are also used, such as RAMM rating surveys, public and township committee comments and observations made by the Council staff in the course of their duties.

The consequences of inadequate maintenance are:

- Reduced safety;
- Accelerated footpath deterioration and additional consequential costs; and/or
- Lower level of service (ease of use, appearance).

Footpath maintenance is prioritised using the following criteria:

- Available budget;
- Optimisation of complimentary work scheduling;
- Safety of pedestrians;
- Linking community services;
- Likelihood that the area of distress may expand and require more expensive intervention; and
- Aesthetics (e.g. minor water ponding/untidy appearance).

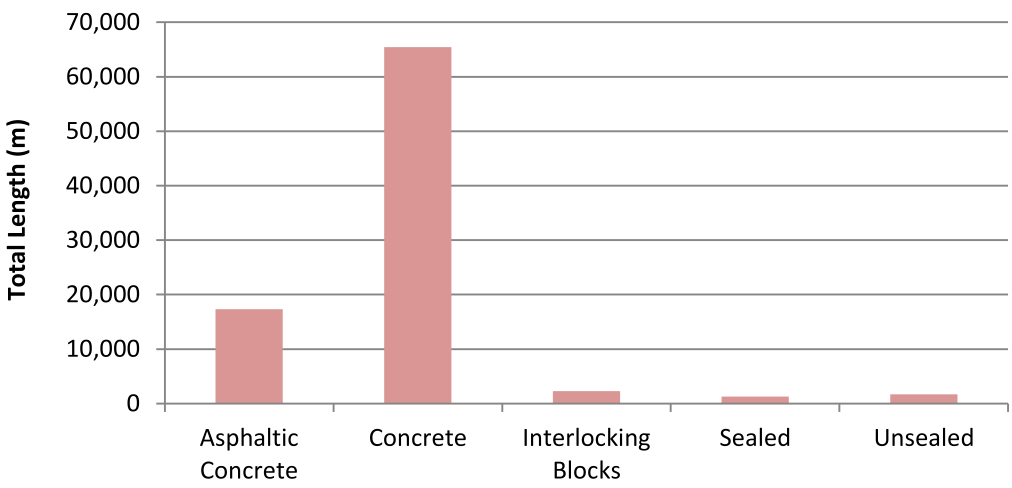
7.8.1.3 Processes

If a crack forms within a footpath due to ground movement or a trip hazard forms between two sections of concrete, the maintenance contractor may choose to carry out:

- ***Grinding*** – At the edges of concrete where the crack or trip hazard has occurred, the contractor can grind away the concrete to form a smoother edge at an equal height to the opposite edge, which removes the trip hazard from the footpath.

- ***Break out and replace*** – For larger sections of maintenance, the contractor may choose to saw cut a 1 m wide section of the footpath and lift out the entire piece. The ground underneath is then prepared appropriately before a new section of concrete is poured into the gap to replace the original section.

Figure 66: Footpath Material by Length



The type of surface used is dependent on lifecycle cost considerations, pedestrian volumes and the amenity value of the location e.g. shopping and commercial areas. Sometimes, a local committee group can also pass recommendations to Council to consider. The types and quantities of footpath surfaces in the District's townships are listed below:

The meanings of the terms used in the above graph are:

- ***Asphaltic Concrete***: Mix of graded aggregate and asphaltic binder laid in a 20–30 mm layer.

- ***Concrete***: Unreinforced concrete laid in a 75 or 100 mm layer.

- ***Interlocking blocks***: About brick size concrete blocks (usually coloured), or vitrified clay bricks laid side by side on a formed and compacted base in an interlocking pattern to form the footpath surface.

- ***Unsealed***: Graded crushed stone chips spread over compacted basecourse.

- ***Sealed***: Layer of sprayed bitumen with a fine grit spread over compacted basecourse.

7.8.1.4 Standards

Technical specifications and Council engineering drawings and details are supplied to the road maintenance contractor regarding the quality standards of footpath construction and renewal work. This ensures there is no misunderstanding with minor details during the works.

Unless specified by the road engineer, footpath material selection will always be chosen on a like for like basis to match existing works.

Temporary Traffic and Pedestrian management is always set up where footpath works are carried out to control pedestrian movements in a safe and controlled manner.

7.8.1.5 Forecast

The amount of actual pure township footpath maintenance in relation to renewal work such as resurfacing and reconstruction is quite small. To split the small amounts involved in maintenance from the bulk of the other work is impractical from a work level point of view and uneconomic from an asset management one. All footpath maintenance and renewal costs are therefore classified as renewals.

In addition to the assumptions detailed in the Risk Management section, it should also be noted that footpath maintenance costs may reasonably increase in proportion to any increase in new footpath length, either constructed by Council or by private developers.

7.8.1.6 Deferred Maintenance

There is no intentionally deferred maintenance works on footpaths, however the table shown in the renewal programme section details the volume of renewal and maintenance work identified for consideration over the next few years.

7.8.2 Condition, Performance and Capacity

7.8.2.1 Condition

The RAMM system contains a footpath condition rating function, which records information and creates a condition rating score to provide an overall picture of the footpath network. Unfortunately, the current information is not currently available. An item has been added to the Improvement plan to address this issue moving forwards.

7.8.2.2 Performance

There is currently very little information within the RAMM database to provide any real understanding of the current performance of footpaths in the District in comparison to their expected life span.

7.8.2.3 Capacity

Expansion of the footpath network requires a deeper understanding of pedestrian movement according to how the towns are changing according to how the people are using shops, businesses and community services.

As the extent of the asset increases and other influences change with time, it is likely that it will be necessary to revise the current approach to prioritising this work. In particular, a combination of the present system of annual inspections and the use of rating data collected for RAMM on footpaths is more likely to indicate the expected condition of footpaths. It will provide a better indication of the likely need to increase expenditure on maintenance and renewals.

7.8.3 Renewal Plan

Renewals are carried out to:

- Return paths to their original condition;
- Provide for safe passage and ease of use for pedestrians, as appropriate to the facility;
- Provide a surface that requires minimal lifecycle maintenance.

Renewal is required when a path has deteriorated to the extent that:

- The required level of service is not being delivered; or
- Continued maintenance is not economical.

Justification of renewal work is also influenced by:

- The condition of the kerb and channel adjoining the footpath - Replacement of substandard kerb and channel will also require the reinstatement of the footpath, generally to an extent consistent with full reconstruction.
- Coordination with other nearby works, such as street upgrading, urban road reconstruction or renewal of other utility services.

The issues and desirability of coordinating footpath renewals in conjunction with other works is discussed in association with kerb and channel renewals. It is noted that an Improvement Programme plan task is also referenced to identify and establish a forward programme of complementary asset groups such as footpaths, kerb and channel, pavements and street lighting.

The types of renewal work undertaken to renew these facilities include:

- Resurfacing, where the existing formation is sound, to provide a smooth, waterproof, surface by:
    - Overlaying with asphaltic concrete on existing surface; or
    - Resealing with bitumen and chip or slurry on existing chip seal; or
    - Resurfacing with asphaltic concrete on existing chip seal; or
    - Removing the existing surface and laying new surface over existing basecourse.
- Reconstructing substandard sections of path, where the existing formation is unsound, by replacing any timber battens, basecourse and surfacing.

Work needs are identified following annual visual assessments. Priorities are based on:

- Level of service deficiencies / path performance, including safety issues – differential settlement, cracks, potholes etc.;
- Physical condition;
- Coordination with other works, such as kerb and channel replacement, installation of underground wiring by utility companies, underground utility renewal, and street upgrading; and
- Likelihood of accelerated deterioration.

7.8.3.1 Standards

Renewal works, including selection of appropriate material, should comply with Council's Engineering and construction standard details and drawings.

Asphaltic Concrete (AC) is the surface material used for most other renewals. More than two layers of AC can create problems with "high lips" on footpaths; therefore it may be necessary to use slurry seals after the second resurfacing of asphaltic paths.

Concrete and interlocking block paths, such as Taihape Town Centre, are generally renewed to an identical standard. Interlocking blocks are generally used for aesthetic reasons in shopping areas and other high profile public spaces. Local businesses may occasionally agree to meet the additional cost to provide a more decorative footpath than that normally funded by the Council.–However, the surface of the ground underneath a footpath will shrink or expand over time due to heat, cold or water ingress. This can result in a greater chance of movement between individual blocks and therefore, a greater risk of introducing a trip hazard. Consequently, this limits the capacity of an interlocking block footpath when compared to a concrete or asphaltic surface.

Concrete paths have reduced future maintenance needs (no resurfacing for concrete), but are initially more expensive to construct.

Concrete paths can be less tolerant to heavy vehicle loading e.g. from house building activity traffic on an adjoining lot and can crack and spall. They are also prone to differential settlement between panels over time if not constructed to a high standard initially. Access to underground services can be problematic where a berm is not present, as the footpath must be removed and reinstated where services need to be installed. Generally, it is more difficult to integrate vehicle entranceways into concrete footpaths than asphaltic footpaths.

The following criteria has been utilised to assist in choosing the footpath material:

- As concrete footpath reconstruction usually carries a cost premium, an economic assessment comparing the net present value (NPV) lifecycle cost of the asphaltic and concrete path options is required as part of the justification.
- If there is an adjoining concrete path, concrete will always be considered as a first option to achieve the greatest lifespan from the asset.
- Where a full block is being reconstructed, the footpath can be considered for replacement in concrete.
- In conjunction with adjoining sections, AC surfacing is sometimes used to provide uniformity of appearance and performance.
- Unsealed rural pathways are occasionally selected by a committee to look more natural with surroundings. These may be selected for sealing in another financial year.

7.8.3.2 Programme

The required level of renewal varies depending on the:

- Levels of service provided by the paths.
- Condition profile of footpaths.
- Age profile of paths.
- Proximity of trees.
- Level of on-going maintenance required.
- Economic lives of the materials used.
- Effects of underground wiring.

The expected average annual long-term renewal and lifecycle renewal requirements for the network were established from analysis of the Council's 2013 Roading asset valuation.

The base lifecycles used to establish this data are represented in the table below.

Table 75: Asset Life - Footpaths

Footpath Material	Expected Useful Life (years)
Asphaltic concrete	25
Concrete	75
Interlocking blocks	75
Metal	25
Seal	25

Site inspections are carried out by Council road engineers along with the road maintenance contractor to identify issues throughout the District. This information is added to the footpath forward works programme for assessment and included in the Councils Long Term Plan.

The current FWP shows areas requiring maintenance and renewal within all urban areas of the District, so several criteria are applied to the footpath sections to prioritise and evaluate where investment should be made first. This ensures Council generates best value for money with non-subsidised expenditure.

7.8.3.3 Forecasting

To enable long-term renewal forecasting, an accurate construction date is required for existing assets. This information is not currently available to a high enough standard to be usable. An item has been added to the Improvement plan to address this issue moving forwards.

7.8.4 Improvement and Development

The Council's current performance measures for footpaths throughout the District are the most significant driver of footpath improvement projects. In general, other new paths are acquired through:

- New paths being constructed by the Council where no path previously existed; or
- New footpaths vested in the Council from new urban subdivisions by private developers; or
- Upgrading to improve the level of service particularly in relation to:

- Special treatments (e.g. interlocking block paving) in township centres and commercial areas.
- Surfacing of metaled paths.

7.8.4.1 Strategy

The footpath and cycleway / pathway development strategy is to:

- Develop other new footpaths where there is a clear community need and strong community support for them.
- Provide footpaths and cycleway linkages that have been identified through Council initiatives, such as township structure plans, neighbourhood accessibility plans and in planning for new urban subdivisions.
- Promote and encourage third party initiatives to establish formed walking and cycling pathways, for example "Rail trails" for both commuter and recreational purposes.
- Ensure opportunities are taken to establish walking and cycling facilities when upgrading existing or planning new road infrastructure projects.

The criteria used for advancing and prioritising footpath development projects are:

- Pedestrian and cyclist safety;
- The locality, proximity and suitability of alternative paths;
- The vehicle operating speed on adjacent carriageways;
- Providing and enhancing connectivity e.g. between new urban subdivisions;
- Township and Community Board committee priorities (within their jurisdictions only);
- The ability to coordinate with other works to provide a package of complementary works to meet demand e.g. roads, walking, cycling, public transport etc.;
- Capitalising on opportunities put forward by any third party walking and cycling advocates, or regional initiatives; and
- Promotion of sustainable transport options.

7.8.4.2 Programme

The timing of new subdivisions and thus, the paths they contain, is under control of the respective property developers and is strongly influenced by market forces. This work is not funded by the Council and is not programmed in this, or any other, Council plan.

Table 76: Footpath Breakdown

Footpaths	Length (m)
Footpath Length in Major Towns	75,313
Footpath Length in Smaller Towns	12,681
Length of Urban Streets with no footpath	26,310

The table above outlines the total shortfall of footpaths in the District under the current Council policy. The Council has been funding footpaths on existing urban streets i.e. footpath extension excluding footpath replacement, at the average rate of 0.50 – 0.75 km each year. On this basis, it would take over 30 years to provide at least one footpath alongside streets and roads in all urban areas meeting the above criteria.

Footpath projects are usually funded as part of the Council's non subsidised footpath budget. The identification and prioritisation of any new projects, is subject to consultation with the relevant township committees and Community Boards in a process outside this plan. New footpaths and cycle ways may eventuate as discrete projects or part of a wider improvement project like a street upgrade.

7.8.5 Disposal Plan

Under the Council's policy of providing and maintaining only one footpath on urban streets, unless there are specified reasons for providing two, the following paths are technically surplus. Thus, more emphasis on maintenance will be placed on one footpath rather than the other hence it will be allowed to deteriorate until the level of service or other reasons require their removal.

7.8.5.1 Strategy

Before committing to the removal of any footpath the Council will:

- Consult the people in the affected street or streets;
- Consult the relevant communities; and
- Consider the recommendations of the relevant township Committees.

7.8.5.2 Candidates

The costs of disposing of a footpath are essentially the costs of removing the foundation and surface, replacing them with suitable soil, and sub-soil if appropriate, and sowing new grass in the reconstructed berm. This will often, but not always, be done in conjunction with renewal of the footpath on the other side of the road or part of a street upgrade project.

There is a task in the Improvement Plan to identify potential footpaths that can be considered for disposal. These will be identified from those footpaths on low volume local streets and roads that currently have two footpaths, where one would suffice. Preparation of the candidate list will follow preparation of the kerb and channel renewal programme, as there is currently no intention to dispose of any paths as “independent works”. Once candidate paths have been identified, the cost of disposal can be assessed.

However, it is noted that formed and sealed vehicle entranceways would remain if a footpath is removed, and that there is likely to be a cost to isolate these and provide them as standalone sealed areas in conjunction with berm reconstruction.

There are currently no plans to dispose of any footpath assets.

7.9 Environmental Management

7.9.1 Stock Crossing/Droving

Stock droving is permitted on roads within the Rangitikei District but it must comply with the requirements of the Rangitikei District Council Bylaw 2013. Farmers must obtain the appropriate consent in advance when the droving or crossing activity will exceed normally accepted standard conditions, practices and expectations detailed in the bylaw.

The law was created to:

- Improve road safety.
- Reduce damage caused to the road, road reserve and vehicles due to stock droving, excrement and mud.

The current bylaw reflects the Councils current responsibilities towards the control of the activity. It balances the needs of farmers to use public roads for moving stock against the rights of other road users, primarily from a road safety perspective, in a fair manner. In addition this, with the increase in rural residential subdivision that has occurred in the District, the resulting new property owners are much less tolerant to rural farm practices, such as stock and effluent on rural roads, than the original farming communities. Again, the Council has had to balance the needs and rights of the respective road users in a fair manner.

7.9.1.1 Consents

Consents are required for regular or one-off movement of stock on arterial, collector and strategic roads. The movement of dairy cows on or across any road for milking requires the written consent of the Council.

There are numerous consents granted for droving of stock across or along roads within the District. The majority of these consents are for droving dairy cows directly across roads for milking purposes. Several of those consents are for regular droving of cattle/sheep on significant roads within the District. These consents were all issued in accordance with the Rangitikei District Council Bylaw 2013.

