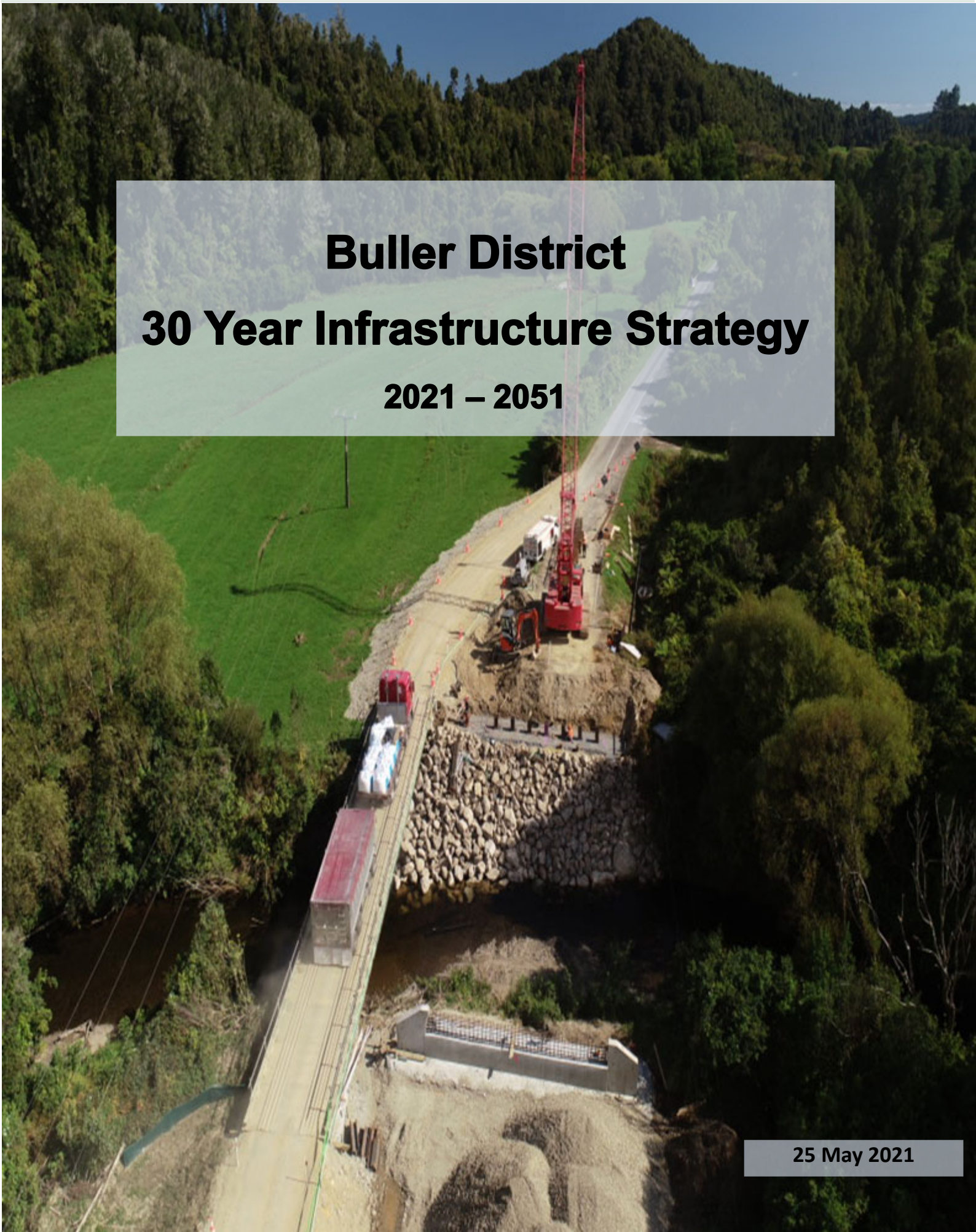
BULLER
DISTRICT COUNCIL
Te Kaunihera O Kawatiri



Buller District
30 Year Infrastructure Strategy
2021 – 2051

25 May 2021

This page was left blank intentionally

Quality Record Sheet

Document Approved by	Mike Duff – Group Manager Infrastructure Services		
Document Information	Activity		30 Year Infrastructure Strategy 2021-2051
	Version		3
	Release State		Issue for Use
	Contribution		Sarie van der Walt – Coordinator Asset Programs
			Mike Williams – Manager Infrastructure Planning
			Other departments in Council
	Reviewed Internally By		Mike Duff – Group Manager Infrastructure Services
	Reviewed Externally By		Ross Waugh
Revision History	**Version**	**Date**	**Amendments**
	0	12 March 2021	Initial draft document for comments
	1	24 March 2021	Incorporating comments from Auditor-General and Waugh Infrastructure
	2	9 April 2021	Incorporating comments from Auditor-General
	3	25 May 2021	Incorporating comments from ISC

Buller District

30 Year Infrastructure Strategy

2021 - 2051

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY 1

2. INTRODUCTION 4

2.1 Strategy Layout 5
2.2 Purpose 5
2.3 Buller District Core Infrastructure Assets 6
2.4 Infrastructure Performance 8
2.5 Risks to Asset Performance 10

3. OVERVIEW OF OUR DISTRICT 11

3.1 The Buller District 11
3.2 History 12
3.3 Major towns 13
3.4 Employment, Population, Growth and Demographic Trends 14
3.5 Council's 10 Year LTP Significant Strategic issues 18
3.6 Strategic Context 22
3.7 Linkage with Other Documents 24

4. ASSUMPTIONS AND UNCERTAINTIES 28

4.1 Significant Assumptions 28
4.2 Future Risks and Opportunities 48

5. STRATEGIC CONSIDERATIONS 51

5.1 Managing Challenges and Emerging Trends 51
5.2 Government and Industry Direction 51
5.3 Three Waters Reform Programme 55
5.4 Drinking Water Supplies 61
5.5 Demographic Changes 62
5.6 New Technologies 63
5.7 Changing Government Priorities and Legislative Environment 63
5.8 Climate Change Resilience and Environmental Sustainability 67
5.9 Biodiversity Protection and Enhancement 71
5.10 Infrastructure Resilience 71
5.11 Aging infrastructure 72
5.12 Economic Change 72
5.13 Affordability 72
5.14 Community Assets 73
5.15 Karamea Highway Special Purpose Road 73
5.16 Waka Kotahi One Network Framework 75

6. THIRTY YEAR STRATEGY 77

6.1 Applying the Strategic Statements (Community Outcomes) to Infrastructure Planning 77
6.2 The Organisations' Priorities 78
6.3 Infrastructure Strategies 83
6.4 Significant Decisions Required 87

7. SIGNIFICANT STRATEGIC INFRASTRUCTURE ISSUES 88

7.1 Council's Asset Data 91
7.2 Levels of Service 97
7.3 Capital Works Programme 101
7.4 Three Waters 104
7.5 Water Supply 106
7.6 Wastewater 110
7.7 Stormwater 114
7.8 Land Transport 116
7.9 Solid Waste Management 124

8. FINANCIAL ESTIMATES 132

8.1 Financial Expenditure Estimates Overview 132
8.2 Water Supply 133
8.3 Wastewater 135
8.4 Stormwater 137
8.5 Land Transport 139
8.6 Solid Waste Management 141
8.7 Most Likely Scenarios 142

APPENDIX A: THREE WATERS REFORM PROGRAMME 145

APPENDIX B: THREE WATERS SERVICES DELIVERY REFORM PROGRAMME 146

APPENDIX C: MAJOR PROJECT DELIVERY MODEL 147

APPENDIX D: ASSET LIVES & CONFIDENCE GRADE 152

APPENDIX E: BRIDGE INSPECTION REPORT AND PROGRAMME OF WORKS 2018 153

LIST OF TABLES

Table 2-1: Infrastructure Strategy Layout 5
Table 2-2: Asset Value as at 30 June 2019 7
Table 3-1: Community Outcomes addressed by Council's Strategic Issues 24
Table 4-1: Significant Assumptions and Uncertainties 28
Table 6-1: Data Improvements 86
Table 6-2: Significant Infrastructure Decisions 87
Table 7-1: Asset Data Confidence Rating 91

TABLE 7-2: LEVELS OF SERVICE 98
TABLE 7-3: THREE WATERS OPTION ANALYSIS 105
TABLE 7-4: WATER SUPPLY ASSET VALUE AS AT 30 JUNE 2019 106
TABLE 7-5: WATER SUPPLY – ISSUES AND OPTIONS 107
TABLE 7-6: WATER SUPPLY PROPOSALS 108
TABLE 7-7: WASTEWATER SUPPLY ASSET VALUE AS AT 30 JUNE 2019 110
TABLE 7-8: WASTEWATER – ISSUES AND OPTIONS 112
TABLE 7-9: WASTEWATER PROPOSALS 113
TABLE 7-10: STORMWATER ASSET VALUE AS AT 30 JUNE 2019 114
TABLE 7-11: STORMWATER PROPOSALS 116
TABLE 7-12: LAND TRANSPORT ASSET VALUE AS AT 30 JUNE 2019 117
TABLE 7-13: LAND TRANSPORT OPTION ANALYSIS 118
TABLE 7-14: LAND TRANSPORT PROPOSALS 123
TABLE 7-15: SUMMARY OF SOLID WASTE SERVICES 125
TABLE 7-16: SOLID WASTE MANAGEMENT PROPOSALS 129
TABLE 7-17: COMMUNITY OUTCOMES ASSOCIATED WITH SOLID WASTE ACTIVITY 131

LIST OF FIGURES

FIGURE 2-1: ASSET VALUE AS AT 30 JUNE 2019 7
FIGURE 3-1: DEPARTMENT OF CONSERVATION LAND 12
FIGURE 3-2: ACTUAL AND FORECAST EMPLOYMENT LEVELS IN BULLER (2010 – 2050) 15
FIGURE 3-3: ACTUAL AND PROJECTED CHANGES IN EMPLOYMENT INDUSTRY IN BULLER (2010 – 2051) 15
FIGURE 3-4: POPULATION CHANGE BETWEEN THE 2013 AND 2018 CENSUS FOR BULLER GEOGRAPHIES 16
FIGURE 3-5: POPULATION CHANGE IN 65+ AGE GROUP BETWEEN THE 2013 AND 2018 16
FIGURE 3-6: ACTUAL AND FORECAST POPULATION AGE STRUCTURE IN BULLER (2013 – 2051) 17
FIGURE 3-7: ACTUAL AND FORECAST POPULATION IN BULLER (1996 – 2051) 17
FIGURE 3-8: INFRASTRUCTURE STRATEGY- LINKAGES WITH OTHER DOCUMENTS 25
FIGURE 7-1: WATER SUPPLY ASSET VALUE AS AT 30 JUNE 2019 106
FIGURE 7-2: WASTEWATER SUPPLY ASSET VALUE AS AT 30 JUNE 2019 111
FIGURE 7-3: STORMWATER ASSET VALUE AS AT 30 JUNE 2019 114
FIGURE 7-4: LAND TRANSPORT ASSET VALUE AS AT 30 JUNE 2019 117
FIGURE 7-5: SOLID WASTE SERVICES 124
FIGURE 8-1: DISTRICTWIDE ACTIVITY PROPOSED TOTAL EXPENDITURE 132
FIGURE 8-2: PROJECTED WATER OPERATING EXPENDITURE 133
FIGURE 8-3: PROJECTED WATER CAPITAL EXPENDITURE 134
FIGURE 8-4: PROJECTED WASTEWATER OPERATING EXPENDITURE 135
FIGURE 8-5: PROJECTED WASTEWATER CAPITAL EXPENDITURE 136
FIGURE 8-6: PROJECTED STORMWATER OPERATING EXPENDITURE 137
FIGURE 8-7: PROJECTED STORMWATER CAPITAL EXPENDITURE 138
FIGURE 8-8: PROJECTED LAND TRANSPORT OPERATING EXPENDITURE 139
FIGURE 8-9: PROJECTED LAND TRANSPORT CAPITAL EXPENDITURE 140
FIGURE 8-10: PROJECTED SOLID WASTE MANAGEMENT OPERATING EXPENDITURE 141
FIGURE 8-11: PROJECTED SOLID WASTE MANAGEMENT CAPITAL EXPENDITURE 142
FIGURE 8-12: PROJECTED OPERATING EXPENDITURE - ALL CORE ACTIVITIES 143
FIGURE 8-13: PROJECTED CAPITAL EXPENDITURE- ALL CORE ACTIVITIES 144

1. EXECUTIVE SUMMARY

The Buller District Council's vision for the District is based on its five community outcomes which it seeks to achieve, these being the enabling of:

- Vibrant, healthy, safe, and inclusive communities, that are:
  - Supported by affordable, quality infrastructure, facilities, and services, that enable
- An innovative and diverse economy, where:
  - Our lifestyle is treasured, and our strong community spirit is nurtured, and where
  - Our natural environment is healthy and valued

The Buller District faces several infrastructure challenges over the coming years. These include managing the effects of natural hazards and climate change, maintaining safe and secure water supply networks, and replacing and upgrading our infrastructure to ensure it is efficient, cost effective, fulfils our legislative requirements, and does not adversely affect `nor degrade the natural environment in which we all live.

Addressing all of these challenges such that the risks presented by them are eliminated is simply unaffordable for the community, given Council's high level of rates reliance and the District's small rate payer base. As such, we have worked hard to deliver an Infrastructure Strategy that represents great value for our communities.

The Infrastructure Strategy is based on several significant assumptions and uncertainties that have associated risks. Key amongst these is the potential impact of changes to anticipated central government funding for infrastructure maintenance and upgrade activities, unforeseen shifts in District demographics, and the occurrence of impacts related to natural disasters, including those associated with the Covid-19 pandemic and climate change-associated events.

Based on current information, climate change means that much of Buller is going to get warmer, wetter, and windier. Over the coming decades, NIWA's likely scenario includes greater frequency and intensity storm events, including higher intensity rainfall, leading to changes in storm surge and wave height and thus more frequent or higher magnitude coastal flooding outcomes, as well as changes in fluvial flooding. Intense rainfall events will put pressure onto water catchments and associated infrastructure such as turbidity challenges and slips into community water supplies and intakes and increased risks around roads and bridges. Additionally, sea level is expected to keep rising for at least several centuries posing an ongoing challenge for current and future generations to create more sustainable coastal communities.

Building, operating, and maintaining Council's infrastructure assets in an affordable manner considering the above assumptions and risks is becoming increasingly difficult. Additional strategic considerations come from Three Water Reform and Taumata Arowai, mitigating and adapting to climate change, Zero Carbon and Freshwater Management requirements and implementation and other changes to government priorities There are shifts and changes forecast to the legislative environment, environmental impacts and sustainability, infrastructure aging and resilience, economic shifts affecting affordability, and changes in technologies and major industries operating within the District.

In response to the risks and strategic considerations identified above, Council has developed its 30-year strategy against the framework of the five community outcomes it is seeking to achieve for the communities it serves. Council is aware of the role of infrastructure in providing the basic needs of residents and underpinning economic activity, but this must always be delivered with affordability as central to the Strategy.

Key aspects of the strategy include utilising a long-term, lifecycle approach to asset management and the use of prudent decision making regarding further development of networks and maintenance and renewal of existing assets; the use of a procurement system which is based on providing fair payment for the delivery of services; assuming a more sophisticated approach to how Council thinks about resilience, beyond a narrow focus on shock events or infrastructure failure towards the consideration of interdependencies, levels of services and community preparedness; and making its decisions based on evidence and improving its data collection and analysis methods to support this approach.

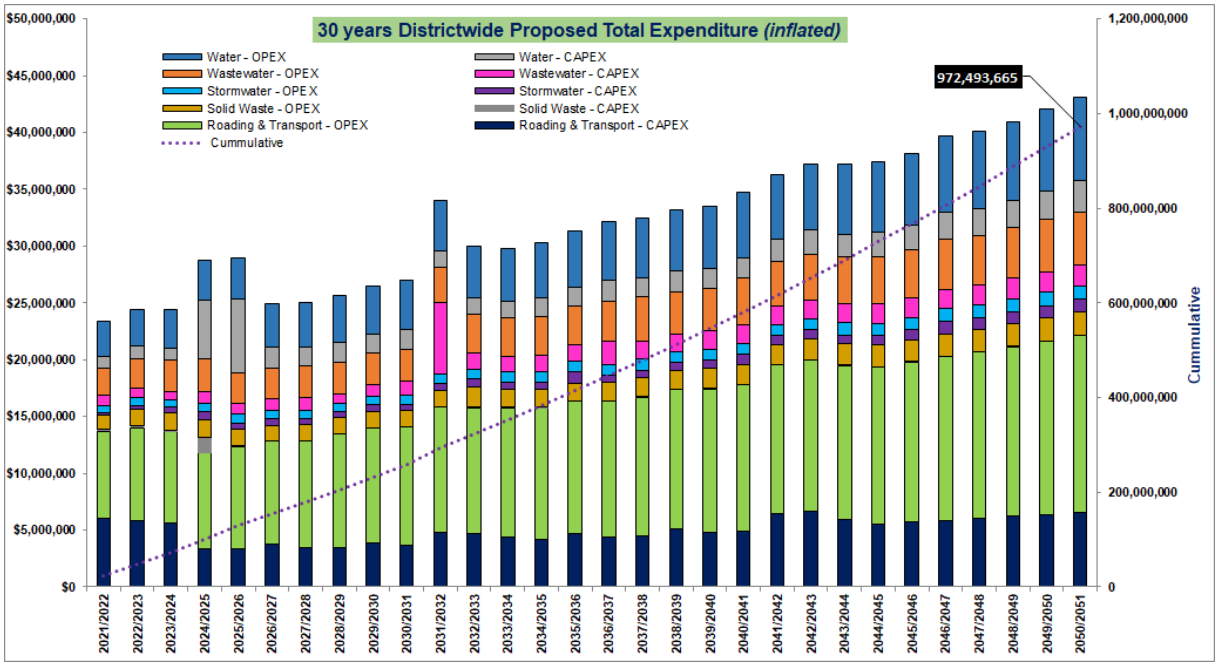
In short, decisions made by Council now must consider the costs and benefits for future generations as well as the current generation.

Specific significant issues that Council will address include how to maintain the affordability of its infrastructure assets to its ratepayers whilst achieving asset renewal and compliance under any future legislative reform, and how to prepare for and protect our communities against climate change.

This strategy and corresponding Asset Management Plans aim to respond to these key questions by addressing infrastructure backlog, applying new strategies i.e., focussing on bringing assets from “poor/adequate” to “fair/good”, and not necessarily “excellent”, and introducing new Key Performance Indicators to measure and communicate strategic performance, with ‘more, ‘same’, and ‘less’ options being developed with predictable cost and Level of Service outcomes associated with each.

Key projects have been identified across all activity groups for the Long-Term Plan 2021 – 2031. This strategy provides details around these activity projects, explaining the issue that must be resolved and scoping the various options for resolution.

The total capital and operational expenditure across all activity groups for the 30-year period 2021 – 2051 for Land Transport, Three Waters (Water Supply, Wastewater, Stormwater) and Solid Waste was estimated as **$972m**.



The 30-Year Infrastructure Strategy is to be adopted as part of Council's Long-Term Plan 2021 – 2031 and needs to be considered in context and in conjunction with other Council policies and processes including the Financial Strategy and Asset Management Plans.

2. INTRODUCTION

The development of the Infrastructure Strategy included a very clear and comprehensive series of steps building towards key issues for the Long Term Plan 2021-2031 (LTP). The pathway included workshops focused on community engagement, environmental scan & SWOT analysis, long-term vision, community outcomes, priority projects and levels of service requirements. As a result of the process, four significant strategic issues have been concluded for Council:

- Socioeconomic Prosperity
- Infrastructure, Affordability & Reform
- Climate Change Resilience & Environmental Sustainability
- District Revitalisation

The LTP Significant Strategic Issues report from October 2020 provided a closer examination of the issues relating to Infrastructure, Affordability and Reform. The key questions included:

- Is the district's infrastructure sized correctly, fit-for-purpose, reliable and affordable?
- What are the climate change implications for the district's infrastructure?
- What savings can be made whilst still maintaining assets in a sustainable manner?
- What are we doing about central government's Three Waters Reform?
- What are we doing about the Karamea Special Purpose Road (SPR)?

The Infrastructure Strategy and corresponding Asset Management Plans (AMPs) have been developed to address these key questions as well as considering priorities, principles and result areas including:

- Reduce infrastructure backlog i.e. the deficit of renewal works required to meet Level of Service outcomes
- Introduce asset intervention methods i.e. "bring to satisfactory" based on evidence-based data
- Develop new Key Performance Indicators (KPIs) i.e. Infrastructure Backlog Ratio, Asset Maintenance Ratio, Asset Renewal Ratio to measure performance

In terms of key portfolios, the transport programme is well understood, supported by a detailed activity management plan and business case for the next triennial developed in collaboration with other West Coast Councils and Waka Kotahi NZTA. Asset preservation through an enhanced maintenance programme focuses specifically on bridge and pavement replacements to improve network resilience and freight capacity.

Three waters is a national infrastructure challenge and Buller has many of the same systemic issues to address as the rest of New Zealand, including mandatory compliance, significant backlog of renewals and increased regulation. Whilst reforms are supported in principle and considered essential for the future well-being of our district, we have maintained a "business as usual" approach for Three Waters consistent with best practice and central government advice for the LTP. This includes presenting the community with a clear set of information about the likely financial requirements of providing water services under the present delivery arrangements and current/expected future regulatory settings and ensuring that the base of underpinning information and the systems that manage the information are as robust and up-to-date as possible. In other

words, able to provide any new service provider with all of the information and systems that are needed to manage the services from day one.

Strategies for solid waste align with Council's Waste Management & Minimisation Plan (WMMP) and national signals of policy shift and cost incentives. Risks and opportunities for Council pivot around such legislative changes including waste levy increases and movement towards a circular economy. Initiatives supported in our LTP include reduction of waste, management of special waste, local and sustainable facilities and landfill management with key focus areas of compliance readiness and further investigations into potential regional collaboration.

The Infrastructure Strategy has considered the essential requirements for level of service delivery and asset management planning, whilst contemplating legislation changes, national reforms and aspirational initiatives to guide our "fit for future" investment. The overall strategic position for this LTP is one of **"affordable asset preservation and compliance"**, mindful of known infrastructure condition, remaining useful life and mandatory priorities; constrained only by district ratepayers ability to afford the costs.