7.9.1.2 Maintenance

Stock droving consent holders are required to maintain all stock crossing points, vehicle crossings, road verges and gateways to the satisfaction of the Council. The consent states:

> *Consents for the regular droving of dairy cows directly across roads require the farmers to take all reasonable and practicable steps to clean, scrape or sweep the road. It is also recommended in the Council Bylaw that protective matting is used to protect the road surface from stock damage.*

7.9.1.3 Underpasses

There are a number of stock underpasses in the District, these are constructed to an agreed standard and each required a building consent before construction commenced. Upon completion of an underpass's construction, it is inspected by a Council Engineer who must approve the structure before the Code Compliance Certificate is issued. Council Policy also contains specific details regarding construction and maintenance requirements of stock underpasses.

The Council offers a subsidy on the construction cost of a stock underpass to dairying operations that were in existence prior to 1 August 2002. Specific details regarding stock underpasses and other subsidies are also detailed in Council Policy.

A stock underpass is generally considered for construction if:

- It is technically possible.
- Average traffic volume of the road is greater than 1,000 vpd.
- Council considers it beneficial to other road users.

Figure 67: Stock Underpass Installation

To date, the Council has not relied on any funding assistance that may have been available from the NZTA through the Subsidised Land Transport Programme. By fully funding its contribution to underpasses, the Council avoids the funding and other constraints required by the NZTA. This makes negotiations with farmers easier and allows encouragement of the timely installation of an underpass with the minimum of "strings attached", which may otherwise jeopardise an agreement.

An Improvement Plan task has been included to examine how subsidised funding maybe utilised by the Council for the maintenance and cost sharing of stock crossing facilities in accordance with the NZ Transport Agency's policy detailed at clause F10.6 – Stock Crossings in its Planning, Programming and Funding Manual.

7.9.1.4 Programme

There is no forward works programme for stock crossings in the District. The funding of contributions towards stock crossing facilities is included in the Non Subsidised Forecasts in this plan's financial summaries detailed in section 11 – Financial Summary of this Plan.

7.9.2 Cattle Stops

There are several cattle stops within the Rangitikei road network used to maintain stock within boundaries. They are classified as structures lying under a right to occupy the road reserve, but they are not Council assets. The farmer or landowner carries the cost of construction, maintenance and disposal of these structures.

7.9.3 Fords

There is one Ford within the Rangitikei District on Mangaohane Road, north east of Taihape. It is constructed from a reinforced concrete deck, sitting only 200–300 mm above the water level, cast on top of four small culvert pipes.

It is considered a Council asset and maintained to the same standards as a bridge or large culvert crossing. The road maintenance contractor regularly inspects the surface deck of the ford and will occasionally close this unsealed road, which joins directly off Taihape-Napier Road, when heavy rainfall causes the river level to rise above the level of the deck.

7.9.4 Litter, Detritus and Street Cleaning

7.9.4.1 Street Cleaning

The street cleaning activity covers the inspection, reporting, programming and cleaning of all urban kerb and channel (including State Highways through townships), sump tops, property access culverts and slot crossings. It involves the removal of all unsightly items including, litter, leaves, detritus, waste, road kill etc. up to a limit of 40 kg.

Contract No. 903 Road Maintenance contains the specified requirements for street cleaning. The performance measures pertaining to this work are specified as follows:

- Kerb and Channel (flat, dish and shallow dish) – There shall be no litter/debris left in the channel immediately after the cleaning operation.
- Sumps (all channel types) – There shall be no litter/debris blocking sump gratings immediately after the cleaning operation.
- Covered Channel (all types) – There shall be no litter/debris remaining under portions of covered channel as to create blockages that would otherwise impede drainage, immediately after cleaning operation.
- Mountable Kerb in Carriageway – There shall be no loose material left on the carriageway within 300 mm of the edge of the kerb immediately after the cleaning operation.
- If litter/debris in the channels cannot be removed by normal cleaning methods, the Contractor shall loosen the matter by other means, without damage to the channel, prior to removal and disposal.
- The works are to be completed in accordance with the specified frequencies and as scheduled by the Contractor’s programme.

Cleaning is done on a cyclic basis with the frequency based on the historic needs, which are regularly reviewed, to reflect demands and the need to keep the channels clear. These frequencies vary from weekly in townships to six monthly on rural roads. Extra cleaning is done on an as needed basis during heavy rain events, leaf fall, outside shops that require extra rubbish removal and areas that get a regular build-up of debris.

Cleaning is carried out by mechanical sweeping where this can achieve the standard of cleaning, but hand cleaning is done in conjunction with this on dish channels, channels with non-standard shapes, areas with berms and trees in front of the channel and those that have channel covers or slotted channels at entranceways.

A proportion of funding for this work is budgeted under the New Zealand Transport Agency (NZTA) Work Category – Street Cleaning in the Council's Land Transport Programme. The forecast costs of street cleaning is summarised in Section 11 – Financial Summary of this Plan. The details include the funding necessary for street cleaning in both the subsidised and non-subsidised portions of the financial forecasts.

7.9.4.2 Detritus

The road maintenance contactor routinely removes surface detritus during monthly inspections of the District. It can be defined as a collection of fragments or material on a sealed surface or water channel including loose chip and aggregate. This can also include:

- Material that impedes the efficient operation of existing drainage.
- Vegetation cuttings.
- Dead animals.
- Loose aggregate or leaves.
- Broken glass.
- Silt and small weed growth in channels.

Locations of sealed surfaces include the following:

- Road carriageways and sealed shoulder areas.
- Cyclist zones and lanes.
- Footpaths.
- Drainage channels (lined or unlined).

7.9.5 Abandoned Vehicles

The road maintenance contractor is responsible for notifying the Council of any abandoned vehicles and having them removed by a suitable means. This work is subsided under the NZTA work category - environmental maintenance.

The processes pertaining to abandoned vehicles are contained in Section 356 of the Local Government Act 1974 - Removal of Abandoned Vehicles from Roads. This details, amongst other things, the Council's responsibility to identify the owner of the vehicle before sale or disposal.

7.9.6 Vegetation Control

Vegetation is defined as grass, plant pests, shrubbery, exotic seedlings, plant growth or small trees up to 2.5 m in height on sealed and unsealed roads or within the road reserve.

The vegetation is sprayed where it is:

- Obscuring abutments, headwalls, signs, etc.
- Affecting the functioning of the soak holes, kerb and channel, etc.
- Affecting the aesthetics of the median, driveways, footpaths, etc.

Spraying is undertaken under Contract No. 903 Road Maintenance. Under the contract, the Contractor is required to hold consent from Horizons Regional Council for use of non-residual sprays or other sprays, suitable for application in urban and rural areas, which ensure that weed growth is stopped. The contractor employs a certified applicator for this work.

7.9.6.1 Roadside Mowing

Mowing is carried out along most rural roads and at intersections under the Contract No. 903 Road Maintenance. The berm on both sides of each side road is mowed for a distance of 1.5 m back from the edge of sealed carriageway aid in maintaining visibility of approaching traffic on the side roads and around bends. In addition to these intersections, some intersections of local roads are included in the schedule because of the problems with sight distances.

After mowing, the height of vegetation has three specified maximum heights, as shown in the following table.

Table 77: Vegetation Heights Allowed

Road Class	Max. Vegetation Height (mm)
A	300
B	500
C	600

The maintenance contractor generally carries out mowing during the spring growth season, often in November and depending on weather conditions may also be done again in the autumn. The need for mowing is managed by the contractor, as the road engineer will simply assess the grass height at any given time.

7.9.6.2 Vegetation Hazards

When vegetation grows out too far into the road reserve, it can become a safety hazard by obscuring vision along roads and around bends. Overhanging trees can easily collapse under their own weight during a storm event, heavy rain or wind creating a roadblock and possible risk of vehicle collision.

Figure 68: Road Closed by Vegetation Hazard

The road maintenance contractor regularly recommends vegetation control measures to Council to highlight possible risks to road safety. Council has also embarked on education programmes, under its Community Programmes - Work Category 432, to encourage property owners to control overhanging vegetation from their properties. In particular, properties adjacent to intersections where visibility can be obscured by overhanging tree branches and long grass.

The Council's Request for Service (RFS) records sites where there are observed problems on the road network, such as a fallen tree blocking the road. If not remedied by request, or if clearance is more of a major undertaking, the site is prioritised for remedy in the Councils forward works programme. The following graph shows historic expenditure for vegetation control throughout the Rangitikei District.

7.9.6.3 Urban Street Trees

The aesthetic or decorative trees planted in the berm areas of urban streets is covered under the road side tree maintenance budget. The removal of trees for safety is considered on a case by case basis based upon input from:

- Road maintenance contractor.

- Council road engineer.
- Community Committees.

Urban street trees are occasionally planted by small community groups such as "Keep Marton Beautiful" or the Parks and Reserves part of the Council.

Occasionally, urban trees may need to be removed by the road maintenance contractor to control damage to infrastructure e.g. Tree root damage to footpaths or road pavements. This cost is paid for by the unsubsidised tree maintenance budget.

7.9.7 Emergency Works

7.9.7.1 Reinstatement

Emergency works may arise from adverse weather events such as high winds, snow or extremely heavy rainfall. Under the road maintenance contract, the contractor is required to attend to all emergency work as soon as possible to ensure roads are open, or at least made safe, as soon as possible. They may be required to establish emergency patrols during periods of expected damage to facilities.

Council allows a designated amount of money for environmental maintenance and clearance e.g. Trees that have blown down and blocked a road. If the extent of this becomes too severe during a storm or weather event, the Council can apply to NZTA for additional funding under Work Category 141 – Emergency Reinstatement. This funding allows the Council to repair all road damage caused by severe weather to, at least as good a standard, as previously existed before the weather event.

In other instances, the Engineer notifies the Contractor of the need to carry out emergency works. However, notifications from Council staff, road users or observations by the contractor also give the contractor the authority to carry out emergency works, if considered necessary, with the Engineer being notified as soon as possible.

7.9.7.2 Snow Clearing

Snow clearing is included in Contract No. 903 Road Maintenance Contract and the Contractor acts in determining when and where snow clearance is carried out. Prior to mobilising personnel and equipment, the Contractor must receive verbal confirmation from the Engineers representative if possible.

The Contractor confers with the Engineers representative on a regular basis during periods where there is a risk of snow to ensure that, as far as possible, hazards are anticipated. The need for snow clearance can be a matter of opinion however; safety to the road users is the primary factor.

Where there is difficulty retaining access on all roads, snow clearing is done so that priority is given to roads in the following order:

- Strategic.
- Arterial.
- Collector.
- Highest traffic volume.
- Prevention of the isolation of communities or persons in need.

The performance of the Contractor during the Contract period will be measured by the following criteria:

- The Contractor's demonstrated ability to identify the need for snow clearance with accurate and timely recommendations to the Engineer.
- That snow clearance is carried out so that traffic hazards due to build up snow is kept to a minimum.
- The Contractor's ability to provide these services without damage to the road and its furniture.
- The Contractor provided sufficient resources.

Mostly snowfall is more likely above the 300 m contour line and mostly occurs in the north of the District around the Taihape community.

Snow Clearing is budgeted under NZTA Work Category 121 – Environmental Maintenance in the Council’s Land Transport Programme.

7.9.7.3 Frost and Ice Gritting

The application of grit, as a safety measure to areas of frost or ice that are a potential traffic hazards on sealed pavements, is included in the road maintenance contract.

The Contractor is responsible for inspecting the scheduled sites known to have frost and ice problems, when climatic conditions dictate it. This is based on a GIS map of identified sites throughout the District compiled by both Council staff and the contractor, which is regularly reviewed and updated based on both parties’ accumulated knowledge and experience. The contractor is also responsible for determining when and where gritting should be carried out.

The removal of surplus grit is done after the potential hazard of the ice has passed. All surplus grit is removed from the carriageway. The following performance measures are contained in Contract No. 903 Road Maintenance.

- The Contractor's demonstrated ability to identify the need to frost and ice grit with accurate and timely recommendations to the Engineer.
- That gritting is carried out so that traffic hazards due to frost and ice are kept to a minimum.
- The Contractor's ability to provide these services without damage to the road and its furniture.

The cost of gritting has increased over recent times, reflecting a higher level of service expected by motorists who wish to drive less to the conditions and to what they would expect to able drive under normal conditions, i.e. they object to the need to be slower and more cautious.

Common frosting and icing sites are associated with tall shelter belts that often shade a road for long periods. The ability to mitigate this hazard by the lowering or removing of the shelter belt is problematic, as there is an extensive network of shelter belts throughout the District that are relied upon by farmers to protect stock from the winds and storms that occur.

Clause 355 of the Local Government Act 1974 provides for a process to have a landowner to "remove, lower or trim to the satisfaction of the Council any tree or hedge." However, this power has not been exercised by the Council in these instances, reflecting the balancing of competing needs of to the farmers and the road users by the Council.

While the current District Plan has provisions in it to control the height of vegetation in relation to shading, and including shading of roads, it does not retrospectively cover vegetation that was established prior to the current District Plan being introduced and has since grown to a height that causes problems.

Frost and ice control is budgeted under NZTA Work Category 121 – Environmental Maintenance in the Council's Land Transport Programme.

8 Risk Management

8.1 Overview

Risk management is the systematic application of management policies, procedures and practices to the tasks of identifying, analysing, evaluating treating and monitoring of risks.

The management of the risks is an inevitable outcome of this process. In other words, if the levels of service as designed are achieved, then legislative compliance, prudent investment and financial management, minimization of exposure to public and general liability, and minimization of asset risk will occur.

Risks can be seen to arise from many areas of the Roading management, both in the physical assets and business management of the services provided.

Risk can be defined as the consequence of uncertainty. Establishment and maintenance of procedures for the on-going identification of asset or asset management related hazards, failures, and potential losses are fundamental aspects of asset management. Management cannot occur before the identification and assessment of these risks, and requires identification and implementation of control measures.

Risk events associated with Roading management are often dominated by extreme consequences such as public health and high community cost. The treatment of risks is usually undertaken to ensure there is intervention at lower acceptable probabilities than may be acceptable for other Council services.

Traditionally risks for Councils are derived from:

- Legislative compliance – including health and safety.
- Financial and investment risks.
- Public and general liability.
- Completion for services – usually from service providers for operations and maintenance.
- Asset risks.

8.2 Risk Management Strategy

This section looks at the Risk Management Processes utilized by RDC for assessing and managing risk within the Roading activity. Risk is used as a strategic decision-making tool assisting with developing and prioritizing strategies and work programmes.

Table 78: Risk Hierarchy

Level	Detail
Overview	RDC risk policy
Corporate	Civil Defence, political and legal risks, financial and cashflow risk, business continuity risks.
Activity	Focus on risks associated with management of the activity and the enabling infrastructure.
Operational	Business continuity

Business Continuity is a progression of disaster recovery, aimed at allowing an organisation to continue functioning after (and ideally, during) a disaster, rather than simply being able to recover after a disaster, rather than simply being able to recover after a disaster. The Following plans have been developed to ensure business continuity:

- Effects and Responsibilities Plan – Effects and Intervention for Transportation: The principal objectives for the Roading Lifelines Response plan associated with Rangitikei District Council Roading are:
    - Possess a management tool that identifies natural hazards for Roading.
    - Identify the consequences of the natural hazards.
    - Identify immediate remedial actions.
    - Define restoration levels, priorities and issues.
    - Identify long-term risk management issues.

While roads in the District affected by floods and snow, there are seldom long delays before they are opened. The upper eastern rural roads have frequent snowfall and rainfall events with subsequent longer delays, but they serve fewer people who generally have a lesser expectations. The portions of the Roading network above the 500 m contour line are those usually the worse effected with heavier snowfall volumes and higher intensity rainfall durations.

Washouts occur frequently on the eastern portion of the District roads. Soil and moisture conditions in the area from the Manawatu Gorge to a line near Mangaweka are such that frequent slips and washouts occur. It is a characteristic is the silty clay material in the area. They seldom close the roads for long periods and are simply removed or repaired in a short time.

- Succession planning.
- Criticality.

- Asset insurance.
- Health and Safety.

8.3 Risk Identification

8.3.1 Framework

Council has adopted a risk management framework based on the Joint Australian New Zealand International Standard – Risk management – Principles and guidelines (AS/NZS ISO 31000-2009). It allows Council to focus on the areas of greatest risk and to manage/mitigate that risk.

Council will manage assets using “best for asset” principles in order to minimise the risk of failure. This enables decisions to take into account variable factors to ensure the asset remains fit for purpose.

Council officers further evaluated the risks and developed a risk matrix and assigned numbers for each category. The following is the final risk assessment matrix used to assess each risk:

Risk Rating	**4 Almost Certain**	**3 Likely**	**2 Possible**	**1 Unlikely**
4 Catastrophic	16 Extreme	12 Extreme	8 High	4 Medium
3 Major	12 Extreme	9 Extreme	6 High	3 Medium
2 Moderate	8 High	6 High	4 Medium	2 Low
1 Minor	4 Medium	3 Medium	2 Low	1 Low

In addition to governance, business and strategic categories further subcategories were added. They then assigned each risk within the subcategories a rating, using the above matrix. Council officers considered each risk in terms of the likelihood of it occurring and its impact. These are subjective considerations. For example, there is likely to be some form of natural disaster in the Rangitikei District at some point. But it is impossible to say how intense it will be, and therefore its likely effect.

8.3.2 Identified Risks

The Council policy manual lists identified risks by category and include risk ratings and proposed mitigation measures. Generally, the mitigation measures are designed to prevent the risk occurring in the first place. However, as mentioned above, there are risks over which Council has no control. It can only manage the effects.

8.3.3 Implementation

Council's Risk Management Plan assigns responsibility for monitoring and mitigation to individuals and groups. The plan will be reviewed at least annually to ensure the identified risks and mitigation measures remain relevant and any new identified risks are incorporated.

8.3.4 Risk Assessment Criteria

The establishment of risk management criteria is one of the most important steps in the risk management process, because it sets the boundaries for consistent risk decision making across the organisation.

The likelihoods and consequences of events occurring, or risks arising, will be measured and described in the Risk Management Plan.

The level of risk to the Council is indicated by the product of the respective probability and consequence scores shown in the Likelihood and Consequence tables and summarised into the following categories, by the total scores indicated.

Risks are assessed based on the following criteria:

Table 79: Risk Consquences - Corporate

Consequence	Death or Injury	Service	Environment	Compliance, Corporate Governance, Information	Financial Performance	Community & Political
Catastrophic	Numerous deaths, triage fails.	Loss of service to majority of customers (length of disruption TBA).	Unauthorised discharge resulting in substantial and protracted breach of environmental requirements.	Ministerial Dismissal of Council. Irrecoverable loss of business-critical information.	Substantial increase in rates due to single unplanned loss greater than $5 million.	Not attempted – no reasonable experience of what would escalate to become catastrophic.

Risk Management

Consequence	Death or Injury	Service	Environment	Compliance, Corporate Governance, Information	Financial Performance	Community & Political
Major	Repeat deaths. Same cause on two or more occasions.	Loss of service to majority of customers in one network (length of disruption TBA).	Unauthorised discharge results in serious environmental breach. Serious and long-term environmental damage.	Ministerial censure. Breach of statutory obligations leading to conviction. Negative coverage of Council governance by national media.	$1 million to 5 million unplanned loss.	Resignation of Councillors of senior staff. Widespread public protest against Council. Delegations to the Minister.
Moderate	Fatality due to single event.	Loss of service to majority of customers (length of disruption TBA).	Unauthorised discharge – serious event. Clean-up takes weeks.	Negative coverage of Council governance by media. Breach of statutory or regulatory obligations not leading to conviction. Loss of access to business-critical information for more than 24 hours.	$100,000 to $1 million unplanned loss.	Failure to implement legislation. Letter of complaint to Minister resulting in ‘please explain’ from Minister to Council. Negative coverage of Council policy and performance by national media.
Minor	Breach of legislation (OSH) or injury.	Unplanned loss of service to customers (number of customers and length of disruption TBA).	Failure or repeated event. Clean-up takes days.	Audit qualification. Loss of access to business-critical information for less than 24 hours. Critical breach of information security e.g. confidential records.	$5,000 to $100,000 unplanned loss.	Failure to implement Council policy. Letter from Ombudsman. Letters of complaint to Council/Chief Executive. Negative coverage of Council policy and performance by local media.

Consequence	Death or Injury	Service	Environment	Compliance, Corporate Governance, Information	Financial Performance	Community & Political
Insignificant	Potential minor injury or effects of staff using poor work practices (non-serious harm).	Exceeding response times set out in Asset Management Plans.	Occasional failure to meet resource consent requirements.	Administrative breach. Non-critical breach of loss of information security.	Up to $5,000 unplanned loss.	Letters of complaint to managers.

8.3.5 Roading Network Risk

The Council is exposed to a number of risks arising from the operation of the road network. These risks arise from any number of sources, but can generally be grouped into two main areas:

- ***Management*** – those risks that are largely concerned with the way the Roading network is managed. These include funding, resourcing, programming of work and interaction with the public.

- ***Environmental*** – those risks that are concerned with the impact of the environment on the physical assets, including natural and man-made disasters.

When managing risk of a network asset such as this it is necessary to establish the goals, objectives, strategies, and the scope of the assessment and management process. If this is not done then the acceptability of risks cannot be evaluated. The corporate level policy towards risk also needs to be stated, defined or interpreted.

8.3.6 Treating and Monitoring Risks

If all possible work that impacted a level of service was done, then the possibility of failing to deliver the level of service would be zero. If none was done, the probability of failure would be almost certain.

In reality, not all items identified can be mitigated either immediately or in the long term; but numerous items are being implemented. The successful implementation of each identified work item will help to reduce the probability of failure.

For a particular project or work item, the probability of failure to deliver its desired contribution to achieving levels of service is affected by a number of factors –

Standard of:

- Planning and design (lifecycle).
- Construction.
- Maintenance.
- Operation.
- Monitoring.
- Renewals.

All of these factors can impact on a successful outcome and will affect the lifecycle cost of the assets involved.

8.3.6.1 Prioritisation of Expenditur.

Typically, assets are replaced when there is unacceptable risk to levels of service because of:

- Asset condition.
- Operability.
- Vulnerability to external influences (earthquake, flood, fire, etc.).

It is intended that the selection and prioritisation criteria for asset renewals will put greater emphasis on condition, performance on condition, performance, and risk and failure history assessment. This will be done through a Failure Mode Effects and Criticality Analysis. There are sufficient processes in place to monitor road pavements and bridges to ascertain the renewal programme required.

8.4 Risk Summary

8.4.1 Risk Identification and Management

This section outlines the risks to the Council’s Roading network, and the approach to their management, that will be used, by the Council to:

- Ensure that asset failure modes are identified.
- Determine the level of acceptable risk for different situations.
- Identify critical assets.
- Identify and quantify consequences of failure.
- Avoid or mitigate risks.

The following sections summarise the principal sources of risk that the Council faces in managing, operating and owning a road network.

8.4.2 Lifeline Risks

Engineering lifelines are infrastructure that supports life and business in our community. Lifelines Projects aim to minimize the impact of natural hazards on infrastructure networks and reduce the time that networks may be out of services.

Lifeline Risks considered here are:

- Earthquake.
- Meteorological events.
- Mass movement.
- Coastal hazards.
- Climate change.

8.4.3 Rangitikei District Civil Defence Plan

8.4.3.1 Introduction

The term natural hazards covers situations where water, air and ground movement have the potential to adversely affect human life and property. They can also have adverse effects upon structural assets and the natural values of areas. The hazards most relevant to the Rangitikei District are flooding, earthquakes, land instability, coastal erosion/deposition and tsunamis (tidal waves). Events such as storms, tornadoes, and volcanic ash showers may also happen, but land use planning could do little to reduce their effects. The potential threats to the Rangitikei District are outlined more fully in the Council's Civil Defence plans.

The first way of reducing adverse effects on people, property and natural values from hazard events is to reduce the severity of the event itself, for example by planting stream catchments to reduce the speed of water runoff. The second is to avoid damage by keeping residents and development away from the hazard. The third method is to try and modify the effects of the hazard, e.g. by constructing stopbanks to confine floodwaters.

When it comes to hazard avoidance, the level of risk determines the amount of development which is "acceptable". For example most people would agree that houses should not be built in places which flood every year, but the risk may be acceptable on a property which is flooded every two hundred years.

Natural Hazards in the Rangitikei District

The hazards most relevant to the Rangitikei District are flooding, earthquakes, land instability, coastal erosion/deposition and tsunamis (tidal waves). These may result in natural hazards occurring at two levels:

- ***District-wide*** – Large-scale natural hazards which affect all or large parts of the District, e.g. a major earthquake.
- ***Localised*** – Natural hazards which affect a smaller area of the District, e.g. flooding in a township or a landslip.

8.4.3.2 Flooding

Flooding can be caused from stormwater ponding in low-lying areas; or water bodies overflowing their normal channel in high rainfall events. Townships known to experience localized flooding include:

- ***Marton*** - overflow of the Tutaenui Stream.
- ***Bulls*** – overflow of the Tutaenui Stream and Rangitikei River.
- ***Scotts Ferry*** – overflow of the Rangitikei River.

Rangitikei District is bounded by two major rivers. Both the Rangitikei and Whangaehu Rivers. The Tutaenui Stream and Whangaehu Rivers traverse centrally through the District as well. All the four rivers/streams may break out of their channels in major floods. Horizons Regional Council has done considerable work modelling likely outbreak point and flood channels for flooding of all four rivers and streams.

Low-lying townships in Coastal Rangitikei may also be vulnerable to flooding from tsunami. Historically, tsunamis that affect New Zealand’s coastline are triggered by earthquakes off the coast of South America or Japan. Horizons Regional Council has also modeled the Southern Areas of Tangimoana, Koitiata and Himatangi Beaches within the Manawatu-Wanganui Region to assess the risks associated with varying tsunami events. The modelled effects would be sea water encroachment into the settlements with water flowing up the mouths of rivers such as the Rangitikei River and the Kaikokopu Stream.

However, although the probability is low for any particular location, other parts of the Pacific Rim frequently experience more destructive tsunamis. In 2012-2013 two warnings were issued to New Zealand Coastal environments due to earthquakes off South America and the Solomon Islands. Although no effects were noted, the probability exists of further activity affecting New Zealand.

A flooding risk assessment was included as part of the Manawatu-Wanganui Lifelines project and included in the table following. The assessment considered major lifeline services and the effects of Natural Hazards on them.

8.4.3.3 Active Faults/Earthquakes

In central New Zealand, motion of the Pacific Plate relative to the Australia Plate occurs at approximately 40 mm/year in the direction of approximately 260 °. The forces involved in plate movement are immense and cause rock of the Earth's crust to buckle (fold) and fracture (fault) in the general vicinity of the boundary between the plates. There are a number of known active faults in the vicinity of the Rangitikei Region and all have the potential to cause strong shaking.

These active faults are:

- ***Marton anticline*** – laying 15 km northwest of Marton.
- ***Rangitikei fault*** – lying 0.2 km southeast of Taihape.

A number of other faults lay within the Rangitikei District such as follows. These are recorded on GNS Science Geological Maps as faults or anticline:

- ***Rauoterangi fault***.
- ***Utiku anticline***.
- ***Puwhea fault***.

All three of the above sit parallel either side of the Rangitikei Fault

A Seismic Earthquake risk assessment was included as part of the Manawatu-Wanganui Lifelines project and included in the table following. The assessment considered major lifeline services and the effects of Natural Hazards on them.

8.4.3.4 Volcanoes and Volcanic Eruptions

The New Zealand region is characterised by both a high density of active volcanoes and a high frequency of eruptions. Volcanic activity in New Zealand occurs in six areas, five in the

North Island and one offshore to the northeast in the Kermadec Islands. The volcanoes of note to the Rangitikei District is the cone volcanoes of Mt Ruapehu, Mt Tongariro, Mt Ngauruhoe, Mt Egmont/Taranaki, and the caldera volcano of Lake Taupo.

Typically, a number of types of hazards will result from a volcanic eruption. Each hazard poses different risks affecting different areas. This is the key difference between eruptions and the other principal natural hazards, floods and earthquakes. The most threatening hazards include pyroclastic falls, pyroclastic flows and surges, lava extrusions (flows and domes), lahars, debris avalanches and volcanic gases

8.4.3.5 Pyroclastic fall

Pyroclastic fall deposits consist of material which rains out from an eruption column.

Large fragments (blocks and bombs) follow ballistic trajectories and are highly damaging. These fragments rarely land more than two kilometres from the vent. Finer material (ash and lapilli) is convected upwards in the eruption column before settling out downwind to form pyroclastic fall deposits. Fine ash can be deposited hundreds to thousands of kilometres from its source, and volcanic ash is the product most likely to affect the largest area and the most people during an eruption. These particles commonly have sharp broken edges and volcanic ash is therefore highly abrasive. Volcanic ash clouds will block out sunlight and total darkness may result where moderate to heavy falls of ash occur.

A community's infrastructure provides the services and linkages which allow society to function.

These 'lifelines', such as electricity, water, sewerage and roads are vulnerable to damage from ash falls. Falls of volcanic ash, for example, have the potential to disrupt electricity supply. Loss of supply commonly occurs when ash is wet, as a result of rain during or immediately after the ash fall.

Contamination of open water supplies occurs, even in relatively small ash falls. Both turbidity (suspended material) and acidity are the most common problems affecting water supplies but they will usually return to normal levels within a few hours or days unless ash falls are prolonged. Hazardous chemicals from ash can mix with small volumes of water such as roof-fed water tanks, stock water troughs and shallow surface water bodies, causing chemical contamination above safe guidelines for drinking water. Volcanic ash falls can cause severe damage to sewage and stormwater systems. Ash is easily washed off impervious surfaces, such as roads, car parks and buildings, into these systems.

Volcanic ash falling on roads is extremely disruptive to transportation, reducing visibility. The ash is easily raised in clouds by passing vehicles and this presents an ongoing visibility hazard.

Wet ash can turn into mud, causing further problems with vehicle traction. Fine ash causes clogging of air filters resulting in cars overheating. Vehicle brakes are susceptible to damage and ash may also enter the engine causing wear on moving parts, which reduces vehicle life. Even minor ash fall (<1mm) will close airports.

Ash has damaging effects on other electrical or mechanical systems.

A Volcanic risk assessment was included as part of the Manawatu-Wanganui Lifelines project and included in the table following. The assessment considered major lifeline services and the effects of Natural Hazards on them.

8.4.3.6 Lifelines Services – Risks of Natural Hazards

This report undertaken by the Manawatu-Wanganui Lifelines Advisory Group examined the effects of direct damage by known major natural hazards to lifeline services. It:

- Assesses the vulnerability of lifeline services to damage from hazards.
- Identifies interdependencies amongst the lifeline services.
- Identifies practical strategies for reducing risk.
- Helps project participants identify and implement mitigation and response strategies for their own.
- Networks and coordinate these with the plans of other lifelines.

Assessed risk scores were determined and a summary of the key risks for the Rangitikei District Roading Infrastructure is summarized below. High score, >50, indicate high risk and dependency of other utilities.

Rangitikei DC Roads			Siesmic Risk Score	Flood Risk Score	Volcanic Risk Score
Rangitikei District - Strategic Roads					
Kakariki Road	Rangitikei River Bridge	SH1 East of Bulls	40	268	5
Rangitikei District -Arterial Roads					
Wanganui Road	SH1 - Turakina	Marton	11	5	46
Calico Line	Marton	SH 1	1	4	42
Makirikiri Road	SH1	SH3	1	4	42
Wellington Road	Marton	SH1	1	125	42
Pukepapa Road	Marton	SH3	1	4	42
Fern Flats - Jefferson's Roads	Wanganui Road	SH1	1	4	42
Kawhatau Valley Road	SH1 - Mangaweka	Manawatu District	31	498	42
Te Mouhou Road / Spooners Hill	SH1 north of Taihape	Taihape-Napier Road	42	665	42
Skerman and Bond Street	Wanganui Road	Calico Line	1	1	42
Kaungaroa Road	Fordell - Wanganui / Mangamahu	SH1 Hunterville	10	467	498
Rangitikei District - Alternative Routes					
SH1 Bypass - Rata	Mt Curl Road	Leedstown to Jefferson Road	10	42	4
SH1 Bypass - Porewa	Jefferson Road	Norwood, Tutaenui to Calico Line	10	42	4

8.4.4 Network Events

8.4.4.1 Network event risk management

The nature and use of the District's road network are such that the detailed network knowledge gained from continual observations and monitoring of the network is the appropriate means of managing most of the events described in this sub-section. The associated risks are further reduced by the management measures described under each heading.