2.1 Strategy Layout

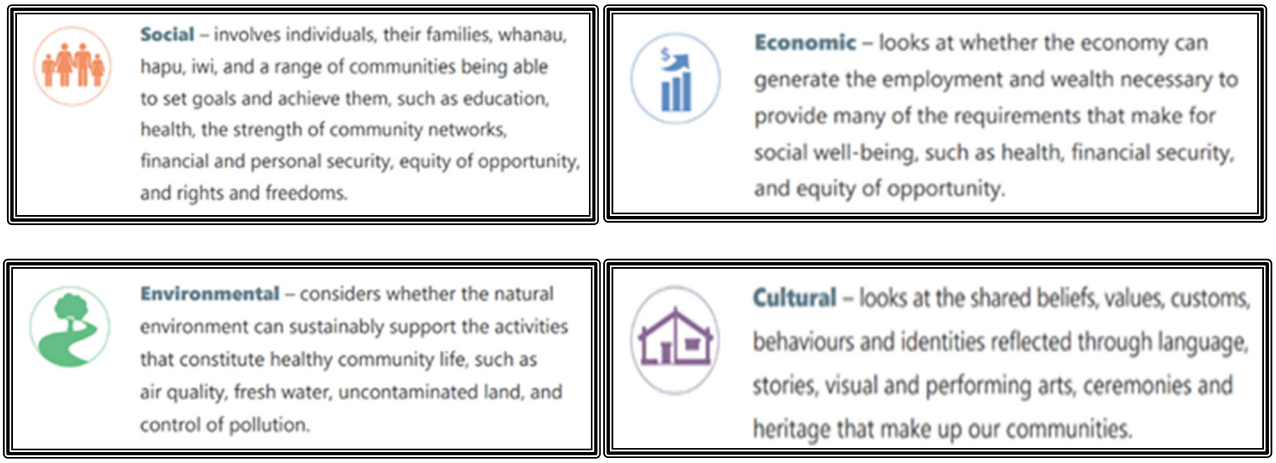
The Infrastructure Strategy document sections and corresponding Local Government Act (LGA) sections are provided in Table 2-1 below:

Table 2-1: Infrastructure Strategy Layout

IS Section		LGA 2002 as amended (Section 101B)
1	Executive Summary	-
2	Identifies the purpose of the IS and the core infrastructure included in this strategy	2(a) and 6
3	Describe the district/city and illustrate the linkage between strategic documents	2(a)
4	Describe the significant assumptions, risks and mitigation	2, 3(e), 4(c) & (d)
5	Discuss the emerging issues that will impact on the core infrastructure assets	3 (b) to 3(e)
6	Discuss Council's response to the emerging issues and the significant decisions to be made during the term of this strategy	2(b), 4(b)
7	Identifies the response options for the significant issues and documents the benefits, cost, when and funding source	2(a) & (b); 3(a) to (e) & 4(a) to (d)
8	Identifies the costs associated with the actions proposed	4(a)

2.2 Purpose

Our purpose is to provide quality and affordable infrastructure and services to meet the current and future needs of our communities, and to engage with our communities to facilitate positive economic, social, cultural and environmental well-being outcomes.



Section 101B states:

(1) A local authority must, as part of its LTP, prepare and adopt an Infrastructure Strategy for a period of at least 30 consecutive financial years.
(2) The purpose of the Infrastructure Strategy is to;
   a) Identify significant infrastructure issues for the local authority over the period covered by the strategy; and
   b) Identify the principal options for managing those issues and the implications of those options.

Section (6) defines infrastructure assets as including:

a) existing or proposed assets to be used to provide services by or on behalf of the local authority in relation to the following groups of activities:
   i. water supply
   ii. sewerage and the treatment and disposal of sewage
   iii. stormwater drainage
   iv. flood protection and control works

2.3 Buller District Core Infrastructure Assets

2.3.1 Assets Covered in this Infrastructure Strategy

Buller District Council has developed this Infrastructure Strategy to cover core community infrastructure as required by the LGA including:

- Land Transport;
- Water supply;
- Wastewater collection, treatment and disposal;
- Stormwater; and
- Solid Waste Management.

The assets include physical items like:

- roads, bridges, footpaths, streetlights and street signs;
- other assets associated with transport within the road corridor;
- drinking water supply schemes – treatment to distribution;
- network pipelines and fittings on the pipelines;
- treatment plants; and
- landfill and transfer stations.

Council manages **$484.25m** of infrastructure assets. Solid Waste has been incorporated into this strategy though assets are not reflected in the valuation figures. The Infrastructure Assets' Replacement Costs as of 30 June 2019 are shown in **Table 2-2** and **Figure 2-1**.

Table 2-2: Asset Value as at 30 June 2019

Asset Group	Description	Replacement Value	% ot Total
Land Transport (incl. Roading)	Roads (arterial, collectors, local), kerbs and channels, bridges, footpaths	$348,902,220	72%
Water Supply	Water extraction, treatment and distribution 10 schemes	$61,844,921	13%
Wastewater	Wastewater collection, treatment and discharge	$50,624,022	10%
Stormwater	Stormwater collection and discharge	$22,880,719	5%
TOTAL*		**$484,251,882**	**100%**

**30 June 2019 Valuations*

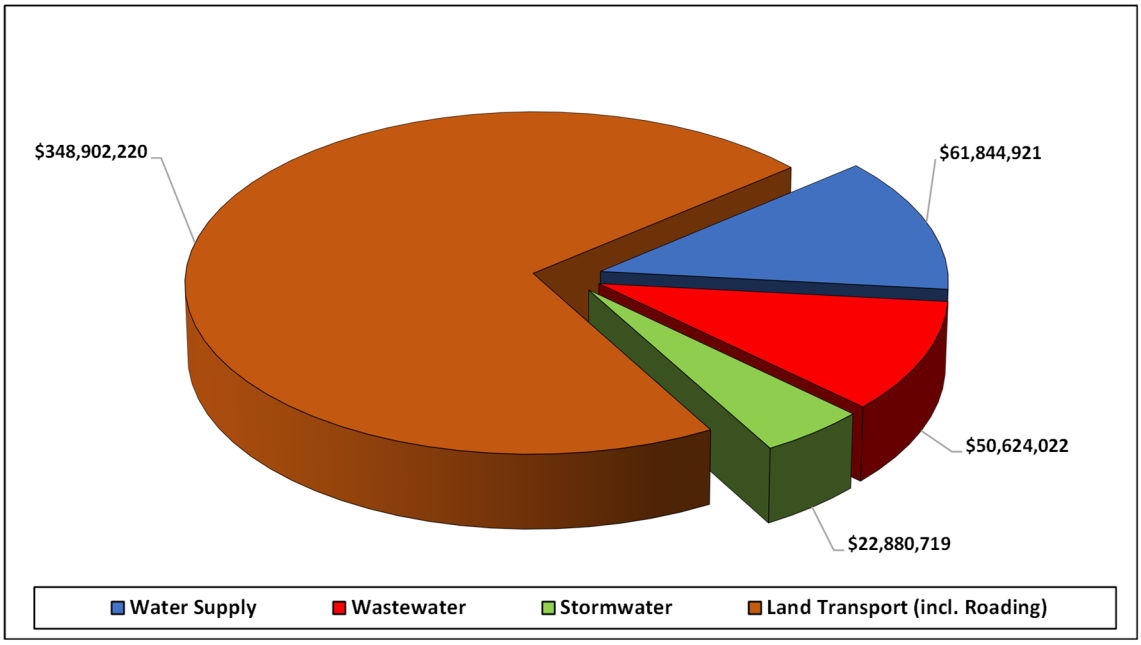


Figure 2-1: Asset Value as at 30 June 2019

2.3.2 Council Activities Not Included

This strategy only includes core Council services of Transport (Roading and Footpaths), Three Waters and Solid Waste managed under Infrastructure Services. It does not include commercial infrastructure such as the airport and port facilities, or Council's property portfolio including buildings, parks and reserves which are managed under different departments. Incorporating all Council infrastructure in future strategies will be considered once all relevant asset information and planning frameworks are consolidated and consistent.

2.3.3 Non-Council Infrastructure

Both central government and the private sector provide and maintain other infrastructure groups vital for the needs of the Community. These include the state highway network, the rail network, communications and electricity and gas networks. These services are not covered under this strategy.

2.4 Infrastructure Performance

Generally, the portfolio of assets owned and managed by Council is performing appropriately for the Levels of Service (LOS) agreed with the community.

There are small communities where reliability is key, and a limited service is acceptable. This is a challenge for Council to balance, particularly for water quality. Examples of this are the number of schemes where communities are hands-on operators and the 2015 decision of the Karamea community against establishing a community water supply. These communities are determined and have a culture of being self-sufficient.

There is currently a national focus on drinking water management and this is an ongoing and important conversation for Council and the Buller community. With several schemes having no form of treatment or disinfection, and three schemes on permanent boil water notices, changes are imminent. Two schemes need more certainty over ownership before action is taken to improve the water treatment system.

Council remains committed to work with the Buller communities around safe drinking water requirements within community affordability constraints. Council will continue to work with Buller communities with regards to implementation of the required new service levels and water safety changes associated with the governments water reform programme.

Sewerage services are provided to three communities with satisfactory performance. There is an issue for Westport with high rainfall 'overloading' the system and requiring flow relief via the stormwater system.

Stormwater networks are limited and provide a satisfactory service most of the time. However, once rainfall exceeds moderate levels and outfalls are affected by floodwaters or tides, performance is hampered. In Westport, long term decisions around flood protection led by the West Coast Regional Council will override localised stormwater issues. Council is continuing to liaise with the West Coast Regional Council regarding Westport's flood protection from the Buller River, coastal protection, and any subsequent stormwater system installation Council may require. This integrated approach is currently in the investigation phase, with analysis reports being undertaken. Potential design directions have not been finalised and as such any costing of potential future work would be

speculative. Dependant on design decisions a future Infrastructure Strategy may include additional stormwater capital expenditure for Westport.

The reticulation serving communities varies in age as development and replacements occurred within the townships. This information as well as condition is being gathered and recorded in the computer-based asset management system. The renewal programmes that have been developed in the asset management plans are taking into account the criticality of the pipe, as well as age, condition and material. Reticulation renewal is required in a timely manner to ensure pipes provide the level of service required.

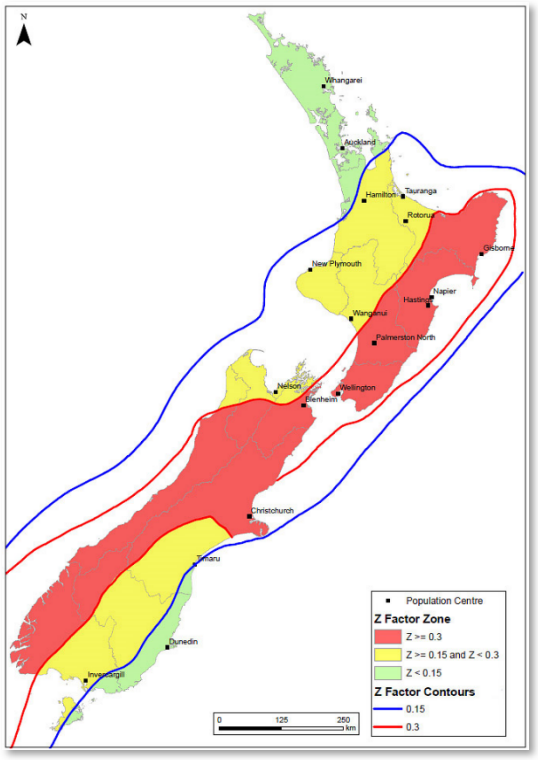
It is noted that only 7.7% of water pipe reticulation and 1.7% of wastewater pipe reticulation are asbestos cement pipe, and as a result asbestos cement pipe is not considered to be a material issue in the management of Councils pipe reticulation.

With the road and footpath network, resilience and consistent level of service is the primary focus. The local and state highway networks operate as one, with economic, social and tourist activity reliant on the 'one roading network'.

Performance issues with the local network are not having a significant impact on the economy or the districts communities. The capability of the network including bridges is the main performance issue that requires consideration. Keeping up with maintenance and renewal work remains vital to preserve the asset and provide a satisfactory level of service.