8.4.4.2 Traffic Loading

The numbers and sizes of vehicles using a road are the two major influences on its condition and the costs of maintaining the desired level of service. Most Council roads carry significantly less than the theoretical limit of around 2,500 – 3,000 vpd for rural roads in rolling terrain; the figure for flat terrain are significantly higher.

The Council has a traffic-counting programme that allows them to keep this matter under review.

8.4.4.3 Structural loading

The traffic-counting programme also monitors the proportion of heavy vehicles on representative roads. This monitoring supplements the detailed network knowledge gained from continual observation and monitoring of the network.

Bridges are protected through regular inspection by appropriately trained and experienced external consultants. Any bridges with reduced capacity have legally enforceable load and/or speed restrictions placed on them under Land Transport Rule 41001 – Vehicle Dimensions and Mass 2002, and its subsequent amendments. These limits are displayed at each bridge, and where appropriate in advance of the bridge at a location where heavy-vehicles can turn or have the opportunity to use an alternative route.

Permits for over mass (over weight) vehicles to use Rangitikei District Bridges are issued by the Council, where appropriate, after consideration of the effects of the load on each bridge the over mass load will pass. A new prototype over mass permit system has recently being introduced by the New Zealand Transport Agency (NZTA), "50 Max" which permits loads up to 50 ton operating on permitted routes. The permits for these are issued by the NZTA under a Memorandum of Understanding with the Council. The effects of the increased loading are being monitored although with the provision of extra axles, the effects are considered marginal.

8.4.4.4 Material Failure

Material failures include deterioration through normal wear and tear. The Council carries out regular condition-ratings of all its sealed roads using industry-standard procedures and at frequencies appropriate for the road hierarchies.

The bridge inspections outlined in the Lifecycle Management Plans also assists in monitoring the condition of the bridge materials and components.

Unsealed metal roads are inspected regularly both a combination of network supervisors, and Council engineering resources. Grader operators, who are among the most skilled road maintenance workers, provide information on deterioration and non-recurring maintenance needs.

8.4.4.5 Mechanical and Electronic Equipment Failure

The only mechanical and electronic equipment on the road network relevant to this plan is railway crossing barrier arms and signaling bells/lights. These are the property of the NZ Railways (OnTrack) and are maintained and inspected by them. All railway-crossing installations have back-up power supplies capable of operating for at least 24 hours.

8.4.4.6 Electrical failure

On the road network electrical failures only affects urban street-lighting and rural intersections. Failure of individual lights is managed through the Street Light Maintenance Contract that specifies response times for individual street lights and groups of failed lights. It also requires periodic electrical inspections of each light fitting, post and mounting mechanism.

Emergency incidents, vehicle accidents and weather related issues, are initially responded to by the PowerCo (electrical network provider) on-call technicians to make safe the scene. Formal communications links are in place with the Street Light Contractor to repair or re-instate the damaged pole or fitting.

8.4.4.7 Vandalism

The most significant risk posed by vandalism is removal or damage of warning or regulatory signs, to the extent that their messages are lost. The Council’s maintenance contracts cover reinstatement of signs damaged by vandals or vehicle incidents.

8.4.4.8 Failure of Other Utilities

The installation or maintenance of utilities such as power, telecommunications, water supplies or wastewater in the road reserve can have significant adverse effects on both the road formation and its users. The applicable acts exist depending on the utility in question, and are as follows:

- Telecommunications Act 2001.
- Gas Act 1992.
- Electricity Act 1992.
- Local Government Act 1974.
- Utilities Access Act 2010.

8.4.4.9 Health and Safety

Council is responsible for providing a safe work environment for its staff and public. A Health and Safety committee meets regularly, and provides information to all Council staff on their obligations in this matter.

Council staff, by the nature of their work, are exposed to risks outside the office environment that are associated with the Roading activity. Council provides training in general and specific safety areas as required, Temporary Traffic Management being a key area.

8.4.4.10 Temporary Traffic Management

All work within the road reserve requires the contractor/property owner/utility owner to inform the Council of the proposed work. A Corridor Access Request (CAR) form is used to obtain the details of the work, notifications to other utility owners, and the requirements for reinstatement, traffic management etc.

All requests are entered into a database, which also keeps information on traffic management plans. Having the information in a database allows the contractor/property owner/utility owner to be contacted if there are problems with the reinstatement. A minimum 12 month defects liability period is applied to all excavation activities via the CAR process. The database:

Records all relevant details of each Traffic Management Plan (TMP). The majority of the contractors that carry out work for the utility companies have generic sign layouts submitted.

The Council uses the NZTA Code of Practice for Temporary Traffic Management (CoPTTM), including the RCA Forum Local roads supplement, as the basis for management of traffic at and around worksites. All worksites, whether for Council contracts or for third parties, such as Telecom or adjacent property owners, are required to be controlled by appropriately qualified site traffic management supervisors (STMS).

8.5 Emergency Management and Lifelines

8.5.1 Background

Rangitikei District is subject to a wide range of natural hazards. Several significant natural events have been recorded in the last 15 years. Some of these are as follows:

- Mt Ruapehu eruption 1995 & 1996.
- Snow storm 2003.
- Manawatu region floods 2004.

- High wind storms 2011 (x2).

Through responses to and rebuilding after these events Council has gained considerable experience. It is important that the knowledge gained is captured, integrated and shared for future response and recovery operations, should they likely occur again. Lifeline exercises provide an opportunity for such experience to be shared.

8.5.2 Civil Defence Emergency Management

The Civil Defence Emergency Management (CDEM) Act 2002 requires Local Authorities to coordinate Plans, Programmes and Activities related to CDEM across the areas of Risk Reduction, Readiness, Response and Recovery. It also encourages cooperation and joint action within regional groups.

A Lifelines Response Plan has been prepared for key Council services including Roading. The Plan considers natural hazard events including earthquake, flooding, volcanic and mass movement (land slip).

9 Financial Summary

9.1 Overview

This section provides an overall financial summary for the next ten years. These forecasts are based on much longer term projections contained in the AMP spreadsheets.

All forecasts are presented in two forms:

- The amounts detailed in the AMP, which do not include forecast inflation; and
- The amounts for inclusion in the Long Term Plan, which include forecast inflation as required by the Local Government Act 2002.

The funding apportionment rationale is contained in the Council's Revenue and Financing Policy. All expenditure for infrastructure falls into one of following categories:

1. ***Operational expenditure.*** Activities that have no effect on asset condition but are necessary to keep the asset utilised appropriately, i.e. overhead, management costs
2. ***Maintenance expenditure.*** The on-going day to day work required to keep the assets operating at required levels of service, repairs and minor replacement. Ensures the asset reaches its assumed effective life.
3. ***Renewal expenditure.*** Significant works which restores or replaces an existing asset to its original size, condition or capacity.
4. ***New Improvement Works expenditure (also called development and capital works).*** Works to create a new asset, or to upgrade or improve an existing asset beyond its original capacity or performance in response to changes in usage, customer expectations, or anticipated future need i.e. can be driven by changing customer expectations for an improved level of service or the need for expansion of the network (growth).
5. ***Disposal expenditure.*** Any costs associated with the disposal of a decommissioned asset.

When a project results in replacement of an asset due to physical deterioration, and also provides for capacity for increased demand, proportions are allocated to both development and renewals on the basis of marginal cost.

9.2 Strategy

This plan provides the substantiation for budget forecasts put forward in the LTP (2015-2025) for Roading services assets. RDC will:

- Implement an improvement approach to asset management planning in the short term. A twenty year improvement plan is included in each asset management plan. Improvement projects will be monitored monthly by a corporate Asset Management Steering Team.

- Prepare, maintain and periodically review an AMP outlining sustainable long-term asset management strategies. The AMP will typically be reviewed three-yearly in advance of the LTP. Annual amendments or updates may be undertaken if significant asset management changes occur.

- Report variations in the adopted annual plan budgets against the original asset management plan forecasts and explain the level of service implications of budget variations.

9.3 Assumptions

The following basic assumptions have been made in preparing 30-year cash flow forecasts:

- The assumptions made for the asset valuations are carried forward throughout the entire Asset Management Plan. These assumptions are detailed in the Valuation Report.

- Where appropriate, maintenance and renewal allocations are based on preserving current Levels of Service in line with recent expenditure levels. These levels have been increased to match the growth of new assets were this can be predicted.

- The forecast levels of new improvements use trends and averages from previous years for both private developments e.g. new subdivision Roading infrastructure constructed and from new works undertaken by Council, including that shown in Annual Budget.

- Significant changes in the cash flows may also result from more detailed evaluation of the details and timing of individual asset renewal and new improvement projects.

9.3.1 Confidence

The confidence in the asset data used as a basis for the financial forecasts has been assessed using the following grading system from the NZWWA NZ Guidelines for Infrastructure Asset Grading Standards.

Table 80: Data Confidence

Grade	Reliability	Description
A	Highly Reliable	Data based on sound records, procedure, investigations and analysis which is properly documented and recognised as the best method of assessment.
B	Reliable	Data based on sound records, procedures, investigations, and analysis which is properly documented but has minor shortcomings' for example the data is old, some documentation is missing and reliance is placed on unconfirmed reports or some extrapolation.
C	Uncertain	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolation from a limited sample for which grade A or B data is available.
D	Very Uncertain	Data based on unconfirmed verbal reports and/or cursory inspection and analysis.

9.3.2 Components

The confidence level in the components of the financial forecast is assessed as being in the range 'A-B'.

This means the forecasts are regarded as sufficiently reliable for the purposes of this plan. Asset Management issues that impact on the confidence levels are identified for improvement.

9.3.3 Asset Data

The Council operates a RAMM databases its prime asset register for the network. It is routinely updated, random samples of newly collected RAMM data is QA field checked. The databases are also continually checked during the course of their use and any anomalies are corrected when identified, some auditing occurs as part of the professional services engagement.

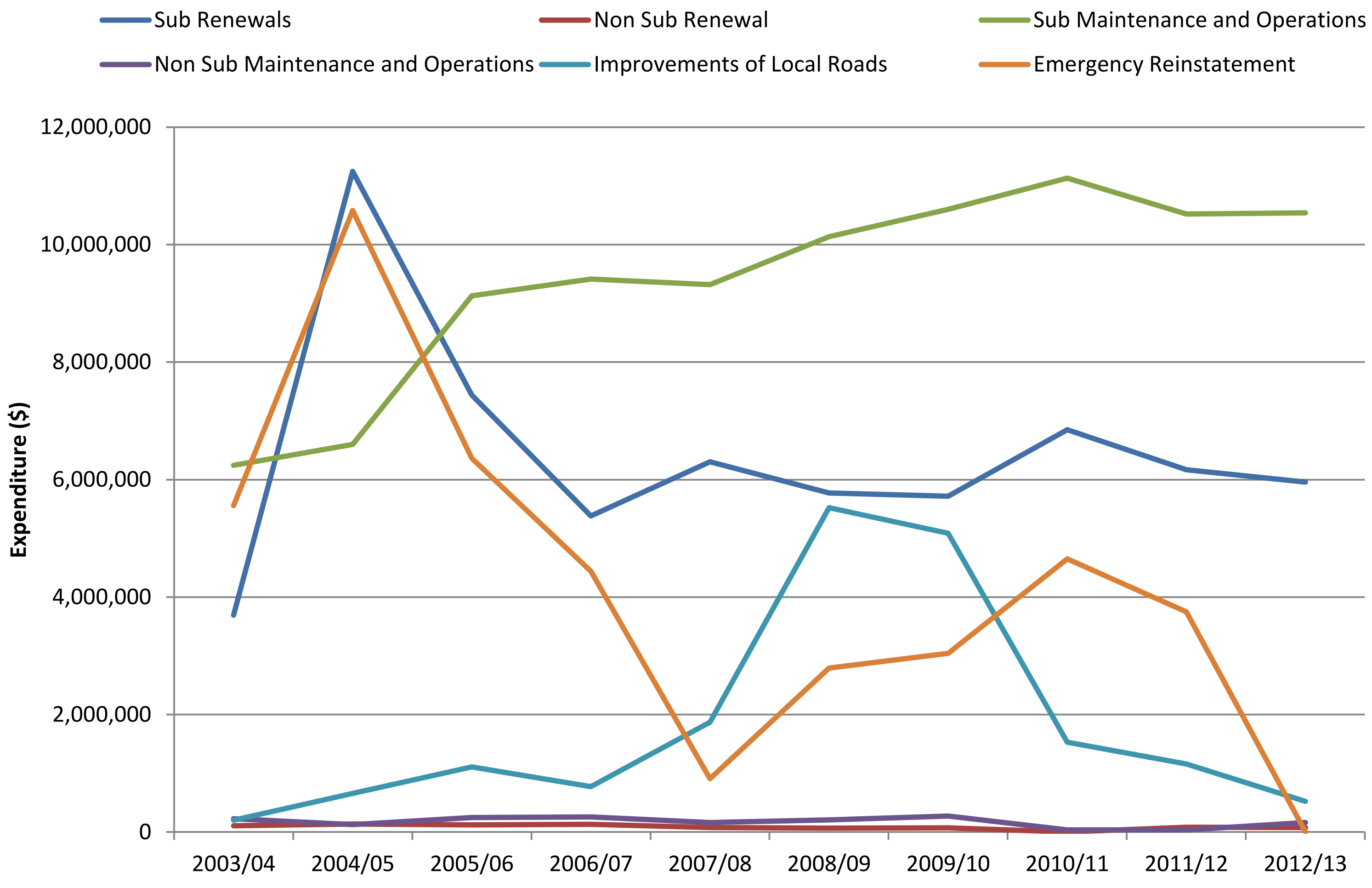
All information held in the databases is reliable. Some data fields are incomplete, but this relates to information that is unknown or cannot be readily assessed e.g. historic information relating to construction dates, old pavement subsurface formation details etc. This would very expensive to obtain i.e. by on site testing. This limits information that can be generated in some instances.

The confidence asset data is in the range 'A-B'.

9.4 Expenditure Trends

Tracking actual expenditure provides a comparison for forecasts. The graph below illustrates the trend from 2003 to 2013:

Figure 69: Expenditure Trends



9.5 Financial Summary

A 10-year forecast of expenditure for each asset group in each of Maintenance and Operations, Renewals, New Improvements and Disposals is separated into two major categories:

- Subsidised expenditure, which is funded via the Council's subsidised Land Transport Programme by the NZTA; and

- Non-subsidised expenditure, which is fully funded by the Council.

The following charts and tables show the 10-year overall Roading forecast in summary.