2.5 Risks to Asset Performance

New Zealand[1] is a young country and has a dynamic geological environment. Like most of New Zealand, the greatest risks to asset integrity and performance are natural hazards. Examples include earthquakes, severe storms, flooding, storm surges, erosion, slips and landslides. New Zealand lies at the southwest of the so-called "Pacific Ring of Fire", which makes it particularly vulnerable to natural disasters. The Alpine Fault is the major fault running the length of the South Island. The Southern Alps have been uplifted along the eastern side of the Alpine Fault. It is considered to be at high risk of producing a major earthquake in the next 50 years. Significant earthquakes can also occur on minor fault systems, of which there are many throughout New Zealand. The Canterbury and Christchurch earthquakes are a recent local example. The Buller region has experienced some of New Zealand's largest earthquakes in modern times, Murchison 1929 (M7.8) and Inangahua 1968 (M7.1) (refer www.gns.cri.nz). Therefore, Council needs to take earthquake risk into consideration in its planning and in its infrastructure strategy.



Council has completed a range of thorough analysis regarding the likelihood and consequences of a major alpine fault earthquake. Council has considered associated financial risks, has insured accordingly, and is comfortable with the insurance portfolio held.

Council is also involved with ongoing AF8 analysis and planning for resilience.

The predominant wind direction along the West Coast is southwest to southeast. Because of the orientation of the Southern Alps air is forced to rise and cool, thus forming rainfall on the west of the Alps, and a rain shadow to the east of the Alps. This is called the 'Orographic' effect. That's why the West Coast has high rainfall, and the East Coast has much lower rainfall. Buller has high annual rainfall (although less than our neighbours in the south). Significant falls occur in the mountains (several metres) and headwaters of the key rivers. This makes heavy rainfall and flooding an enduring risk to the whole Buller district, and causes significant damage to infrastructure; roading in particular to bridge structures and to surface water supply intakes.

Scientists believe that global climate change may result in more severe weather events and more often in the next 50 – 100 years, as well as higher sea levels so it's important to factor this into planning and infrastructure strategy.

[1] *www.building.govt.nz/*

3. OVERVIEW OF OUR DISTRICT

The Buller District Council is the territorial authority for the northern West Coast, Buller and Inangahua.

3.1 The Buller District

The Buller District is a diverse and beautiful place. With an enviable climate, laid back lifestyle and close-knit community environment, the Buller District is a great place to live, work and visit.

Stretching from Punakaiki in the south to Karamea in the north, and inland as far as Springs Junction, the District is home to a population of 9,610 as at 2020. This is approximately 1,000 fewer residents than at its mining peak in 2012.

The district boasts two national parks (Kahurangi in the north and Paparoa in the south), one forest park (Victoria Forest Park) and two heritage areas, all offering the opportunity to experience peace and tranquillity or excitement and adventure.

Prior to the COVID-19 pandemic, tourism was the fastest growing sector in the district and the region. Once global travel recovers following global vaccination programmes and the corresponding easing of travel restrictions, it is anticipated that international tourism demand will return to levels like those experienced prior to the pandemic.

There are several world-class tourist destinations within the Buller District. The Old Ghost Road is an iconic mountain biking trail and tramping experience that traverses part of Kahurangi National Park; Punakaiki is a small village located near Paparoa National Park and home to the world famous 30-million-year-old Pancake Rock limestone formations; The Great Coast Road between Greymouth and Westport is one of the Top 10 Coastal Drives in the world according to Lonely Planet; the famous Heaphy Track; and the Honeycomb Caves and Oparara Arches located near Karamea is a remarkable area of both national and international significance.

Mining and agriculture are the other industries of significance in the District in terms of GDP and opportunities for employment.

Like the whole of the West Coast, most of the Buller District is Public Conservation Land. As a result, Council works closely with the Department of Conservation to maximise the visitor experience and provide the infrastructure and services they need to stay safe and enjoy what the district has to offer. Visitors come to Buller to enjoy the natural resources and heritage areas, with walking, tramping, mountain biking, and other adventures pursuits being the main activities. When they come and stay in the District, they spend their money in our towns and communities, and this contributes to our local economy.

Buller's Natural Environment

The district comprises 8,574 square kilometres from Kahurangi Point in the north to the Punakaiki River in the south and east to the summit of the Lewis Pass.

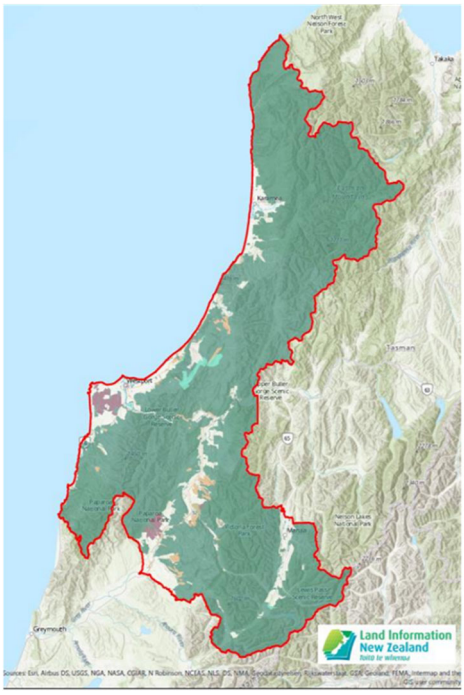
The rateable area of the district is only 18% with most of the area being Conservation Estate .

The West Coast is an area of extremes; wild country, wild weather and it is geologically active – all of which make this a unique environment. Ecosystems are unique, and biodiversity is rich and internationally recognised.

The area, because of its location adjacent to the Southern Alps, captures a high annual rainfall varying from about two metres on the coastal area, to around 5 metres on the Stockton and Denniston plateau and about 3 metres at Springs Junction in the Southern Alps.

Natural hazards are part of life here and the communities are resilient; and the Council factors this resilience into the way they manage infrastructure and its planning.

Climate change and its associated sea-level rise and changing weather patterns will increase natural hazard challenges for the District. Strategic consideration regarding the protection, upgrading and / or eventual abandonment following staged retreat, of Council's assets and infrastructure will be required over the coming decades.



Source: LINZ, Central Record of State Land (CRoSL).

Figure 3-1: Department of Conservation Land (dark green) within the Buller District

3.2 History

The Buller District Council was established on the 1st November 1989 from the amalgamation of the former Westport Borough Council (established 1873), Buller County Council (established 1876) and the Inangahua County Council (established 1876).

Early Māori used the coastal area of the District as a key stopping point on the coastal pounamu trail along the West Coast for many centuries. Research undertaken between 2003 and 2008 has shown that Māori history in this area is much more significant than previously understood. The estuaries and wetlands provided abundant food supplies for residents and travellers and, in the early days of European settlement, many artefacts were found, mostly at Tauranga Bay and Ōkari. Archaeological excavations in proximity to Carters Beach have revealed that a very early Māori settlement existed as early as AD 1350, and this is now one of the most significant archaeological sites in New Zealand.

European settlements developed on the back of extractive industries in the 1860's; gold initially followed by coal. The town of Westport is a river port that was used extensively through its history for the transport of coal. The Denniston Incline was considered one of the engineering wonders of the world with its unique transportation system that used gravity to transport coal from the plateau to the railway at Conns Creek.

Agriculture has also been a hugely important factor in the development of the region, with the district being particularly suited to dairy farming.

3.3 Major towns

Westport

Westport is the West Coast's second biggest town and is Buller's commercial and administration centre. Situated at the mouth of the Buller/Kawatiri River, Westport and its surrounds are home to around 5,800 residents. Westport has a commercial fishing port and an airport, with flights to and from the capital city, Wellington, six days a week, and is used as the base for tourists to experience the many attractions of the nearby coal plateaus of Denniston and Stockton, historic gold workings and the beauty of the rainforest.

Westport provides an employment base for a wide range of industries including mining, farming, fishing, horticulture, technology, and tourism. However, some of these employers are in the process of change. Cyclical changes in the mining industry have led to a contraction phase in this sector. New central government direction indicates there will be no new mines on Conservation land. Existing mines will be able to continue to operate. This includes some proposed developments that have commenced the permitting process.

Requirements regarding the management of our freshwater and indigenous biodiversity as well as carbon and methane emission reductions, will require, in particular, our coal mining and agricultural industries across the District to consider and manage the effects of their activities from a whole life-cycle approach. Additional job and training opportunities may result in the environmental advice and restoration sectors.

Karamea

An hour and a half drive north from Westport is Karamea. A popular tourist destination, Karamea includes the spectacular Oparara basin with its limestone arches and caves and the Kahurangi National Park along with the famous Heaphy Track.

The close community of around 720 people supports a growing horticulture, dairy farming, and tourism industry.

The area is packed with opportunity to experience the wonder of the environment. Walking, tramping, mountain biking, caving, and fishing are some of the activities that are available in this region. The community has a five-year partnership with the Department of Internal Affairs and has developed a Community Plan to help develop the area.

Reefton

Reefton is the gateway to both the West Coast and Buller from the east coast using the Lewis Pass. Reefton is located an hour's drive from Westport and is located at the heart of the Victoria Forest Park. Founded in the 1860's with the discovery of the nearby goldfields, Reefton became the first town in the southern hemisphere to have a public supply of electricity in 1888. The stable population of around 1,000 are proud of the town's historic past and the township features many heritage buildings.

The main employment opportunities have changed over time but now the area has dairying, coal mining, gold mining and tourism. Reefton is the main service town to these industries.

Reefton, is adjacent to the Victoria Forest Park which means it has close access to a wide range of historic tracks and sites that provide extensive mountain biking, tramping and walking options. The rivers provide some of the best brown trout fishing in New Zealand.

Punakaiki

Nestled at the foot of the Paparoa National Park, the small coast town of Punakaiki is home to around 70 full time residents. The town is midway between Westport and Greymouth on the Coast Road which regularly is cited in tourism publications as one of the spectacular coastal highways. Punakaiki is one of the most visited conservation areas in New Zealand, with the Pancake Rocks at Dolomite Point being the iconic attraction.

Punakaiki offers the opportunity to enjoy a unique coastal experience and some amazing beachside accommodation. One of the most popular attractions is the Punakaiki pancake rocks and blowholes walk. The 20-minute loop track to Dolomite Point gives the best views of the 30-million-year-old limestone formations and it is one of the most accessible tracks available with much of being accessible to both wheelchairs and prams. The blowholes are most spectacular when the sea is rough and at high tide, but the dramatic views of the rock systems and the township of Punakaiki are worth a visit even on the calmest of days.

The Dolomite Point Redevelopment Project, which will create a much-improved visitor experience at the key gateway to the Pancake Rocks and the Paparoa National Park, is currently underway following investment of $25.6M from the Provincial Growth Fund in 2018.

Other towns

The townships and associated communities of Waimangaroa, Birchfield, Granity, Ngakawau, Hector, Mokihinui, Seddonville, Little Wanganui, Inangahua Junction, Springs Junction, Mawheraiti, Ikamatua, Charleston, Cape Foulwind, Carters Beach all have history. Community pride and a point of significance has kept these townships going.

3.4 Employment, Population, Growth and Demographic Trends

3.4.1 Employment Projections

Employment in Buller fell sharply over the past decade due to redundancies in coal mining and cement manufacturing. Between 2013 and 2018, employment fell by 26% (1,400 jobs in Buller) at a time when employment was growing strongly at the national level. As the COVID-19 induced recession begins to bite, it is expected that further job losses will be seen in 2021 and will stretch into 2022. With positive initiatives, anecdotally Council are beginning to mitigate some of the statistical evidence on population decline.

In Buller District, a decline of -4.9% in 2021 and -2.4% in 2022 forecast, followed by a bounce back of 4.2% in 2023. Nationally, a slightly lesser decline of -2.3% in 2021 followed by -3.0% in 2022 is anticipated. This means that the fall in employment is expected to be slightly sharper than the national average, and likewise the recovery in Buller will be slightly stronger **Figure 3-2**.