Figure 70: Total Land Transport Programme (2015-2025)

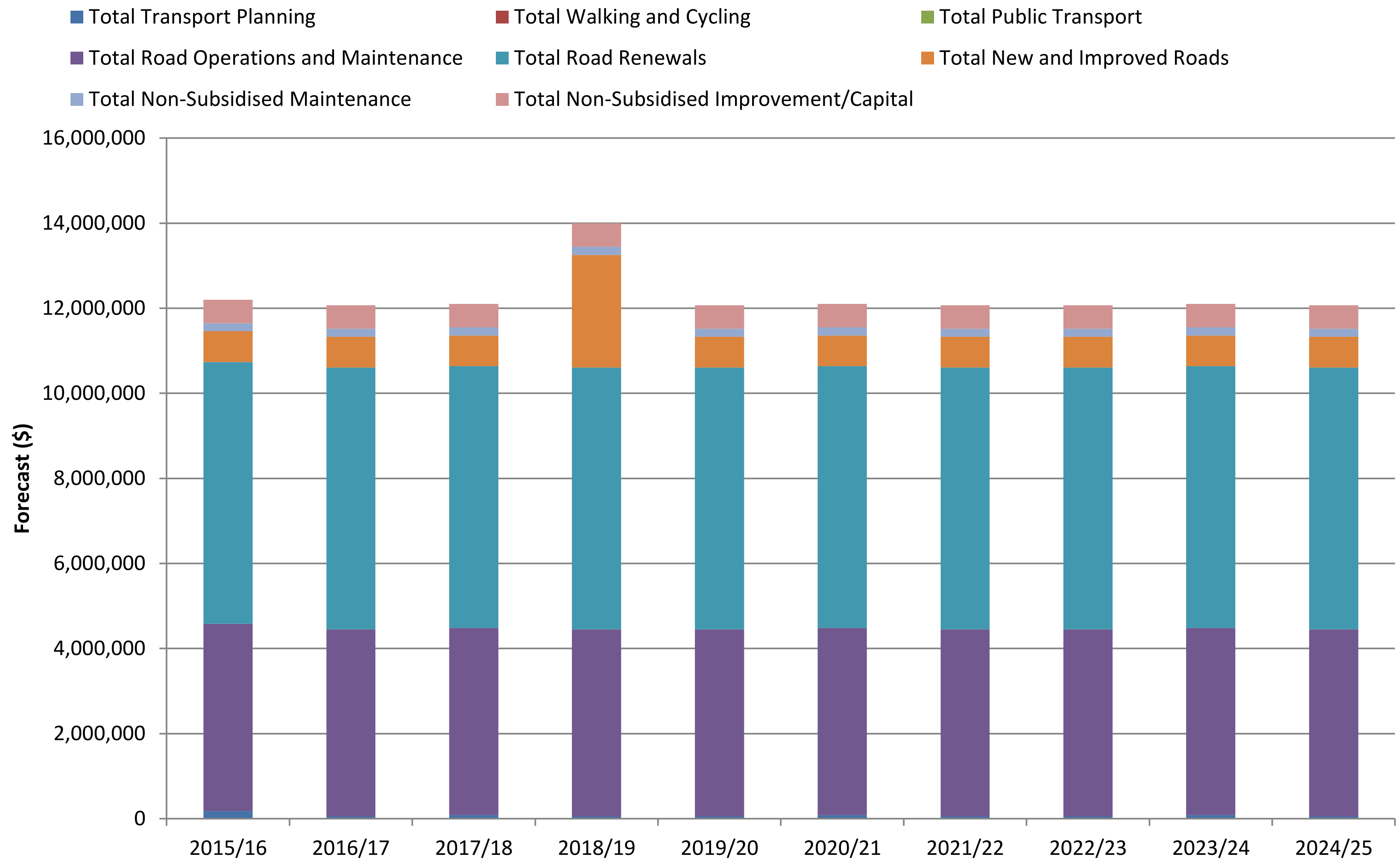


Figure 71: Subsidised Land Transport Programme

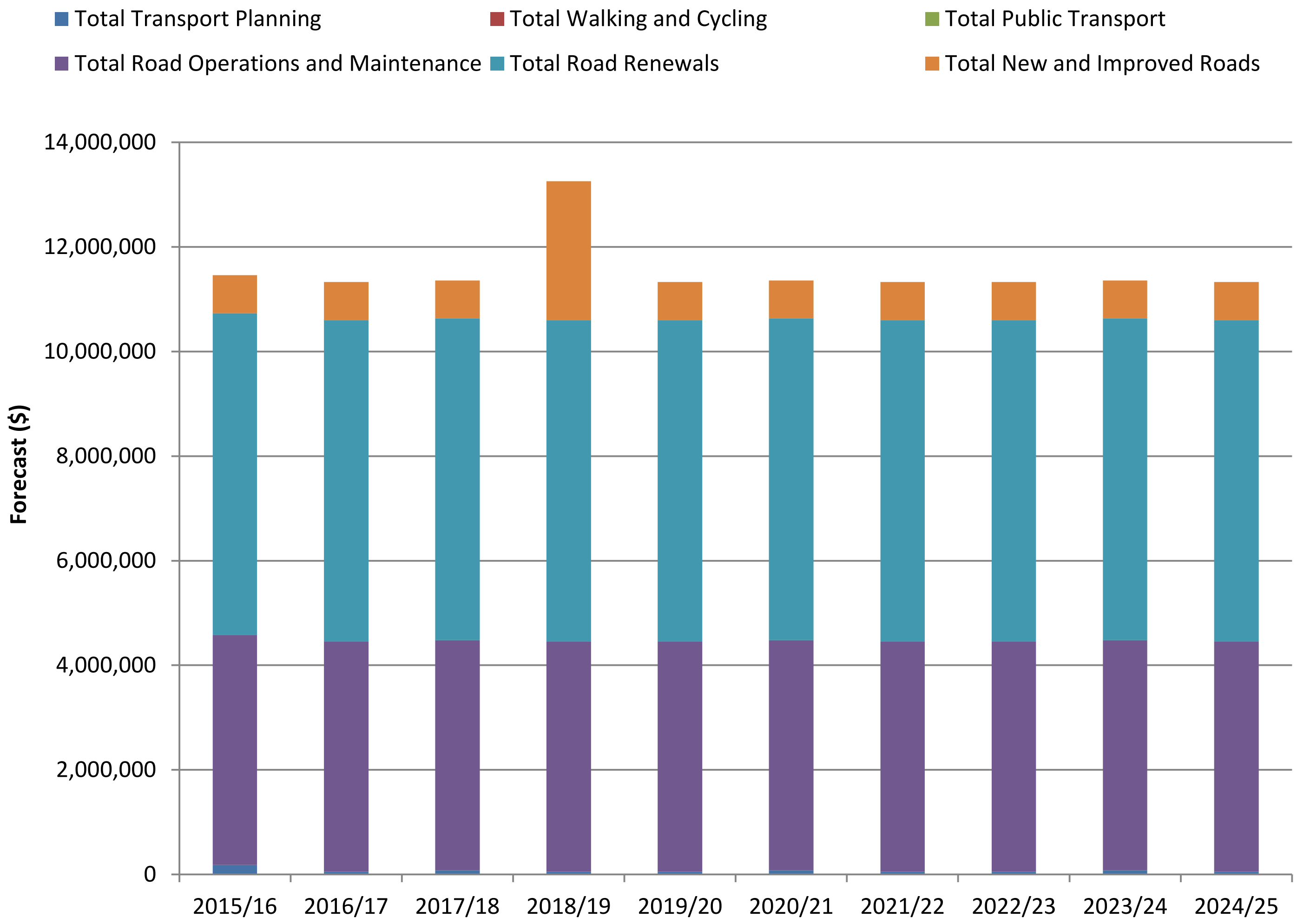
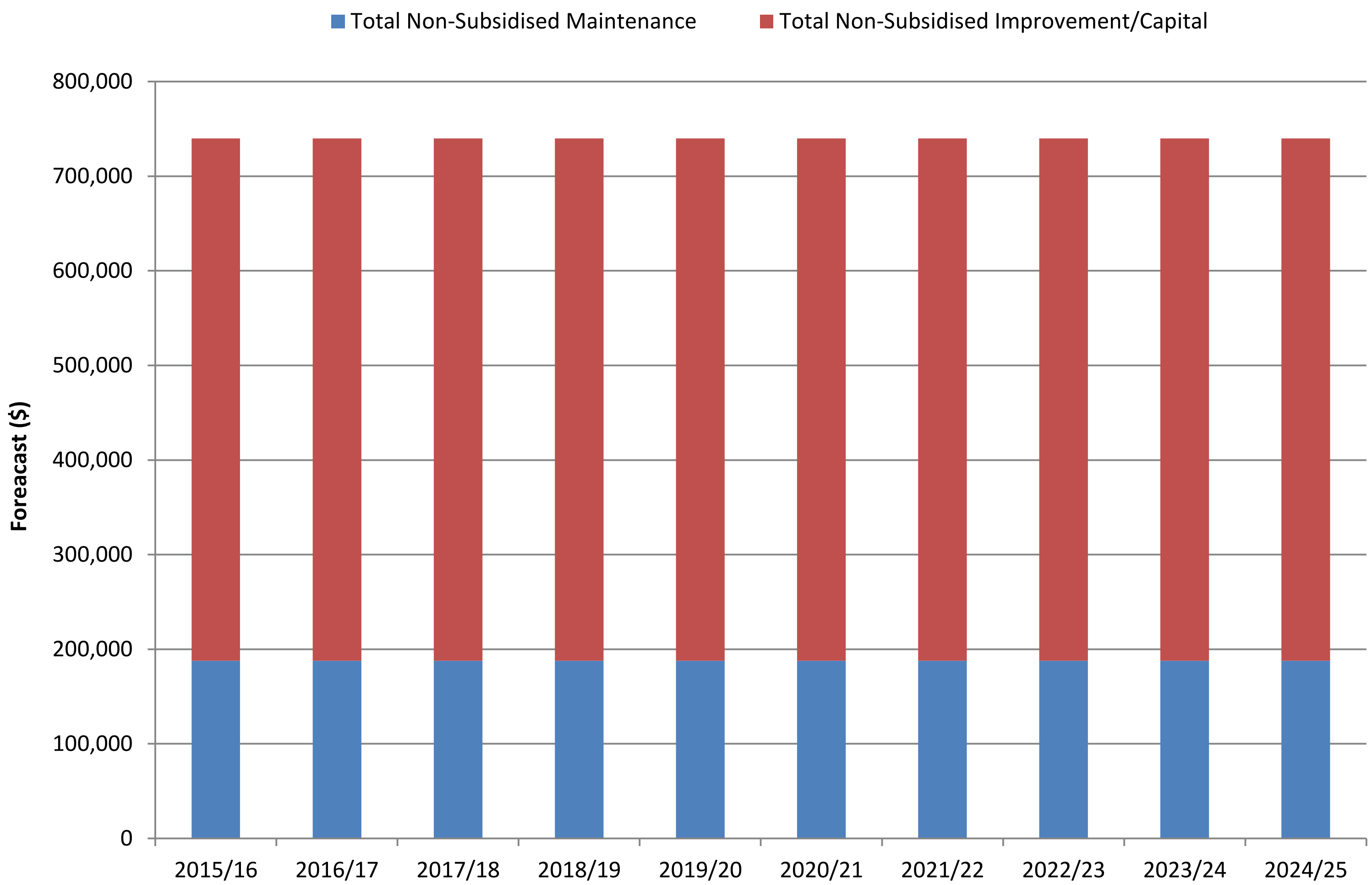


Figure 72: Non-subsidised Land Transport Programme



The key issues identified in terms of the financial forecast are:

- Securing sufficient revenue.
- Ensuring there is sufficient funding to keep maintenance intervention at appropriate levels.

While discussed in the Lifecycle Management and Growth & Demand sections of the plan; these issues are briefly commented on below.

Funding the Transport Activity is dependent on rates, NZTA subsidy and contributions. Any further reduction in NZTA subsidy results in either an increase in the rates requirement or a reduction in the works programme.

Council's maintenance strategy involves 'doing the right job at the right time'. Ensuring there is sufficient funding to keep maintenance intervention at appropriate levels is necessary to avoid unacceptable Level of Service failures or damage to the asset which will be more expensive to repair if an intervention cannot be actioned due to funding constraints.

9.6 Renewals

9.6.1 Renewal Plans

The overall renewal plans is a combination of the renewal requirements determined for each asset group. The groups have different characteristics and combined provide a portfolio type view of the renewal forecast.

The renewal requirements for each asset group are discussed in the Lifecycle Management section of this AMP.

9.6.2 Depreciation

Depreciation is the systematic allocation of (the cost of the asset, or other amount substituted for cost, less its residual value) of an asset over its useful life. Council re-values assets on a 3-yearly basis which enables calculation of depreciation (loss of service potential) which is compared with the renewal programme investment levels.

Each ensuing year, the work completed during the year, which is eligible to be capitalised, is added to the asset register and its depreciation component added to the opening value to obtain a year end figure for the Annual Report.

The Council's transportation network asset depreciation calculation policy is:

- Roads and Footpaths assets, other than land and buildings and plant associated with these activities, are valued on the basis of Optimised Depreciated Replacement Cost

(ODRC) in accordance with FRS 3, with methodology as set out in the International Infrastructure Management Manual (IIMM).

- The assets are depreciated on a straight line basis, with an appropriate depreciation rate determined for each major component type.

The weighted average expected useful economic lives and depreciation rates of the major Roading components are detailed in the valuation report.

9.6.3 10-Year Budgets

Renewal budgets from the Long Term Plan are given below.

Table 81: Long Term Plan Budget - Renewals

Account Name	Budget ($)									
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Unsealed Road Metalling	460,125	460,125	460,125	471,628	471,628	471,628	483,419	483,419	483,419	495,504
Pavement Rehabilitation	684,175	1,627,166	1,688,679	1,730,896	1,730,896	1,730,896	1,774,168	1,774,168	1,774,168	1,818,523
Drainage Renewals - Princpl Contractor	337,425	337,425	352,425	361,236	361,236	361,236	370,267	370,267	370,267	379,523
Structures Components Replacements	189,163	189,163	189,163	193,892	193,892	193,892	198,739	198,739	198,739	203,708
Traffic Services Renewals- Prncpl Contractor	224,950	224,950	224,950	230,574	230,574	230,574	236,338	236,338	236,338	242,247
Sealed Road Surfacing	2,040,399	2,159,418	1,789,375	1,818,389	1,797,428	1,891,753	1,975,470	1,690,960	1,894,949	1,841,140
Footpath renewals	120,000	123,000	126,075	129,227	132,458	135,769	139,163	142,642	146,208	149,864
Vehicle crossings non-sub	25,000	25,625	26,266	26,922	27,595	28,285	28,992	29,717	30,460	31,222
Total Renewals	**4,081,237**	**5,146,872**	**4,857,058**	**4,962,764**	**4,945,706**	**5,044,033**	**5,206,557**	**4,926,251**	**5,134,548**	**5,161,729**

9.7 Operations and Maintenance

9.7.1 10-Year Budgets

Operational budgets from the Long Term Plan are shown below.

Table 82: Long Term Plan Budget - Expenses

Account Name	Budget ($)									
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Advertising	3,000	3,087	3,177	3,269	3,363	3,461	3,561	3,665	3,771	3,824
Legal Fees	5,000	5,125	5,253	5,384	5,519	5,657	5,798	5,943	6,092	6,244
Festive Repairs and Maintenance	15,000	15,375	15,759	16,153	16,557	16,971	17,395	17,830	18,276	18,733
Depreciation - Footpaths	193,002	193,308	197,508	201,813	207,441	211,964	216,600	226,454	231,325	236,317
Depreciation Drainage	6,228,670	6,561,625	6,640,539	6,715,259	6,463,963	6,546,973	6,632,103	6,440,454	6,516,256	6,594,973
Electricity	22,000	22,550	23,114	23,692	24,284	24,891	25,513	26,151	26,805	27,475
Rates Car Parks	3,400	3,485	3,572	3,661	3,753	3,847	3,943	4,042	4,143	4,246
Car Park Maintenance	15,000	15,375	15,759	16,153	16,557	16,971	17,395	17,830	18,276	18,733
Footpath Mtce District	105,000	107,625	110,316	113,074	115,900	118,798	121,768	124,812	127,932	131,131
Access Road Maintenance	83,800	0	0	0	0	0	0	0	0	0
Sealed Pavement Maintenance	1,584,875	1,584,875	1,584,875	1,624,497	1,624,497	1,624,497	1,665,109	1,665,109	1,665,109	1,706,737

Financial Summary

Account Name	Budget ($)									
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Unsealed Pavement Maintenance	383,438	383,438	383,438	393,024	393,024	393,024	402,850	402,850	402,850	412,921
Routine Drainage Maintenance	685,075	685,075	685,075	702,202	702,202	702,202	719,757	719,757	719,757	737,751
Pavement Maintenance	0	0	30,675	0	0	0	0	0	0	0
Level Crossing Expenses	168,713	30,675		31,442	31,442	31,442	32,228	32,228	32,228	33,034
Bridge Maintenance	194,275	194,275	194,275	199,132	199,132	199,132	204,110	204,110	204,110	209,213
Environmental Maintenance	1,127,500	1,127,500	1,127,500	1,155,688	1,155,688	1,155,688	1,184,580	1,184,580	1,184,580	1,214,194
Street Cleaning	130,000	133,250	136,581	139,996	143,496	147,083	150,760	154,529	158,392	162,352
Traffic Services	444,788	444,788	444,788	455,908	455,908	455,908	467,305	467,305	467,305	478,988
Carriageway Lighting - contractors	24,000	24,600	25,215	25,845	26,492	27,154	27,833	28,528	29,242	29,973
Professional Services	679,850	679,975	680,103	697,106	697,240	697,378	714,813	714,958	715,106	732,984
Professional Services - MDC	20,000	20,500	21,013	21,538	22,076	22,628	23,194	23,774	24,368	24,977
Roadside Tree Maintenance	101,200	103,750	106,365	109,045	111,793	114,610	117,498	120,459	123,495	126,607
Berm Mowing	91,080	93,357	95,691	98,083	100,535	103,049	105,625	108,265	110,972	113,746
External Contractor	5,000	5,125	5,253	5,384	5,519	5,657	5,798	5,943	6,092	6,244
Survey Costs	20,000	20,500	21,013	21,538	22,076	22,628	23,194	23,774	24,368	24,977
Total Expenses	**12,333,666**	**12,459,238**	**12,556,856**	**12,778,885**	**12,548,458**	**12,651,612**	**12,888,732**	**12,723,351**	**12,820,850**	**13,056,375**

9.8 Improvement and Development Plans

9.8.1 10-Year Budgets

Budgets for capital and upgrade works (as distinct from renewals and maintenance) are given below.