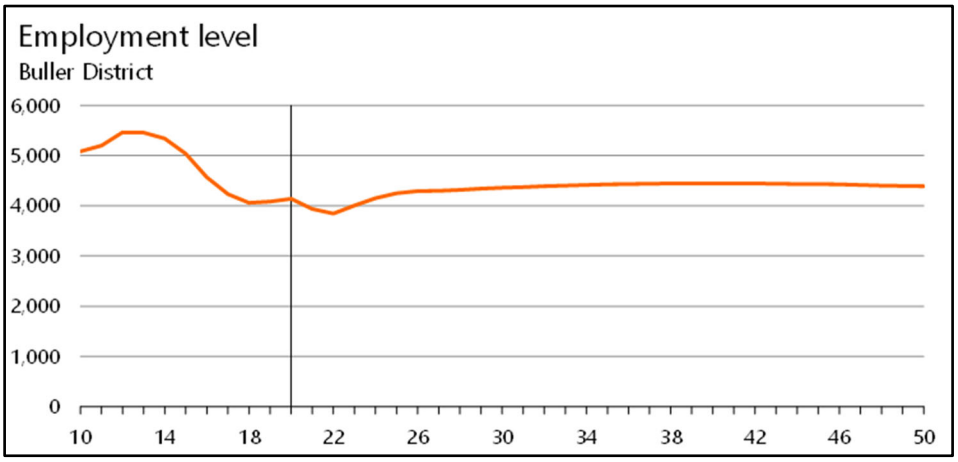


Figure 3-2: Actual and Forecast Employment Levels in Buller (2010 – 2050) (Source: Infometrics, January 2021)

Over the long term, minimal employment growth in Buller District is expected, tipping into slight decline after 2040. This is underpinned by an assumption that higher carbon prices, stronger freshwater regulation, and ongoing decarbonization will adversely affect Buller's primary sector. Furthermore, an easing population reduces demand for services and adversely affects employment.

Considerable change in employment opportunities in the main industries in Buller over the coming decades is forecast, with mining projected to contract further, and employment in the administration and support services, accommodation and food service industry, construction and manufacturing to increase **Figure 3-3**.

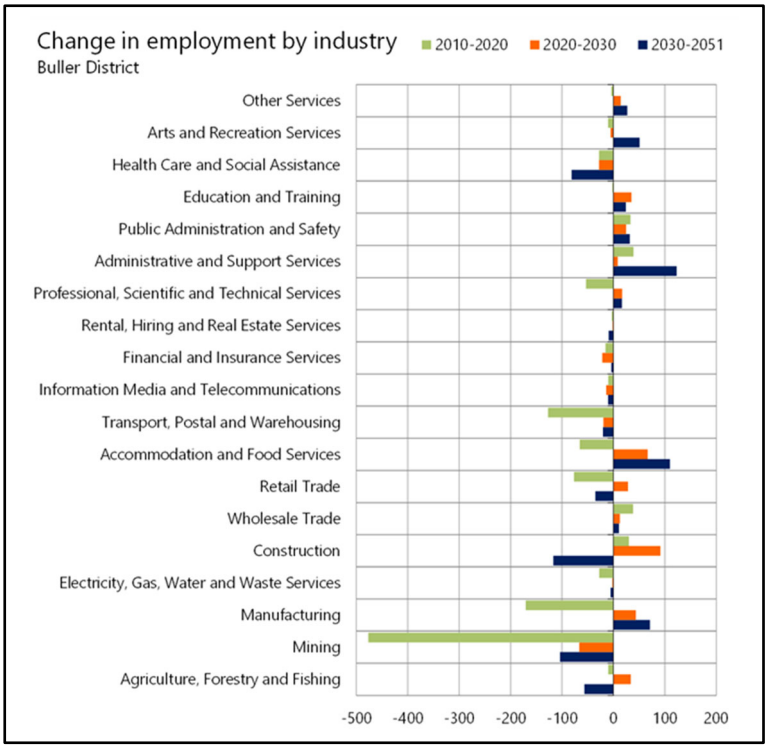


Figure 3-3: Actual and Projected Changes in Employment Industry in Buller (2010 – 2051) (Source: Infometrics, January 2021)

3.4.2 Population and Growth Projections

Buller's population growth has been relatively volatile over the past 25 years. The population was in steady decline up to 2002 but began to grow over the period 2006 to 2012 on the back of a boom in coal mining. As jobs were shed in coal mining and other industries, the population went into decline again, reaching a population of 9,610 in 2020. This represents the District's lowest population in over 25 years, and approximately 1,000 fewer residents than at the previous peak in 2012 **Figure 3-4**.

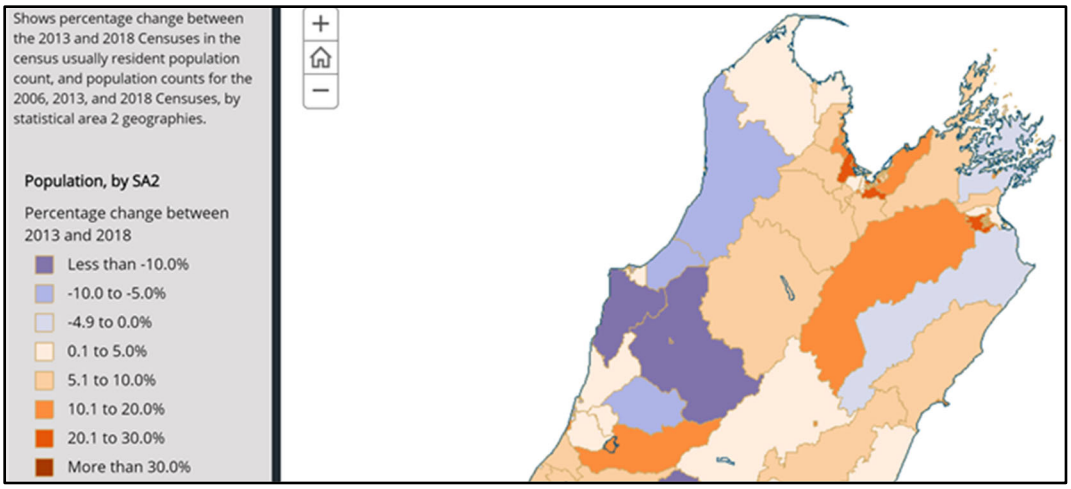


Figure 3-4: Population Change Between the 2013 and 2018 Census for Buller Geographies (source statistics.govt.nz)

Over much of the past 25 years in Buller, births have exceeded deaths, meaning that positive natural increase has contributed towards population growth. However, reduction in the population of childbearing age has led to a strong decline in the number of births since 2012. At the same time, deaths have been gradually increasing as the older-age population increases. Like most areas in provincial New Zealand the Buller District population is showing the effects of the post-World War 2 baby boom with an increasing 65 plus population becoming noticeable and projected to increase.

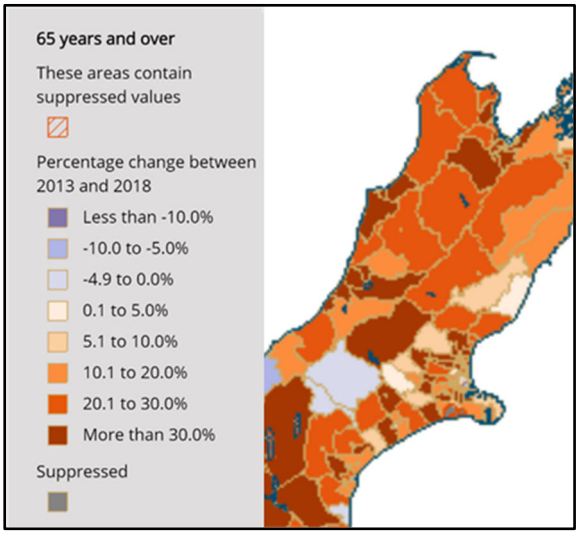


Figure 3-5: Population Change in 65+ Age Group Between the 2013 and 2018 Census for Buller Geographies (source statistics.govt.nz)

The combined effect has been that deaths began to exceed births in 2017 and this deficit is projected to further increase over time. Net migration into the District has been highly volatile in the past, associated with changes in employment.

As the population ages and eventually retires from the workforce, a modest wave of positive net migration in the 2030s is expected, bringing in people to take the place of those retiring from the workforce **Figure 3-6**. This wave is assumed to take place on the back of demand for workers, but this does rely on efforts to raise and maintain the profile of the District to international and domestic migrants.

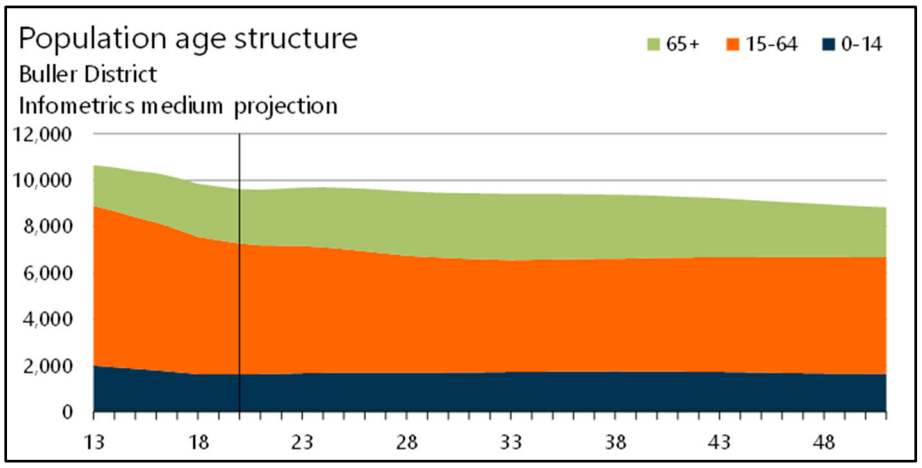


Figure 3-6: Actual and Forecast Population Age Structure in Buller (2013 – 2051) (Source: Infometrics, January 2021)

Buller's population is forecast to be relatively stable over the coming decade, holding at around the 2020 level of 9,600. However, due to a weak outlook for employment growth, we expect the District's population to ease for the remainder of the projection period. The rate of decline is projected to be very weak initially, averaging 0.1% per annum for the 2030s and building up to 0.5% decline per annum in the 2040s. This ultimately leads to a smaller population of 8,800 in 2051 **Figure 3-7**.

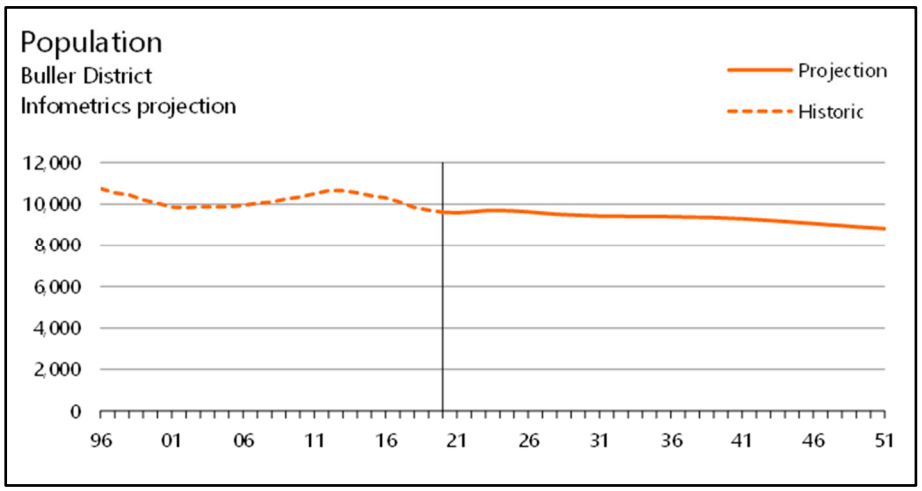


Figure 3-7: Actual and Forecast Population in Buller (1996 – 2051) (Source: Infometrics, January 2021)

3.5 Council 's 10 Year LTP Significant Strategic issues

Four Council Significant Strategic Issues for inclusion in the Long-Term Plan (LTP) 2021 – 2031 were identified via a process that involved community engagement and a series of facilitated workshops with Council governance and management. These are as listed below:

- Socioeconomic Prosperity
- Infrastructure, Affordability & Reform
- Climate Change Resilience & Environmental Sustainability
- District Revitalisation

3.5.1 Socio-economic Prosperity

The district's socioeconomic prosperity will be supported and improved with two broad strategies: increasing prosperity by diversifying the district's economy and increasing affordability by diversifying the Council's income base. Each of these two strategies are described separately below.

Council recognises the need to continue its path of transition to new ventures with ways to grow the district, create employment opportunities and make our towns more liveable and attractive to investors and newcomers.

A vibrant, diverse, and flexible local economy that provides sustainable jobs will enable the population to stabilise, and the prosperity of the district to improve.

Currently, around 60% of the Council's funding comes from rates, impacting affordability and reducing rate-payer satisfaction.

Rates affordability is important for all ratepayers, but this is particularly the case for the high proportion of our district in older age groups and on fixed incomes.

3.5.1.1 Increasing Prosperity by Diversifying the District's Economy

The current economic situation in the district has improved since the last Long-Term Plan was compiled, yet coal mining, still the district's largest employer in the district, has a shelf-life. As such, coal mining is expected to continue to decline over time and result in eventual obsolescence.

Not-with-standing the extraordinary times resulting from the Covid pandemic, tourism (both domestic and international) is recognised as a critical industry for the district's prosperity and is expected to grow. Agriculture has also been important in the development of the region, with the district being particularly suited to dairy farming.

The Council, however, recognises the need to continue its path of transition to new ventures with ways to grow the district, create employment opportunities and make our towns more liveable and attractive to investors and newcomers.

3.5.1.2 Increasing Affordability by Diversifying the Council's Income Base

Unlike local governments in many other countries, New Zealand councils rely on a single form of tax, property tax or rates. Currently, around 60% of the Council's funding comes from rates, impacting affordability and reducing rate-payer satisfaction.

A small population that is remaining stable or even declining slightly means that there is a smaller base to pay for fixed or semi-fixed costs, which is especially difficult when infrastructure needs to be renewed.

Basing rates on the value of property means that, for some individuals with reasonably valuable property but limited income, paying rates can cause financial strain.

3.5.2 Infrastructure, Affordability & Reform

Infrastructure encompasses the district's potable water supply, wastewater and stormwater disposal services, land transport, and solid waste management. Right sizing the district's infrastructure to service the district's future population is a key focus of prudent infrastructure management.

The Buller district's population is reasonably stable and is predicted to remain so over the coming decade. There are also areas where the quality or quantity of service delivered to the community needs to improve and areas where Council needs to improve the environmental performance of its services.

In many cases, areas with declining or stable populations also have a higher than average proportion of elderly people. Older people tend to be on more limited and fixed incomes and are not as likely to be part of activities that create economic growth in the region.

The Council will need to consider the effects of climate change on infrastructure sizing, particularly new stormwater pipes to take account of the predicted increase in intense rainfall events. The Council will also need to undertake flood and ground water modelling incorporating potential sea-level and groundwater level rises of about 1 metre.

3.5.3 Climate Change Resilience & Environmental Sustainability

Climate change is a key issue for all low-lying coastal districts across New Zealand. Preparing for climate change and developing resiliency to its effects is one of two environmental strategies identified within this LTP. The other strategy, which supports the achievement of the first and is also important in its own right, is that of environmental sustainability. Each of these two strategies are described separately below.

3.5.3.1 District-wide Preparedness to Climate Change

On average the world is about one degree warmer than the pre-industrial era, and, as a result, New Zealand is experiencing more frequent, and more intense weather events. In 2018 NIWA reported that climate change had increased flood risk by up to 40 percent and drought risk by up to 20 percent. In short, the effects from climate change are already with us and will become increasingly pronounced.

For the Buller district, this means we are going to get warmer, wetter, and windier. Over the coming decades, NIWA's likely scenario includes greater frequency and intensity storm events, including higher intensity rainfall, leading to changes in storm surge and wave height and thus more frequent or higher magnitude coastal flooding outcomes, as well as changes in fluvial flooding. Additionally, sea level is expected to keep rising for at least several centuries posing an ongoing challenge for us and future generations to create more sustainable coastal communities.

3.5.3.2 Sustainability Leadership

The concepts of sustainable development under the Local Government Act 2002, and sustainable management of an area's natural and physical resources under the Resource Management Act 1991, imply the ongoing ability of communities and people to respond and adapt to change in a way that avoids or limits adverse consequences. Living sustainably touches on many environmental aspects; foci for our district include reducing greenhouse gas emissions, improving the quality of our freshwater resources, protecting our biodiversity, and better managing and minimising our waste.

- Improving Our Freshwater
- Biodiversity Protection and Enhancement
- Waste Management and Minimisation

3.5.4 District Revitalisation

How do we make our district a more appealing place to live, explore, and invest in?

At the beginning of 2020, Council facilitated a series of community engagement workshops with people from a diverse range of groups across the district. The aim of these workshops was to establish our district's shared visions for our future. As we set about building this shared vision, you told us you want to live in integrated and connected communities where we celebrate our culture and diverse histories; you said you want to see our local economy diversified and thriving; you want our towns and places to be supported by strong infrastructure; and you wish for clean water and for our natural environment to be valued and protected.

Throughout community engagement process, you helped us build our overall long-term Vision and refine our Community Outcomes, and you identified our district's key opportunities for special focus in our Long-Term Plan.

One message that was consistent across all community engagement groups was the desire to see our communities revitalised, renewed, and invigorated.

You told us that you want Council to continue to invest in, and lead our district through, revitalisation projects that will create attractive, liveable towns and places, and a district in which people want to live, explore, and invest.

What has been happening across the district…

The district has several initiatives and projects which have been in progress for many years. Some are responses to opportunities, others to challenges. Together these are best viewed at the scale of the whole district and include the Kawatiri Coastal Trail and associated river and beach trails, the wider network of district-wide biking and hiking trails, the Waimangaroa Town Heart project, the Reefton Strand Project, the NBS outdoor area, the Pounamu Pathway, the Punakaiki Masterplan and Dolomite Point Redevelopment Project, the Westport Riverbank, and the community hall and war memorial upgrades.

Some of these projects have been led by volunteers and community groups. Others have been led by iwi or the Department of Conservation. At times, Council has taken a lead role in ensuring the delivery of these initiatives, and at other times, Council's role has been as a facilitator and a supporter, through the provision of grants or by ensuring that the people doing the work have everything they need to succeed.

Some of these projects have now been completed. On others, work is still underway.

The Toki Bridge and Riverbank Project – Council-led revitalisation in action…

The development of Westport's waterfront industrial area into a useable public space is an idea that has been around for many years. The recent departure of Holcim and the demolition of their assets on the waterfront has, for the first time ever, meant that Council can meaningfully consider options to turn our waterfront areas into public spaces that can be enjoyed by all those who reside and visit here.

Riverside developments elsewhere in New Zealand have proven themselves to be fantastic areas for commercial development, and it is anticipated that this one would be no different. The ability for people to provide commercial services, such as bike hire, food and beverages, and tourist operations, will increase the economic output of our town, and draw more people to stay longer in the region.

The Riverbank Project is the first stage in Westport turning to face the river by connecting the town centre with the Buller River. The vision is the creation of a place where people meet, recreate, and connect with each other while enjoying our natural environment.

A footbridge, referred to as the Toki Poutangata Bridge or 'Toki' for short, will provide safe access from Westport's town centre to the Buller River, and will also integrate a look-out platform so that people can stop to take a breath and enjoy the views of the river, Martin's Creek estuary and wider surrounding landscape from a vantage point that is not currently available. The Toki footbridge has been designed in collaboration with Ngāti Waewae and has been named to honour their own taonga 'Toki Poutangata' – a treasured ceremonial weapon which represents strength, mana, bravery, and triumph. Construction will begin on the project within the coming months.

Council's initial investment of $260,000 towards this revitalisation project has realised far wider benefits than its dollar value alone. Through our district's willingness to commit a small portion of the project's total costs, the Central Government, through the Provincial Growth Fund, has contributed an additional $1.8M to the project. This additional investment will mean we can realise a far better outcome for our Riverbank as well as more work and greater job security for our local contracting companies. It has also enabled the vital linkage between Westport's town centre with the hugely popular Kawatiri Coastal Trail, and future connections with developments linked with the Pounamu Pathway.

The Riverbank Project supports the visions we all have for our district. It will connect us to our environment and to our history. It will provide us with an accessible, shared space that will bring us together. It will offer new business opportunities and, with these, a diversification of the local economy. It will help build pride in our places, and a better life.

Where we are going…

Council has listened to, and shares, your vision for the future. This means that you will see more revitalisation work across the district over the coming decade.

Council will continue to provide grants to fund community-led revitalisation projects. These projects will support our community groups, facilitate community connectedness, and contribute to building places that have energy and are attractive and liveable.

We will identify and pursue Central Government funding opportunities that will bring investment into our district, develop jobs and training opportunities (especially for our youth), support social equity, inclusion, and connectedness, and make our places more liveable.

Finally, through focusing effort on working collaboratively and in partnership with iwi, and through building local and regional capabilities and alliances, we will deliver environmental, recreational, and socioeconomic benefit across all our communities.

3.5.5 Additional Considerations: Iwi and Youth

Although not a Significant Strategic Issue for the Long-Term Plan 2021-2031(as there are limited cost implications associated with this consideration), ensuring that Council effectively partners with iwi and supports iwi aspirations remains a focus for the Council in all that is undertaken on behalf of the district. Additionally, recognising the voice of our youth has been recognised as a key priority for the district.

3.6 Strategic Context

3.6.1 Council's Vision, Values and Community Outcomes

Council's Vision

The Long-term Vision describes the future of our district, and the Community Outcomes describe the overall objectives that Council is trying to meet with its policy and service delivery decisions to achieve community wellbeing. Without a Long-Term Vision and the supporting Community Objectives to frame Council's strategy, decision-making could become directionless and difficult to justify.

Effective strategic planning brings clarity to the process of identifying Council's key long-term priorities and projects, as well as enabling the unification between governance and management.

"Buller is 'Fit for Future' by being agile and positive for our communities"

Key Strategies

We will achieve our vision by focussing on the following strategies:

- Facilitating growth and a transition to a diversified, resilient and sustainable economy
- Providing reliable and sustainable infrastructure that meets the needs of current and future generations
- Investing in our towns to ensure we are an attractive district to live, work, invest and play
- Growing our non-rates income and becoming a district where rates are affordable to all residents

Council's Values

The following values guide us in decision and action:

- Community Driven – We are committed to making a difference in the community we call home
- One team – Shared direction, shared effort

- Future Focussed – We seek solutions that are fit for the future
- Integrity – Open and honest in decisions and action
- We Care – About people and place

Community Outcomes

Community Outcomes are the goals that Council wants to achieve for the Community. They reflect what the Community sees as important for its well-being and they help to build up a picture of the collective vision for the District's future. The outcomes guide decision-making by Council. The Council links its activities and services back to the outcomes. In link between the Community outcomes and Council's Strategic Issues are shown in **Table 3-1**.