Table 83: Long Term Plan Budget – New Works

Account Name	Budget ($)									
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25
Minor Safety Projects - Prncpl Contractor	525,677	525,677	525,677	538,819	538,819	538,819	552,289	552,289	552,289	566,097
Major Bridge Refurbishment	0	0	0	2,231,785	486,211	540,345	696,753	0	0	0
Footpath Construction	65,000	66,625	68,291	69,998	71,748	73,542	75,380	77,265	79,196	81,176
Treasury Loans Repaid	164,872	164,872	164,872	164,872	164,872	171,679	179,243	188,998	188,998	189,000
Treasury Loans Raised	0	0	0	0	(204,209)	(226,945)	(292,636)	0	0	0
Total Capital	**755,549**	**757,174**	**758,839**	**3,005,473**	**1,057,441**	**1,097,439**	**1,211,029**	**818,552**	**820,484**	**836,272**

9.9 Valuation

9.9.1 Background

Road assets are infrastructure assets, defined as infrastructural systems that provide a continuing service to the community and are generally not regarded as tradable.

The valuations are based on accurate and substantially complete asset registers (see improvement plan) and appropriate replacement costs and effective lives. The prime asset register is the RAMM database. The asset registers record data to a sufficient component level to allow assets of different base lives to be valued separately.

The Council's current policy is to revalue infrastructural assets on a 3-yearly basis, and to annually review the extent of the change from the previous year. This helps ensure there is an understanding of any significant changes resulting from changes to the asset stock or contractor rates. Significant changes in input parameters, that may have a material effect, may result in an earlier revaluation of assets. Road assets are by Council staff and specialist consultants in accordance with the following standards:

- NZIAS16 The NZ Equivalent if International Accounting Standard 16, Property, Plant and Equipment.
- NAMS Infrastructure Asset Valuation and Depreciation Guidelines, Edition 2, 2006.
- In addition the guidelines provided in the New Zealand Infrastructure Asset Valuation and Depreciation Guidelines Edition 2.0 2006 are followed.

The valuation is subject to Audit. Asset quantities used for the valuations are those detailed in the Council's asset registers and databases.

The valuation calculates the following items are calculated for the subject year:

- Replacement Cost (RC).
- Optimised Replacement Cost (ORC).
- Optimised Depreciated Replacement Cost (ODRC).
- Annual Depreciation (AD).

The Council has adopted the depreciation method of calculating the change of service potential; where:

Change service potential = Renewal expenditure - Annual depreciation.

Cumulative change in service potential 03/04

= change SP 02/03 + change SP03/04

NOTE: The value of new improvements is not added into the equations in the years in which they are built, rather, their depreciation and ultimate renewal are considered in all subsequent years.

9.9.2 Summary

Current asset valuations are summarised in Section 2 – Strategic Environment.

9.9.3 Assumptions

9.9.3.1 Pavements

Pavements are the most valuable asset group of the network. Pavements are depreciated on a straight-line basis using relevant RAMM data and the assumptions outlined below. Unit rates are supplied by RDC.

9.9.3.2 Footpaths

Footpath basecourse and surfaces are depreciated on a straight-line basis in relation to asset condition.

The expected useful lives vary for materials including 30 years for asphalt and 80 years for concrete (refer report for details).

9.9.3.3 Kerb and Channel

Kerbs and channels are depreciated on a straight-line basis in relation to asset condition.

The expected useful lives vary for materials and design, 50-80 years is typical (refer report for details).

9.9.3.4 Bridges

Bridges are depreciated on a straight-line basis. Assets have been allocated base life of ranging between 150 years for a concrete structure constructed after 1972 to 50 years for an Armco culvert, i.e. dependent on the type of construction. The expected life of each structure has been calculated based on the known construction date and the current condition (used to calculate the remaining life). On average the asset has an average age of 54 years.

9.9.3.5 Street Lighting

Poles and brackets are depreciated on a straight-line basis with asset age based on known or assumed installation dates.

Lamps have been depreciated on a straight-line basis based on an assessment provided by the Contractor.

The age of the street light asset varies considerably.

9.9.3.6 Traffic Services

Signs are depreciated on a straight-line basis assuming the asset is half way through its expected life of 10 years on average.

Road markings are not valued or depreciated as these are considered a maintenance activity.

9.10 Funding

9.10.1 Rates

Rangitikei District Council manages the Roading activity on a District-wide basis. Rates are collected for Roading from across the District.

9.10.2 Subsidies

The inherent risk with forecasting of subsidised expenditure are that subsidy rates provided by NZTA could decrease, which increases the net cost of these activities to the Council, and that projects that are expected to be subsidised may not be eligible for financial assistance by the time they are due for funding, once more increasing the cost to the Council.

Roading activity receives financial assistance from the NZ Transportation Agency and projections of this revenue are carried forward at the current financial assistance rate (FAR).

During the period of 2013-2014, the New Zealand Transport Agency undertook a full review and consultation process of the Financial Assistance Rate. Preliminary notifications have been presented to Council advising of the outcomes, and the proposed new FAR rate.

The current financial assistance rates for Roading activities in the RDC are as follows:

Table 84: Financial Assistance Rates (2013-2014)

Name of Rate	Investment Rate % 2013 -2014
Maintenance/Operations	58.0%
Renewal/Capital	68.0%
Admin	2.5%
Level Crossing Warning Devices	100.0%

Name of Rate	Investment Rate %
	2013 -2014
Emergency works	Determined by the scale of the need

The Council has been advised by the NZ Transport Agency that the proposed financial assistance rates for the 2015-2016 to 2017-2018 period will be:

Table 85: Financial Assistance Rates (Proposed)

Name of Rate	Investment Rate %		
	2015 -2016	2016 – 2017	2017 - 2018
Maintenance/Operations	60%	59%	58%
Renewal/Capital	60%	59%	58%
Level Crossing Warning Devices	100%	100%	100%
Emergency works	Determined by the scale of the need		

Full hypothecation of the Land Transport Fund has resulted in ‘ring fencing’ of income and expenditure nationally, which ensures tax paid by road users must be allocated for spending within the National Land Transport Programme. This has impacted on the finds available for various activity classes as discussed under the Government’s Policy Statement on Land Transport Funding – Chapter 2.8.2.

9.10.3 Debt

Debt is used across Council activities to smooth peaks in expenditure and apply a consideration of intergenerational equity to capital projects with a long-term impact.

There is currently no debt registered specifically against the transportation activity.

9.10.4 Strategy

The focus of this Plan is on identifying the optimum (lowest lifecycle) cost for assets necessary to produce the desired level of service. How the necessary cash flow is funded is a matter for separate consideration as part of Council’s Long Term Plan and Annual Plan processes, in accordance with its financial policies.

The service potential is negative for all asset groups illustrating that annual renewal expenditure is less that annual depreciation. The following could explain these results:

- This could be due to the asset being relatively good condition so renewal cannot be justified in the forecast period.

- The depreciation rates used for the valuation of some asset components may not be appropriate for the asset, and further investigation of appropriate rates may be warranted.
- The effective lives of some assets may be very long so programmed renewals do not appear in the twenty-year time frame.

It is likely a mixture of the above reasons is responsible, however for road pavements the significant lack of renewals reflects that the majority of the Roading network is founded on solid subgrade with good drainage over the southern part of the District area that does not require significant work.

Funding sources available road assets:

- Rates (general, separate, special, differential).
- User charges.
- Development impact levies.
- Private development that is subsequently handed over to Council.
- NZTA subsidy.

Under current rating policy Roading services are financed from general rates, which are a combination of general purposes rates levied on the basis capital value on all rateable property in the District.

Within the limitations of unknown timing of NZTA projects and funding, the optimisation of the LTFS/LTP will aim to minimise the fluctuations in rates requirements from one year to the next.

9.10.5 Asset Management System Costs

The Asset Management Systems employed by the Council on its transportation asset are funded under NZTA Work Category 151.

The systems and services that are funded provide inventory, rating and assessment information relating to:

- Traffic features.
- Road condition.
- Road features.
- Age.

- Design lives.
- Costs.
- History.

9.11 Financial Statements and Forecasts

The 30-year cash flow forecasts for the Activity/ Group of activities are presented on the next page. Detailed financial worksheets are presented in the Appendices.

10 Improvement Plan

This section details the improvements to Asset Management within Council that will lead to an increase in confidence in the management of the assets.

An important component of this Asset Management Plan is the recognition that it is a "live" document in need of monitoring, change and improvement over time.

This section sets out plan improvement and monitoring procedures.

10.1 Asset Management Level

The appropriate level of asset management practice for Council's Roading Activities is set at Core.

Core asset management practice is basic technical asset management planning undertaken at a level designed to meet minimum legislative and organisational requirements for financial planning and reporting. 'Core' practice provides technical management outputs for current levels of service, demand management, asset lifecycles, asset forward replacement programmes, new capital expenditure and associated cash flow projections.

This level was determined following an independent peer review by Waugh Infrastructure in 2013, and the following improvement programme is recommendations for implementation.

Asset management programmes must be adequately resourced and therefore require on-going budget to deliver identified improvements and keep plans and processes current with evolving practice. For asset management to be successful in Rangitikei District there must be a commitment recognised across the organisation. This commitment must translate into budget, human resources, and management accountability.

10.2 Improvement Programme

The objectives of the improvement programme are:

- Alignment to Asset Management Policy.
- Programme to match funding available.
- Prioritisation of improvements.
- Achievability.

The development of this Plan is based on existing levels of service, the best available, most current information and the knowledge of Council Staff. This Asset Management Plan will be the subject of annual updating and incremental improvement over time.

The continued monitoring of performance measures and on-going analysis of results will result in:

- Savings in expenditure through lifecycle optimisation.
- Service levels actively monitored and reported on.
- Management of risk and control of failures.
- Measurement of Asset Management Plan effectiveness.

10.2.1 Process

This Asset Management Plan has been prepared using information contained in the 2012 Asset Management Plan, the 2013 asset valuation, and knowledge of current Asset Management practice and issues.

Levels of service have been refined and performance measures extended to reflect more fully the nature and scope of the activity. Consultation on levels of service and LOS alternatives is to be undertaken through the 2015-2025 LTP process, to which this plan contributes.

As an input to this plan, much work has been undertaken in looking at the future development of the District, although this has tended to focus more on population and settlement rather than economic activity.

A review of risks has been carried out, and this will need to be considered in more detail and a full risk register developed with risks prioritised and mitigation actions planned.

Using asset data, such as age, condition and performance, and with an understanding of significant risks, financial programmes have been updated from those prepared for the 2015-2025 Long Term Plan.

In summary, this plan has largely been developed from existing knowledge. Actions to increase the level of sophistication of this plan are recorded below.

On-going monitoring, review and updating to improve the quality of Asset Management Planning and robustness of the financial projections will continue to be an important feature of the AMP process.

The Asset Management improvement process involves:

- A continual cycle of Asset Management Plan monitoring, review, revision and audit to improve the effectiveness of Asset Management Plan outputs and compliance with audit criteria, legal requirements and good practice.

- Definition of service standards reflecting community desires through public consultation (service level review). The Asset Management Plan is used to identify service standard options and costs, and the delivery of the service standards adopted is a key objective of Asset Management Planning.

- A corporate Asset Management coordination role by an Asset Management Team, which guides and audits the development of Asset Management Plans within the framework of Council's strategic direction.

The improvements identified relate to practices and processes used within Council. While some improvements will occur through improvements to the delivery of services (e.g. improved data collection processes within maintenance contracts) others are specific to the Asset Management function.

10.2.2 Programme

Asset Management improvement needs are identified at the end of each section of this plan. The main drivers for the timing and prioritisation of Asset Management improvement tasks over the next 2-3 years are:

- To improve the reliability of asset information in order to meet the requirements of the Local Government Act 2002, in particular with respect to input to future LTPs.

- To integrate risk management concepts into asset management life-cycle tactics.

- To progress the development of optimized decision-making tools and processes, and use the results in Asset Management Planning (e.g. dTIMS).

- To enhance the documentation of key Asset Management processes.

- For a continual and on-going focus on using Asset Management as a service and business improvement tool.

In summary, the planned activities are programmed according to priority as follows:

Table 86: Improvement Priorities

Priority	Timing
Very High / Urgent / ASAP / High	Within the first FY of the LTP
Medium / Routine	Should be done in next 3 yrs
Low	Should be done in next 6 yrs
Good Idea	Beyond 6 yrs

Occasionally, the term “On Occurrence” may also be used. It is followed by a description of the event that triggers the need. The resource requirements associated with this improvement plan will be identified when the improvement tasks are defined and scoped.

While the gap analysis process is a subjective assessment of current practice, it provides a sound basis for prioritising and monitoring improvements to current asset management practices. This is especially true when viewed in conjunction with the outputs of the risk management process.

A number of further improvement tasks have been identified as part of this asset management plan review. All tasks are prioritised and details of those tasks which will be completed over the next three years can be viewed in Chapter 12 - Appendices. These tasks have focus specifically on those areas where the gap is greatest and also where the risk is considered to be most critical. To facilitate the practical implementation of the improvement programme tasks have been designed to address a number of issues concurrently and be programmed to ensure a logical progression towards the 3 –year target.

10.2.3 Improvement Actions

The Improvement Action plan is detailed in the following table, which lists each action and its associated priority.

Table 87: Improvement Actions

ID	Priority	Category	Asset	Issue or task	Description
20.1	3	Database Maintenance	Bridge	Data entry	Add information to RAMM to easily identify weight restriction information.
22.1	1	Data Improvement	Bridge	Define large culverts	Data correction to move culverts less than 3.4 m2 from the bridge table to the drainage table.
32	2	Database Maintenance	Bridge	Data correction	Data correction Taihape-Napier Rd.
33	3		Pocket RAMM	Database	
37		Database Maintenance	Bridge	Data validation	
38	3	Database Maintenance	Signs	Data validation	Data validation Turakina Valley Rd.
39	3	Database Maintenance	Signs	Data validation	Data validation Mataroa Rd.
55.1	1	Strategy	Traffic Counts	Implement traffic links	Clean count data and set up RAMM for traffic links and growth factors to enable estimation of traffic counts.
62			TL survey	Task	

Improvement Plan

ID	Priority	Category	Asset	Issue or task	Description
63			Roughness, skid, rutting, Geometry etc., Survey	Task	
64.1	3	Database Maintenance	Permissions	Tidy up existing permissions	Remove inactive users from RAMM staff table.
65.1	3	Strategy	All Assets	RAMM database merge	Identify benefits of merging MDC and RDC RAMM databases.
66			RCL	Task	
69.1	1	Database Maintenance	As-built Data	Data entry spreadsheet for contractors	Adopt standard format for as-built data from all contractors.
70.1	2	Strategy	Emergency Works	Process	Implement a process to streamline emergency work from identification of work to NZTA claim.
71.1	3	Data Improvement	Marking	Match RAMM with Contractor data	Upload contractor data to RAMM, assess whether it is better to use RAMM or Excell to manage and value road marking assets.
72	4	Database Maintenance	Road Centreline	Update road centrelines	Data update.
74			Taihape Napier Rd 2	task	
77.1	1	Strategy	Streetlighting	Investigate LED implementation	Business Case and Benefit Cost Analysis required to look at the best strategy to take advantage of cost savings from the use of LED technology.
78	1		Security Zones	Task	

Improvement Plan

ID	Priority	Category	Asset	Issue or task	Description
79.1	4	Strategy	ONRC	Modify RAMM default categories	Modify One Network Road Classification default classifications.
80.1	1	Strategy	Bridge	Effect of condition on RUL	Investigate the likely renewal dates for bridges and large culverts. Implement a weighting system from condition, use, remaining useful life, criticality and risk data.
82	2	Database Maintenance	All Assets	Data collection	Data collection - Makohine Lane.
83	4	Database Maintenance	Road Centreline	Update road centrelines	Data update.
84	4	Database Maintenance	Road Centreline	Update road centrelines	Data update.
88.1	1	Database Maintenance	Maintenance Cost	Match to contracts	Work required on the RAMM Maintenance Cost function to ensure all maintenance costs are being captured and applied to treatment lengths for future analysis. For example lump sum contract items like pothole repairs and grading need default costs applied so costs per site can be estimated.
89.1	3	Database Maintenance	Test Pit	Data entry	Populate RAMM with historic data not currently stored in RAMM.
91.1	5	Database Maintenance	Traffic Counts	Data entry	Data entry.
92	4	Database Maintenance	Road Centreline	Update road centrelines	Data update.
93	4	Database Maintenance	Road Centreline	Update road centrelines	Data update.

Improvement Plan

ID	Priority	Category	Asset	Issue or task	Description
94.1	2	Data Improvement	Streetlighting	Useful life review	Review and revise default expected useful lives that RAMM applies to calculate remaining useful life.
95	1	Database Maintenance	AWPT Data Entry	Data entry	Data entry required for historic data.
98.1	1	Database Maintenance	All Assets	Missing historic data	Data entry required for historic data.
101.1	3	Data Improvement	Drainage	Identify lateral pipes	Identify assets and populate RAMM with stormwater laterals.
102.1	2	Strategy	All Assets	Condition rating surveys	Modify requirements for condition rating surveys to include any asset detail and validation checks along with condition information.
103.1	2	Data Improvement	Kerb and Channel	Construction dates	Add construction dates based on other known construction information.
105	3	Data Improvement	Drainage, Bridge	Review of Multiplate culvert costs	Review and revise standard replacement costs.
108.1	2	Strategy	All Assets	Initiate renewal plans	Initiate renewal plans for assets with no renewal plan in place.
112.1	3	Strategy	Retaining Walls	Inspection and renewal plan	Implement inspection programme for retaining walls including data validation check.
115	2	Database Maintenance	Retaining Walls	Onsite check of retaining wall dimensions	Validation of existing assets to check for duplication and unrecorded retaining walls.
116	1	Database Maintenance	Retaining Walls	Add new default SRCs	Add new lookup data and standard replacement costs to RAMM to cover all types of retaining wall construction so asset valuation and inventory is correct.

Improvement Plan

ID	Priority	Category	Asset	Issue or task	Description
122	3	Database Maintenance	Streetlighting	Add SRC for LED lights	Add new standard replacement costs for new LED luminaires.
123.1	2	Strategy	Streetlighting	Streetlighting policy	Implement a policy for which streetlighting assets RDC will accept from new development, and ongoing maintenance.
124	4	Database Maintenance	Bridge	Data validation	Data validation.
125	1	Database Maintenance	Bridge	Add valid SRCs	Correct standard replacement cost data so asset valuation is correct for 5 No. bridges which have incorrect standard replacement costs.
126.1	2	Strategy	Pavement	Seal widening site selection process	Implement a process for identifying candidate sites for seal widening, based on use and existing width.
127	2	Strategy	Unsealed Pavement	Gravel loss prediction mode	Implement a strategy for unsealed road gravel application.
128.1	4	Data Improvement	Stock Underpass	Add lookup and then populate RAMM	Add distinctions in lookups to identify stock underpasses.
132.1	2	Strategy	Bridge	Boundary bridge AV	Investigate how boundary bridges are valued by neighbouring authorities to enable consistent valuation based on RDC share of bridges.
133	2	Strategy	Drainage	Culvert inspection programme	Implement a culvert inspection programme so the entire network of culverts is inspected on a cyclic basis.
136.1	2	Strategy	Kerb and Channel	Renewal plan	Develop renewal plan.
137.1	1	Strategy	Valuation	Standard Replacement Costs	Implement annual review of standard replacement costs.

Improvement Plan

ID	Priority	Category	Asset	Issue or task	Description
139.1	1	Strategy	Forward Works	Add FWP to RAMM	Upload forward works programme into RAMM, add lookup distinctions for other assets and utility work so all can be assessed in RAMM
140	3	Database Maintenance	Road Centreline	Data validation	Data validation.
141	3	Data Improvement	Stock Underpass	Collect data on stock underpasses	Locate and record data on all stock underpasses so that the required inspections can be included in the bridge inspection programme.
146	4	Data Improvement	Minor Structures	Data correction	Determine inclusion in asset valuation for street furniture assets.
147	2	Data Improvement	ONRC	Finalise classification	Classify remaining roads that do not have an ONRC classification.
150		Data Improvement	All Assets	Implement GHD recommendations from 2013 AV report	Follow up on recommendations including recommendation on data collection.
169	3	Asset Revaluations	Retaining Walls	Review standard replacement costs	Review records with original cost data against standard replacement cost and develop strategy for this information.
172	4	Operations, Strategy			Alignment of Council standards with specification in Maint ontract - came about after call from Tony tat HDC re driveway entrance standard of 100 mm in their District Plan with contract specifying 150 mm. Also reseal - MDC rese;as to property boundary, HDC reseals to 1m past carraigeway edge. Should we look at consistancy across the contract or district plan or coucil specification?
173	4	Asset Management Practices	Resource Consents	Monitor resource consents	Capture consent information in RAMM and manage them as assets having value i.e. depreciate.

Improvement Plan

ID	Priority	Category	Asset	Issue or task	Description
175	2	Operations, Strategy	Skid Data	Strategy to manage data	Develop strategy to manage and act on skid data.
176	2	Project Management	N/A	Develop and implement Project Brief template for key projects.	Template to be developed based on Utilities example.

10.3 Review and Monitoring

This AMP will continue to be developed over time to incorporate further advanced asset management techniques, make use of improved data collection and management systems, and respond to legislative and policy changes, and address evolving issues. It is anticipated that the sustainability themes introduced in this Plan will be further tested and developed with on-going focus on planning for climate change, managing greenhouse gas emissions, and improving energy efficiency. A future review of charging mechanisms may be warranted to ensure inter- and intra-generational equity.

This Plan will be reviewed periodically and comprehensively reviewed at intervals of not less than three years via the Special Consultative Procedure. Each review will be completed in line with whole of Council LTP delivery plans.

11 Asset Management Practices

This section outlines the information available on the assets, information systems used and process used to make decisions on how the asset will be managed. It also provides details on planning for monitoring the performance of the AMP.

The Asset Management function of Council has the responsibility for managing the road assets of the Rangitikei District community. To help identify the Asset Management information needs of road management activity it is helpful to breakdown business practice into three key Asset Management inputs;

- ***Processes***: the procedures, considerations, analysis and evaluation techniques that consider asset data and support lifecycle asset management.
- ***Information systems***: the information support systems used to store and manipulate the data.
- ***Data***: available for manipulation by information systems to produce the required outputs.

The tables in the following sections set out the current state of business practice and the desired business practice to be developed. The Asset Management Improvement Plan details development priorities, timetables, resources and costs.

The emphasis of the shift from current to the desired business practice detailed in the following tables is defined by the Asset Manager to achieve the optimum practice for management of the assets. Current Business Practice is that which is achieved with current resources of time, personnel and funding currently allocated. To achieve some or all of the desired practices stated, additional resources will almost certainly be required in some form.

11.1 Information Systems

A variety of Asset Management systems and practices are used within Council and integration of these systems is a corporate function. Current Rangitikei District Council information systems used in the Roading function are outlined below:

Table 88: Information Systems

System	Current Business Practice
Asset Registers	RAMM Reliable asset registers available for most assets except berms and markings,

System	Current Business Practice
Financial System	NCS Job costing system available, via general ledger system Costs allocated at activity level only Inflation adjustment application Current valuation generated from downloaded information inventory from databases
Maintenance Management	Maintenance records held in RAMM, direct entry by the Maintenance contractor
Contract Management	Maintenance standards specified in maintenance contracts RAMM and manual works order systems for unscheduled or out of contract work
Condition/ Performance Monitoring	Good performance & condition information for major asset groups, i.e. pavements, bridges.
Customer Enquiries	Customer service system in place.
Work Planning	RAMM treatment selection analysis undertaken Bridge repairs identified and programmed Minor asset groups defect analysis less developed.
Risk Management	No corporate risk management strategy in place Asset Management Plan to include risk register and analysis.
Optimised Renewal Strategy	RAMM treatment selection module available for pavements Effective lives assigned to all asset groups
Forward Works Programme	Forward programmes developed for major road improvement projects, seal extensions, seal widening and bridge renewal. Development based on a good assessment of needs confirmed under consultative processes
Integration of Systems	Extensive use of RAMM throughout planning and operations All databases have GIS type interfaces or functionality

System	Current Business Practice
Plans and records	Hard copy plans held for most major project and improvement works.(availability reduces as further back in time) All new plans / as-builts on digital systems, & on consents information system
GIS	GIS used for spatial representation of assets

11.1.1 Financial Systems

All expenditure on infrastructure assets falls into one of three categories:

- Operations and maintenance.
- Renewals.
- New improvement works and disposals.

All Council activities are required to have their financial results reported externally in a way that complies with generally accepted accounting practice (GAAP) in New Zealand. This is currently in accordance with International Accounting Standards – IAS16. The International Accounting Standards are determined by the Institute of Chartered Accountants of New Zealand. The Finance Activity ensures that GAAP is complied with by regular updates to the Council's Accounting processes, and the on-going formal and informal training and education of staff in departments throughout the Council.

The activity relies on the Council's core financial systems which include:

- NCS accounts payable, fixed assets, inventory, time entry, work orders, and general ledger.
- Accounts receivable, cash receipting, bank management and rates, plus inputs from other Local Government regulatory systems such as Person/Property, Infringements, Licensing, Consents.

11.1.2 RAMM

The Council's prime inventory system for its Roading assets is the RAMM (Road Assessment and Maintenance Management System) database. The RAMM system is web-based and stored on a server at CJN Technologies in Auckland. The system is available simultaneously to users in the Council and to its contractors, consultants and data-maintainers. The RAMM "Mapping Interface" is used but it is not linked to the corporate GIS system.

First introduced in the late 1980s as a tool for recording asset inventory information on local authority and roads and the state highway system it, or a system like it, became a prerequisite for Government financial assistance (subsidy) in the mid-1990s. RAMM has provided a uniform national inventory system and is also used by the NZ Transport Agency to obtain consistent data and condition reporting over the country's Roading network.

The Council first started implementing RAMM in 1991, and by 1997 the system had evolved to a standard and complexity that its management and needs required it to be professionally managed by specialist consultants. There is an on-going emphasis on quality of data and processes to ensure confidence in the systems and outputs.

The database is annually updated to enable forward work programmes to be developed, both short term via the Treatment Selection process. This programme provide analysis, prediction and costing of major pavement renewal works such as reseals and sealed road pavement rehabilitations, in addition to other works such as kerb and channel and footpath renewals.

Road network maintenance data is entered directly by the contractor and used for asset management and contract management purposes.

The Council also uses the RAMM system to undertake valuation of the asset, using the Asset Valuation Module. The street light portion of RAMM is managed by the Street light Maintenance and Management contractor.

In 2005 NZTA undertook a review of road controlling authorities RAMM databases. This review included, among other things, utilising specialised algorithms designed to expose inconsistencies in data. This check was followed up by random site checks on to the information in RAMM was accurately reflecting that on site.

11.1.2.1 Inventory

An extensive range of inventory items can be recorded using RAMM under the following broad headings:

Table 89: RAMM Inventory Headings

Heading	Information
Carriageway	Road name/location Descriptions/dimensions Summary traffic volumes and loads Ownership
Treatment lengths	Condition Maintenance activities Pavement type Treatment-intervention cots

Heading	Information
Traffic	Traffic volume Traffic mix
Carriageway Surfacings	Description/ dimensions Location/age/surfacing
Pavement Structure	Pavement layer Rehabilitation
Kerb and Channel	Location Type Descriptions/dimensions Ownership
Footpath and Berms	Location Descriptions/dimensions Surfacings Ownership
Drainage	Dimensions/type Location/maintenance Ownership
Traffic Facilities	Location/type Quantity/maintenance Ownership
Bridges and Major Culverts	Components Dimensions Restrictions Ownership
Route Data	Features Location/type
Street Lighting	Pole location / material / type / dates / ownership Lamp type location /dates / ownership Bracket type / dates

Heading	Information
Asset Valuation	Orc ODRC Expected life RUL Effect of condition on life Replacement asset type How asset element is measured (volume, area etc.) Predicted depreciation
User-defined items	In addition RAMM can cater for an unlimited number of user defined items

The RAMM and non-RAMM data currently collected, and any non-standard parameters associated with that data are detailed in Annex D.

RAMM includes a software module (previous called SLIM — Street Lighting Inventory Module) that holds all key information on street lights. Information held includes type, ownership and location details for poles, brackets, luminaires and lamps (“bulbs”).

As part of the Street light Maintenance contract, the contractor is required to use and maintain this database, updating it with details of any new lights installed and recording all other asset changes that have occurred.

All street lights are linked to RAMM via RAMM Road ID. The Contractor module of the software allows the contractor to maintain the street light inventory and recording maintenance history. It also provides call logging, dispatch information for repairs and detail to manage contract claims.

The call logging module allows production of work instructions to repair crews. Details of dispatches can be tracked from their initial entry through to completion with current status always available.

The contractor is able to enter the agreed contract schedule along with rates, internal costs and crew payment rates. All claims for work performed are entered against dispatches, in addition to claims for other activities such as bulk lamp changes.

11.1.2.2 Condition Rating

Condition rating is part of the RAMM system. Road condition is measured by recording absolute values for defects rather than condition indices or scores. For example, the number of potholes is recorded in each inspection length. The defects measured are cracks, deformation, surface texture, disintegration, edge defects and surface roughness.

Condition of other asset groups is stored in appropriate spreadsheets, i.e. footpaths, kerb and channel etc.

- The road network is divided into sections with consistent construction types and traffic loading. Sections are then further subdivided (100 m for roughness rating and 50 m of visual inspection every 500 m).
- Each sealed road section's condition is accessed and recorded, based on a visual assessment of pavement condition and roughness data from a mechanical / electronic survey of the road. Roughness is measured using a NAASRA / IRI roughness meter or laser profileometer attached to a vehicle while a team of two on foot usually collects visual data.

11.1.2.3 Treatment Selection

The absolute values of defects and distress are used in a costing algorithm in RAMM which takes into account the faults measured, carriageway roughness, traffic volumes and maintenance cost, to determine overall costs of alternative treatments. All unit costs are determined by the user.

Treatment alternatives vary depending of the type of pavement, as outlined in the following table, and are reported for the current and subsequent years.