The Community Outcomes are summarised below:

1. **Social** - *Our communities are vibrant, healthy, safe, and inclusive.*
   - ❖ Priorities and Projects to Support the Social Community Outcome:
     - Support the implementation of the West Coast Disability Strategy
     - Maintain a strategic overview of community wellbeing through community monitoring, and partnering with and advocating for Non-Government Organisations
     - Support connectedness and revitalisation through the provision of grants
     - Provide quality community facilities that meet current and future needs such as theatres, libraries, and recreation and health facilities
     - Improve the district's liveability by supporting safety and access improvements

2. **Affordability** - *Our communities are supported by quality infrastructure, facilities, and services that are efficient, fit-for-purpose, affordable, and meet our current and future needs.*
   - ❖ Priorities and Projects to Support the Affordability Community Outcome
     - Grow Council's revenue streams to reduce rates dependence
     - Achieve rates equity through targeted rates
     - Develop partnerships or enable solutions that increase affordability

3. **Prosperity** - *Our district is supported by quality technology and an innovative and diverse economy that creates opportunities for self-sufficiency, sustainable growth and employment.*
   - ❖ Priorities and Projects to Support the Prosperity Community Outcome
     - Improve connectedness in infrastructure and partnerships
     - Support district revitalisation to engender pride and a better future
     - Provide support and advocate for key existing industries as well as new industries and innovations

4. **Culture** - *Our lifestyle is treasured, our strong community spirit is nurtured, and our inclusive and caring communities understand our whakapapa and heritage and support lifelong learning.*
   - ❖ Priorities and Projects to Support the Culture Community Outcome
     - Partnerships and support iwi aspirations
     - Youth
     - Support for, and partnerships with, all community groups

5. **Environment** - *Our distinctive environment and natural resources are healthy and valued.*

- ❖ Priorities and Projects to Support the Environment Community Outcome
  - Drive for a balance between development, biodiversity, and sustainability
  - Develop strategies for climate change and natural hazard preparedness
  - Improve waste management approaches
  - Promote and advocate for the mana o te wai

Table 3-1: Community Outcomes addressed by Council's Strategic Issues

Community Wellbeing(s)	Community Outcome	Relevant Significant Strategic Issue	Community's Visions (community engagement)
Social	Our communities are vibrant, healthy, safe, and inclusive	Socioeconomic Prosperity	Integrated and connected communities
Cultural	Our lifestyle is treasured, our strong community spirit is nurtured, and our inclusive and caring communities understand our whakapapa and heritage and support lifelong learning	District Revitalisation *(Iwi and youth special focus)*	We celebrate the culture and the history
Environmental	Our distinctive environment and natural resources are healthy and valued	Climate Change Resilience & Environmental Sustainability	We have clean water, and we protect our natural environment
Economic	*Affordability:* Our communities are supported by quality infrastructure, facilities, and services that are efficient, fit-for-purpose, affordable, and meet our current and future needs *Prosperity:* Our district is supported by quality technology and an innovative and diverse economy that creates opportunities for self-sufficiency, sustainable growth, and employment	Infrastructure, Affordability & Reform Socioeconomic Prosperity	Diverse economy supported by strong infrastructure

3.7 Linkage with Other Documents

Council's Significance and Engagement Policy, for the purpose of Section 76AA of the Local Government Act 2002, considers the following infrastructure related assets to be strategic assets and they have been included in this report:

- Landfill sites, recycling and transfer stations
- Wastewater reticulation and treatment systems – includes land, pipes, pump stations and sewage ponds and plants.
- Stormwater reticulation systems and open drains.
- Roading system – includes carriageway, footpaths, bridges, street lighting and off-street parking.

- Water reticulation, storage and treatment options – includes pipes, pump stations, reservoirs and treatment plants.

The Infrastructure Strategy and Financial Strategy underpin the Long Term Plan and form the pillars that support the Consultation document.

Figure 3-8 illustrates the Infrastructure Strategy Linkages with other documents in the Asset Management and Strategic Planning Context.

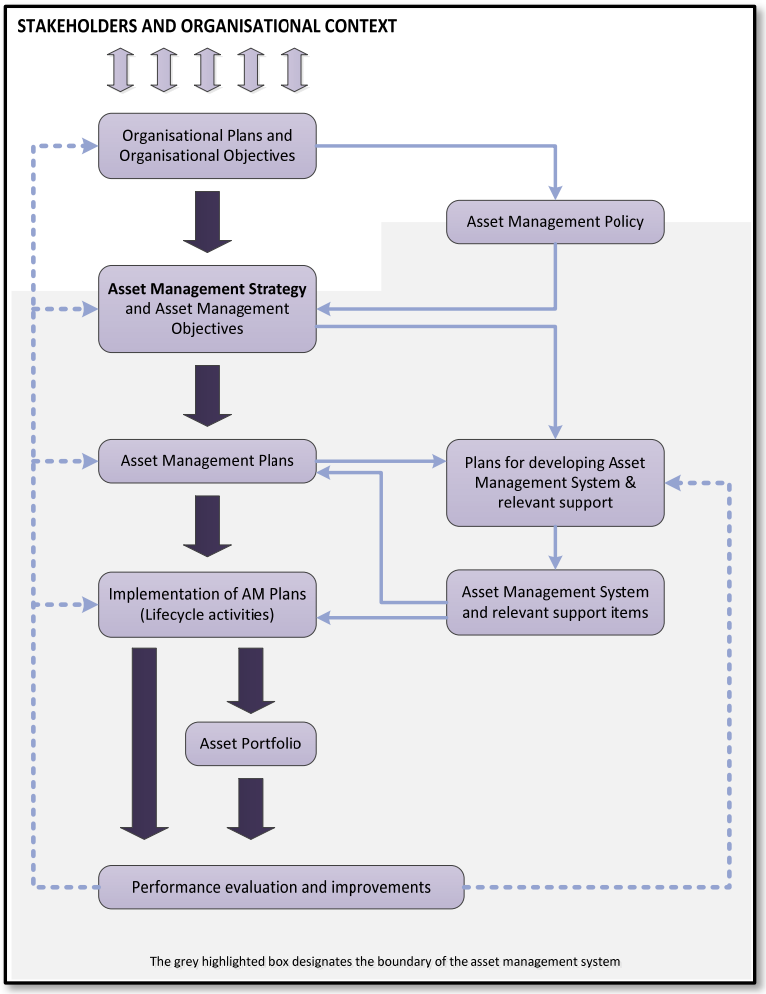


Figure 3-8: Infrastructure Strategy- Linkages with other Documents

3.7.1 Infrastructure Strategy and Financial Strategy

The Infrastructure Strategy works within the requirements of the Financial Strategy.

The Financial Strategy provides a financial framework for making decisions and outlines how Council intends to manage it finances prudently. Council decided it was prudent to give priority to critical projects affecting drinking water in the last LTP. This philosophy has continued into the current LTP.

The Financial Strategy can be summarised as follows:

1. Expenditure to be adequate to maintain existing services and to maintain the quality and avoid deterioration of assets and capacity. Additional expenditure will be considered if it improves

resilience and reliability of Councils services delivery and meets the current and future needs of the community. This includes providing financial support to community led development opportunities and resources to address climate change that meet Councils overall strategy.

2. Allowing for Rates increases for improvements in service delivery, core infrastructure and initiatives that may attract new economic activity in the district and support the four Local Government well beings. Rates affordability is a strong consideration for the communities. Council has set a benchmark to keep rates increases within the long-range Local Government Cost index which is 2.2% per annum.
3. Minimise Council reliance on rates income by considering external investment opportunities and external funding options.
4. Council is focused on tight cost control and will work with other West Coast Councils wherever it can to bring about service enhancement or savings through shared services.
5. Council will continue to invest in core infrastructure for our communities. Infrastructure capital projects and upgrades provide the major proportion of capital expenditure proposed over this plan. This includes completing infrastructure projects to provide a satisfactory service level.

While the Infrastructure Strategy provides details of the level and timing of investment needed to operate, replace, renew and upgrade existing facilities, the Financial Strategy outlines the required rating and debt levels to fund these investments. Maintaining service levels and preserving assets is important because our communities expect a certain level of service and there is a cost in the long run of deferring maintenance and replacement of assets.

Together the two strategies outline how Council intends to balance investment in assets and services with affordability. There may be an impact of government legislation changes particularly around national water reforms for water supplies. Throughout this plan it assumed that Council would retain the water supplies and that no transfer of these will occur. Councils infrastructure strategy has been developed in conjunction with the key aspects of this financial strategy.

Any major changes to the direction of the Financial Strategy of Council would require a review of this Infrastructure Strategy and vice versa.

3.7.2 Infrastructure Strategy and Asset Management Plans

The key documents underpinning the Infrastructure Strategy are the asset management plans. The delivery of many of the public services essential to our community relies upon asset management. The assets of council represent a significant investment by the community, built up over the last 100 years and more. Asset management plans are developed for the management of one or more infrastructure assets that combined technical, financial, engineering and other techniques over the life of the asset to provide an agreed level of service to the community at the lowest long-term cost to the community. This requires taking a life cycle approach to asset planning.

Asset data drives the requirement for depreciation funding and has a major impact on rating levels. Poor data can lead to:

- Insufficient depreciation reserves and possible rating shocks from unplanned renewals of networks.
- Rates funding being too high if assets on average are in better condition than thought and renewal cycles are longer than planned.

The objectives of the Council's asset management plans are:

- To provide for a consistent approach to asset management planning within the council to ensure the plans reflect the strategic direction of the Council.
- To demonstrate to the community that the Council recognises the critical importance of managing the district's assets in an effective and sustainable manner in order to deliver appropriate levels of service to current and future generations.
- To confirm a coordinated process for each significant asset area that reflects Council's strategic direction and links their contribution to the Council Outcomes with specific levels of service, performance levels and desired improvement priorities and strategies.

Principles of Council asset management planning:

- The Council will develop affordable and financially sustainable asset management plans that are to industry standard appropriate for the scale of assets and associated risks being managed.
- Asset management plans will reflect the strategy and priorities of the Council and will be used to drive the day to day management of assets and the associated services.
- The Council will manage the infrastructure assets in a planned, systematic and sustainable manner.

Many of the asset planning activities undertaken by Council are applied to all infrastructure assets. For this reason Council will review the 2018 asset management plans as the Vision for the 2021-2031 Long Term Plan is no different to the 2018 Vision, the asset management focussed on renewals and asset conditions identifying any known significant issues for the delivery of the activity/assets now and in the future. This work has led to the identification of the current and future asset requirements and the financial forecasts for capital (renewals and new capital projects) and operational expenditure for each asset group.

4. ASSUMPTIONS AND UNCERTAINTIES

4.1 Significant Assumptions

The following assumptions as detailed in **Table 4-1** are a subset of those developed for the 2021-2031 Long Term Plan. Those that relate to the long term provision of infrastructure are discussed below. Also included in the list are the assumptions developed for all activities.