Table 90: RAMM Treatment Selection Options

Asset Type	Treatment Selection Options
Flexible Thin Sealed Pavements	Continued routine maintenance Resurfacing Smoothing Strengthening
Structural Asphaltic Pavements	Reconstruction Milling and replacing unstable surface mix Thin overlay Thin overlay over a stress absorbing membrane layer (SAMI) Stress absorbing membrane reseal (SAM) Conventional reseal Continued general maintenance
Rigid Pavements	Rigid pavements are not currently catered for in the analysis module of RAMM

Treatment options are ranked based on BCR for pavement renewals, and priority indicators (PI) for resurfacing. Priority indicators (PI) are calculated by dividing the additional cost in maintaining a pavement for an additional year by the cost of resurfacing, to give a first year rate of return. The need for renewal of a pavement is checked against the required BCR. If the BCR is not satisfied it is then checked for a reseal. If a reseal cannot be justified then the treatment is to continue maintenance.

A preferred pavement renewal option and a preferred non-pavement renewal option are determined and then the two preferred options compared to determine the overall preferred option.

11.1.2.4 Performance Models

The RAMM system does not include performance prediction modes and lifecycle costs are not determined. However, dTIMS provides the ability predict long-term pavement deterioration and to optimise treatment selection in conjunction with sound engineering judgment.

11.1.3 Security

The responsibility for asset information security rests with the IT department administrators. The data is backed up at regular intervals and backup files are stored in secure lock-ups. Each system has a stepped password access system in place, allowing some staff to view the data only, and others to add and edit it. Data manuals are available that explain the various procedures.

11.2 Data and Knowledge

11.2.1 Requests for Service

To assist reactive maintenance Council deploys a Customer Service via NCS. Customer request for service (RFS) are received through the Council Customer Service Centre during business hours and Palmerston North City Council after hours service centre. RFS are presently recorded and forwarded to the appropriate Council staff or maintenance contractor for action. The RFS are recorded with the appropriate details (name, location, issue, priority etc.) to enable tracking for resolution etc.

The receiving officer/maintenance contractor is required to action the enquiry within a specified period. Once the issue is resolved to Council’s requirement the details are updated with completion time/date and any issues etc.

The information in this system has been interrogated to produce the information in the Levels of Service section of the AMP.

11.2.2 Data Assessment & Analysis

The Street lighting module includes "decision cube technology" which allows choice on how and what data is displayed. This allows data to be manipulated in order to perform asset management functions over the whole range of data held. For example comparisons can be made against electricity usage and cost, component performance, contact claims, lamp failures etc.

RAMM also has built-in functionality:

- To record requests for service and track their progress and completion.
- To issue work orders.
- For pending work to be recorded by location and asset element.
- For the contractor to sign-off repairs as they are completed and update the asset data base accordingly.
- For collection and updating of data.
- For interpretation of problems and issues on-site – though the availability of all data held on the asset element.

11.2.3 Bridges

11.2.3.1 Inventory

All major inventory information on bridges is held within a separate database developed and maintained by the Council's bridging advisors, Opus International Consultants Ltd. This data includes:

- ***General*** — name, foundations type, superstructure type, and deck type.
- ***Dimensions*** — span length, width and waterway area.
- ***Loadings*** — design loading, restrictions and posted limits.
- ***Inspections*** — date, full inspection data, general assessment (appearance etc.), superstructure condition, piers and abutments and waterway adequacy.

Consideration is being given to moving this data to the RAMM database.

11.2.3.2 Condition Assessment

Each bridge was surveyed and inspected at least once every 6 years. All inventory information is captured and a full inspection performed in accordance with NZTA bridge assessment criteria. This provides the base information necessary to manage repairs and maintenance of the bridges. The latest Bridge Inspection report is attached to Part 5, Lifecycle Management Plans, of this AMP.

Repairs are prioritised based on the following classifications:

Table 91: Bridge Repair Priority

Classification	Meaning
1	Urgent
2	Priority
3	Routine

The experienced personnel undertaking the bridge inspections assign the repair priorities. Priority levels are set on the basis of:

- Public safety.
- Traffic movement.
- Maintaining structural integrity.
- Future costs if the work is not done.

Subsequent inspections can be added to the database so a history of inspections is held for future reference. This is particularly important in the assessment of the performance of the asset in terms of particular trends and demands that develop and the corresponding effect on the asset.

The bridge inspection results are also used, by the inspectors, to assess the load-carrying capacity of each bridge. Where the capacity is reduced, by a bridge's condition, to less than normal highway loadings or a restriction on heavy-vehicle speed is required then the Bridge Inspection report includes an appropriate recommendation, in accordance with Section 11 of the Heavy Motor Vehicles Regulations 1974, regarding the imposition of restrictions.

Bridges in very poor condition are scheduled to be inspected at shorter intervals, based on their condition and expected rates of deterioration.

11.2.3.3 Data Use

The Council's bridging information is readily downloaded into spreadsheets for further manipulation. Costs can be attributed to the repairs and from this forward maintenance strategies can be determined with likely costs. This is then used to form contract work instructions.

Usually all the work identified cannot be undertaken in one year due to budgetary constraints. Under the repair prioritisation system the most urgent repairs are carried out first, with less urgent repairs programmed over subsequent years.

11.2.4 dTIMS

While RAMM has some condition prediction functionality this is relatively limited. To fill this gap, the Association of Local Government Engineers (INGENIUM), through a subcommittee entitled RIMS, led the development of pavement deterioration modelling software to assist asset managers with multi — year programming of road works. The selected system is called dTIMS.

dTIMS, or more correctly NZ dTIMS, is a computerised pavement deterioration modelling tool. The software has been developed as a national application for predictive modelling of pavement assets. It allows future condition, different budgets, and alternative levels of service (in terms of renewal intervention levels) to be tested and optimised. It is inherently a very flexible system that enables the user to alter the framework or models to suit the locally calibrated conditions.

The system also has the advantage of being able to forecast the need for works at treatment length level as well as at network level. This system is being implemented by the Rangitikei District Council. It is now used throughout NZ by most road controlling authorities, including the state highway authority and by private contractors with long-term performance specified maintenance contracts for state highway maintenance.

dTIMS uses data stored in RAMM, such as traffic volumes and pavement strength, to extend the predictive capability of future network condition and treatment needs over a long-term period (typically 20 years). Treatments can be triggered using intervention levels or on an economics based approach, and include reseals, smoothing, strengthening and reconstruction options. These can be justified as full rehabilitation or Area Wide Treatments (AWT’s).

dTIMS is managed by a professional services provider under contract.

NZ dTIMS mainly uses the HDM models produced by the World Bank. These follow a deterministic approach to predict pavement deterioration. The models have been calibrated using the available for NZ. Additional calibration work is being carried out on regional models to ensure the results reflect local networks behaviours.

Network calibration is generally based on analysis of local calibration sites and long-term pavement monitoring sites. dTIMS can provide the following information to the user:

- A 10-20 year maintenance programme, at treatment length level, that optimises maintenance treatments (strengthening, smoothing, reseal and routine maintenance, activities) for five budget scenarios (unlimited, high, medium, low and very low). Treatment types and costs are based on local practice. Benefits are measured in terms of road user costs based on models in the Transfund NZ Project Evaluation Manual.

- The condition of the pavement (roughness, rutting, cracking, etc.) is predicted for the network over the forecast period (20 years) based on proposed intervention levels and the various budget scenarios analysed.

- The model is significantly more advanced than the RAMM Treatment Selection Algorithm however all results still need to be confirmed in the field before renewal programmes are finalised.

While additional calibration is needed for the models, there is also a need to improve the quality of the data they use. This is because in the short term the predicted treatments are be influenced more by the data used in the modelling than by the different rates of pavement deterioration determined by the calibration factors. Established RAMM procedures for the measurement of distresses were generally adequate for use in dTIMS, except for rutting, the RAMM rating procedures have been modified to include mean and standard deviation of rut depth to address this deficiency.

Other key data required for a dTIMS analysis includes layer thickness and construction date, sub grade strength, maintenance costs. RAMM contains up to date reseal dates. Where this data is not available assumptions, based on local knowledge, falling weight defect meter (pavement strength) testing, desk study of construction drawings, or a mixture of these, are made to ensure results are reasonable. These assumptions are often introduced into dTIMS outside of RAMM. The appropriateness of traffic forecasts and data collection should also be reviewed.

Once RAMM has been updated with all currently available information, the dTIMS files are automatically exported from RAMM and dTIMS outputs can be similarly input into RAMM for forward works programming if required.

Implementation

The Council has purchased the core software for dTIMS. An implementation programme has been developed for dTIMS; it concentrates on the critical area of determining pavement strength for the network. Currently no information exists on this and will have to be captured through field — testing. Due to practicalities and expense, information will have to be obtained on a representative basis, and applied over the whole network. Initially this will involve testing main routes such as strategic, arterial and collector roads which are subject to the highest traffic loadings, hence potential faster rate of deterioration, followed by typical areas in the local Roading network. It is also likely classified traffic counts will need to be carried out to determine more accurately the mix of vehicles in the traffic stream and the effect on the pavements from heavy vehicles on long — term pavement performance. This work is planned for 2003-2004.

The compilation of a new RAMM professional services contract has been delayed while the further requirements associated with dTIMS can be assessed and included in appropriate in the tender documentation. Currently there are two different approaches by RCAs to this aspect. Firstly some completely separate the provision of professional services for the two activities i.e. RAMM and dTIMS.

It is argued that this approach provides a check and balance between the two systems and the consultants who may manage them. Secondly one consultant carries out the management of both systems who is considered to be in the best position to coordinate the complementary and integrated aspects of both systems.

Data Quality

The assessed current completeness of asset management data is as follows:

Table 92: Data Completeness and Accuracy

Category	Description
Data Completeness and Accuracy Asset Classification	Suitable asset classification system adopted for asset
Asset Identification	Unique ID numbers allocated in RAMM for most assets
Asset Attributes, Spatial Data	Aerial photos available for assets in all towns. Plans available for most bridges and recent construction projects
Asset Attributes, Textual Data	Pavements > 100 % complete & ~ 95 % accurate (RAMM) Bridges > 100 % complete & ~ 95 % accurate (RAMM) Footpaths > 100 % complete & ~ 95 % accurate (RAMM) Street lights > 100 % complete & ~ 95 % accurate (RAMM) Kerb & channel > 100 % complete & ~ 95 % accurate (RAMM) Signs > 100 % complete & ~ 95 % accurate (RAMM) Markings > 95 % complete & ~ 95 % accurate (RAMM) Minor culverts 50 % complete and 50 % accurate (RAMM)
Maintenance Data	Routine maintenance activity and costs available from contracts Unscheduled maintenance work records available in hard copy form
Historic Condition & Performance Data	Good historic records for pavements and bridges only
Future Prediction Data	Good knowledge of future demographic and traffic trends
Lifecycle Costs	Renewal & new improvements costs for common items known from recent experience

11.2.5 Geographical Information Systems (GIS)

Council has used MapInfo as its GIS system. GIS has some basic linkages with the RAMM system, and RAMM has GIS type functionality included. The GIS system is available to all Council Staff (at all Service Centres) and used extensively through all Councils activities.

11.2.6 Contract Management Systems

Contracts are managed using RAMM as well as paper-based records and systems. Management responsibility is assigned to specific staff members who are responsible for contract supervision and contract payments within their delegated authority.

Contracts contain detailed specifications, and those in period contracts continually evolve, being adjusted to reflect changes in best appropriate practice, need and other circumstances.

Although the Council does not have any formal contract management systems, it follows industry best practice in this area.

11.3 Asset Management Processes

The asset management process is intended to deliver agreed levels of service in the most cost effective manner to present and future customers. Managing the transportation network infrastructure is simply one of the inputs to this process.

At the highest level, the services to be delivered and standards to be achieved are those that contribute towards the achievement of the community outcomes in the Council's Long Term Plan, which are defined in Chapter 4 — Levels of Service.

Gaps between required standards and services and the ability of the network to deliver them are identified and processes are put in place to manage these gaps within acceptable margins. In managing these gaps both asset solutions (such as new or enlarged asset elements) and non-asset solutions (such as use reduction programmes) are considered.

Decisions on the option to be followed in any particular instance are based on a range of factors such as risk assessments, legal requirements, through life costs, customer approval ratings and the ability of the community to pay for system improvements. The detailed considerations behind these decisions are not made or detailed in this Plan; rather, they occur during the early stages of the projects' development as determined by the complexity, scale and potential effects of the problem / issues and the options available to address them.

11.4 Organisational Structure

11.4.1 Staff Structure

The Council's road and bridge assets are managed by the Asset Manager Roading who works with the Service Delivery Unit's Roading Team Leader and other Roading staff to discharge all his responsibilities for operational, daily, short-term, medium term and strategic planning of the road network and its maintenance. Road network professional services are largely delivered by in-house staff, who are accountable to the Asset Delivery Manager.

The staff structure of the Council is outlined in Figure 10-2. There are a number of cross-departmental links that are important to the correct functioning of the Roading team and management of the Roading network. The most significant of these are with the Financial and Administration Services staff.

11.4.2 Staff Competencies

An important measure of the quality of Council's asset management is the ability, experience and qualifications of the individuals and companies involved in its preparation. The Rangitikei District Council employs a wide range of technical staff appropriately qualified to carry out the asset management function. Formal qualifications range from NZ Certificate to Chartered Engineer. Staff experience in Asset Management ranges up to 30 years.

In this context competency refers to applied knowledge, it is not just the knowledge itself. Competencies can be described as: The behaviours that employees must have, or must acquire, to input into a situation in order to achieve high levels of performance.

There are a large number of competencies that the Council requires of its staff to effectively manage its transportation network assets; these are not statements of current individual's skills or competencies; rather, they are statements of the Council's desired competency in the areas and subjects detailed.

Establish the gaps between the competencies of current staff and the competencies required in the organisation. These gaps will be used to guide staff training and development programmes.

Inform the recruitment process for staff involved in road asset management when new positions are being filled or replacement staff sought.

11.4.3 Long Term Plan

To ensure that staff were thinking and working towards a common LTP goal, Council management instigated a LTP planning process in late 2010 for the 2012-2022 LTP. The group consisted of the four senior managers, LTP planners, asset managers and accountants.

This group meets regularly and provides direction on issues such as:

- Council priorities.
- Agreed assumptions.
- Growth projection.
- Plan format and style.
- Communication and consultation.
- Auditing processes.

11.4.4 Council and Committee Structure

Council's committee structure is extensive and is established under the Local Government Act 2002.

Each township and rural community also has a local Community committee elected every three years at a specially convened public meeting. The purpose of the committee is to consult with its community and relay local concerns and preferences to the Council or Community Committee. Township services and beautification projects are generally undertaken in conjunction with, or at the behest of, local township committees.

The full list of the Township and Hall and Reserve committees is:

- Ratana Community Board.
- Taihape Community Board.
- Bulls Community Board.
- Hunterville Community Committee.
- Marton Community Committee.
- Turakina Community Committee.
- Turakina Reserve Management Committee.

11.5 Quality Assurance

11.5.1 Audits

To establish and ensure the on-going improvement of the quality of Council's systems, audits of financial, technical and performance systems need to be routinely implemented.

The Local Government Act requires that independent annual financial audits be undertaken on the operations of Council – such audits may include all significant activities such as asset management planning. The auditor's opinions are included in the Annual Report.

System audits should be undertaken at regular intervals to access the appropriateness and performance of asset management systems, data and processes.

Audits should identify the current status of asset management processes, systems and data and produce targets for Asset Management practices to be achieved in following years.

Technical audits (peer reviews) are undertaken by NZTA undertaken at regular intervals to assess and identify compliance with statutory requirements.

Council may undertake additional technical audits may be undertaken using external or internal reviewers as part of AMP preparation.

Performance audits will establish whether the stated objectives for the operation of the asset have been achieved.

Measurement of the success of the operation of the asset will be assessed using the results of:

- Customer satisfaction surveys.
- Key service criteria objectives compliance.
- Benchmarking surveys.

These measurements will determine the public view of how well the levels of service have been achieved, an objective measure against stated key service criteria and national measures of relative performance. The performance audits will also be used in on-going customer consultation regarding future standards and requirements of the customers in the provision of service.

The collation of this data is often undertaken as part of NZTA national role in monitoring performance of transportation agencies.

11.5.2 Standards and Guidelines

Recently Council has a comprehensive suite of design guides and codes of practice. Adherence to these codes is expected to improve the quality and consistency of Council's portfolio of assets.