Table 4-1: Significant Assumptions and Uncertainties

LAND TRANSPORT			
Description	**Significant Assumptions**	**Uncertainty**	**Impact**
Waka Kotahi (New Zealand Transport Agency - NZTA) - Financial Assistance Rate (FAR) Waka Kotahi advised Council that the FAR rate for local roads will be increased to 72% in the first year of the LTP (2021/2022). This rate will continue for three years until 2023/2024. After 2024 there is no assurances provided by Waka Kotahi around the FAR rate for local roads. Council has assumed that this rate will continue at 72% over the rest of the plan. A similar assumption is made regarding the Special Purpose Road. The 100% financial assistance rate will continue until the end of the 2023/2024 year. Thereafter the road will revert back to local road status (72% subsidy) for the rest of the Long Term Plan from 2024/2025 onwards.	In this Infrastructure Strategy, Council has assumed that the FAR for local roads will remain at 72% for the period 2024/2025 to 3030/3031, the 10-year LTP period. A similar assumption is made regarding the Special Purpose Road. The Waka Kotahi FAR rate of 100% will continue until the 2030/2031 year, the full 10-year LTP period. The Long Term Plan also assumes that the present levels of service applied to the District's roads will not be materially different. The consequence of these assumptions is that (before inflation) the cost of roading to the ratepayer will be fairly stable.	Medium	Any decrease in Waka Kotahi funding will require Council to make a decision of whether to increase funding from rates, reduce service levels, remove projects from the Long Term Plan or apply a mix of these options. This would require service levels in roading to reduce, which may be evident in higher road roughness levels, maintenance levels of low volume rural roads and a reduction in vegetation control including mowing.
Mitigation measures – monitoring trends, frequent review and adjustment where necessary			

LAND TRANSPORT			
Description	**Significant Assumptions**	**Uncertainty**	**Impact**
Waka Kotahi (NZTA) – Karamea Special Purpose Road Waka Kotahi have indicated to the Buller District Council that it is proposed that the Karamea Special Purpose Road will lose this designation and revert to a Local Road from 2024/2025 onwards. Council has taken the position that it will not accept ownership of the Karamea road as a Local Road in 2023/24.	Financial assistance rate may reduce. Additional costs associated with this road may not be funded by subsidy. Whilst a draft Special Purpose Road (SPR) Transition Plan has been considered for the Karamea Highway, no agreement has been reached between NZTA Waka Kotahi and Council for a change to Local Road status, nor has there been Council acceptance of responsibility for funding specific activities following any transition. This plan proposes major improvement works, and emergency/ resilience works continue to be funded by Waka Kotahi for the next 10-years as the financial risks of these are considered to be beyond the financial resources of Buller District Council's ratepayers to fund. As such, while the forward programme and financial assessment have been developed on the assumption of a 1st July 2024 transition, this is not an endorsement from Council of NZTA Waka Kotahi's preferred approach. The plan assumes that the 100% subsidy will continue for the 10 years of the plan as either the 100% subsidy rate or for the responsibility for the maintenance returning to NZTA. Under both scenarios the maintenance for the road is cost neutral to the ratepayer.	High	The completion of major improvements before transition, or an agreed approach to completing this with 100% Waka Kotahi funding post 1 July 2024, is not agreed. Should the SPR FAR reduce from 100%, this will increase the total roading budget for Buller District Council, and/or reduce the level of service that can be provided across the entire network. Because the road traverses unstable terrain the ratepayer may be required to fund higher maintenance and capital costs. This could increase rates particularly if these cost result from weather events that do not meet the NZTA definition of emergency works which attract a higher subsidy rate.
Mitigation measures – Reach an agreement with Waka Kotahi, monitor, frequent review and adjustment where necessary			

LAND TRANSPORT			
Description	**Significant Assumptions**	**Uncertainty**	**Impact**
Waka Kotahi (NZTA) – One Network Framework (ONF) The One Network Framework (ONF) is a national road classification system for all roads in New Zealand. This Framework classifies roads based on movement (walking, cycling, public transport, traffic, freight) and the type of place (urban/rural and surrounding land use). The ONF replaces the One Network Road Classification (ONRC) to better align with GPS priorities. The ONF gives a more granular classification of streets and develops an integrated approach between transport and land use planning.	The Financial Assistance Rate may reduce depending on the levels of funding agreed to be provided by NZTA. Council has assumed that there will be no change in the levels of service currently provided.	Medium	Financial assistance provision may reduce depending on the levels of funding agreed to be provided by NZTA Council will be faced with two choices: 1. Change the current level of service provided to that set by NZTA 2. Fund the difference between the current service level and that proposed by NZTA from ratepayer contributions
Mitigation measures – monitor, frequent review and adjustment where necessary			
Footpaths	Subsidisation of footpath facilities by Waka Kotahi will continue.	Medium	Footpath maintenance and renewals are currently subsidised and Buller District Council has increased investment in footpath maintenance to improve levels of service. Any policy change will limit the level of expenditure available.
Mitigation measures – monitor, frequent review and adjustment where necessary			

LAND TRANSPORT			
Description	**Significant Assumptions**	**Uncertainty**	**Impact**
Network capacity for future growth	No significant upgrades are required as no significant increase in population is estimated.	Low	Following a review of likely population and demographic changes throughout the district, it is not expected that the increased usage due to population growth will be significant requiring roading network upgrades. It is believed that there is adequate capacity in the current network for any future growth. It is expected that new roads will be built by developers during the subdivision process
Mitigation measures – monitor, frequent review and adjustment where necessary			
Stormwater in road reserve	There are currently no resource consents required for stormwater discharges from roading and there is no specific treatment of the stormwater currently required	Low	The low volumes of traffic on Council roads and the passage of road run off through grass berms or grass swales minimises any environmental impact
Mitigation measures – monitor, frequent review and adjustment where necessary			

WATER SUPPLY			
Description	**Significant Assumptions**	**Uncertainty**	**Impact**
Three Waters Central Government Reforms Decisions regarding all of Council's drinking water supplies should now be taken in context of proposed central government reforms – both the introduction and wide-ranging powers of the new national regulator Taumata Arowai (to eventually replace Ministry of Health), but also different service delivery models which would change the landscape of drinking water supplies. The Department of Internal Affairs (DIA) have shown two options for how drinking water could be aggregated and supplied by new publicly owned entities instead of Councils. Transferring responsibility may have advantages and opportunities for small district councils who have significant infrastructure backlog (deficit) and ongoing challenges with maintaining an affordable service delivery model. The Government is currently undertaking a three year program to reform local government three waters service delivery arrangements. The intention of the reforms is to have these services provided by a small number of multi-regional entities and for the option to move both the assets, associated debt and service delivery to be voluntary.	Council assumes that the outcome of proposed water reforms will not be known on commencement of this LTP. Therefore Council has assumed that the water assets will remain under its control in this plan. It is assumed that there will be no material changes to existing legislation or additional activity or compliance requirements imposed by Central Government, which has not already been allowed for in this document.	High	That Central Government requires Council to undertake further activities/removes activities, without corresponding funding adjustments or imposes additional compliance costs on Local Government. If changes in legislation require Council to provide further services, or significantly increases, levels of compliance or operating costs then this will need to be offset by increases in fees and charges, and/or in increases in rates. It is unlikely that Government will reduce compliance or legislative costs incurred by Council, but if there was a reduction this could enable Council to reduce rates or fees and charges.

WATER SUPPLY			
Description	**Significant Assumptions**	**Uncertainty**	**Impact**
This plan assumes no change to asset management, ownership and service delivery of the three waters for the ten years of the plan.			
The Government is currently undertaking a three year program to reform local government three waters service delivery arrangements. The intention of the reforms is to have these services provided by a small number of multi-regional entities and for the option to move both the assets, associated debt and service delivery to be voluntary. This plan assumes no change to asset management, ownership and service delivery of the three waters for the ten years of the plan.	The Three Waters Reform Programme requires compulsory transition of three waters service delivery to centralised providers	High	While voluntary transition of three water delivery is most likely, a transition would require all assets, associated debt and costs to be transferred to the new provider. There would be transitional costs however the main change would be charges for three waters services moving from council to the new provider
Mitigation measures – monitor, frequent review and adjustment where necessary			
Water Supply Upgrades The drinking water standard upgrades to rural drinking water supplies is based on an assumption that the Ministry of Health subsidy will be available to be claimed.	There is a risk that the project may not proceed if funding is not received	Low	Provision of safe, clean water may not eventuate if a subsidy is not received. Water schemes may be unaffordable for some communities.
Mitigation measures – monitor, frequent review and adjustment where necessary			

WASTEWATER			
Description	**Significant Assumptions**	**Uncertainty**	**Impact**
Wastewater	It has been assumed that there will be no significant capacity change required for infrastructure to meet to demands	Medium	Following a review of likely population and demographic growth throughout the district little change is expected so risk of under overcapacity is low.
	Resource Consents will be renewed for Westport sewerage for emergency discharge		There is a risk this consent will not be renewed in a timeframe or with conditions that will cause a response from council that is not budgeted for.
	Resource consent to discharge primary treated and untreated sewage effluent to Buller River during storm overflow events was for 20 years from date of issue July 2003		There is a risk from 2023 if this is not approved that further separation of sewer and stormwater in Westport will be required. However the flat grades on many of the sewers will require flushing devices if all stormwater is to be removed
Mitigation measures – monitor, frequent review and adjustment where necessary			

STORMWATER			
Description	**Significant Assumptions**	**Uncertainty**	**Impact**
Stormwater	It has been assumed that there will be no significant growth in urbanised area requiring stormwater reticulation. The only area identified for stormwater reticulation is the North Beach area of Westport	Medium	Following a review of likely population and demographic changes throughout the district little change is expected so risk of under overcapacity is low.
	Westport is a town only 2 metres above sea level which provides some issues for stormwater collection and discharge. One of the longer term requirements will be to install pumps on stormwater outlets to reduce areas of surface flooding		Council is currently investigating the possibility of installing additional stormwater systems, specifically a large pump station to pump stormwater over the river stop banks. Similar designs are currently deployed in Greymouth and Palmerston North. Further investigation, modelling, and design work will be required given the potential impacts of this possible system. These systems can have complex secondary effects on existing stormwater systems and stormwater flows. Preliminary estimates are in the range $0.5 million to $1 million. Council has chosen not to proceed with the system. Future versions of the Infrastructure Strategy will further consider options.
Freshwater Management and Discharge to water	Council assumes that changes to the Freshwater legislation will still enable to for stormwater to be discharged to streams and rivers. Council assumes that the separation of wastewater and stormwater will process in this LTP to enable reduced flows in the wastewater network	Medium	Should legislation prevent the discharge of untreated stormwater into natural sources, Council will need to provide for the treatment of stormwater which has not been included in this LTP. More education programmes is needed to educate the community on need for stormwater separation from wastewater and

STORMWATER			
Description	**Significant Assumptions**	**Uncertainty**	**Impact**
			for preventing contaminants being discharged into the stormwater networks.
Mitigation measures – monitor, frequent review and adjustment where necessary			

SOLID WASTE MANAGEMENT			
Description	**Significant Assumptions**	**Uncertainty**	**Impact**
Solid Waste Management	Investigate combining Grey and Northern Westland District refuse disposal in medium term Collaborate with Central Government, Local Government, NGO's and other key stakeholders to progress towards achieving National Zero Waste Policies on waste minimization and management policy. Reduce quantity of refuse being sent to Landfills by: • Reduce refuse • Reduce quantity of waste generated • Households to sort recycling to a better standard	Low	
Mitigation measures – monitor, frequent review and adjustment where necessary			

ALL ACTIVITIES			
Assumption	**Detail of Risk**	**Uncertainty**	**Impact**
Population Growth/Decline The Statistics NZ March 2018 census recorded a total of 9,591 persons as being normally resident in the district. For the purposes of this Long Term Plan we have assumed that the normally resident population as at 1 July 2021 is in the region of 9,600 persons. By the end of the 10 years covered by this plan Council expect population levels to be slightly under this level. This is based on Infometrics predictions of a small decline beyond 2030 in the Buller District.	Low population growth may impact on the affordability and scale of Council projects and operations.	Medium	The effect of minor changes on Reserve Development Contributions will not be material. Significant changes are unlikely.
Mitigation measures – monitor, frequent review and adjustment where necessary			
Potential Impact of Societal Changes Council assumes resident population will decline in line with Infometrics predictions. There will likely be an aging population. The proportion of the population over 65 years is forecast to increase by 22% between 2021 and 2033.	An increase in the age of the population may increase demand for some services and housing and place pressures on rates affordability.	Medium	The plan assumed that the demand for housing for the elderly is adequate and can be met through supply. Council may need to adjust its level of service in some areas to meet expectations. Rates affordability managed by keeping rates within financial prudence benchmarks, from the planned rates review and by carefully managing rates debt.
Pandemic Recovery (COVID-19) One of the consequences of the sudden cessation of economic activity has been that many councils will be increasing their level of debt. Stakeholders will look to councils' planning as evidence of the long-term	That there are no significant Covid 19 restrictions that prevent Council from carrying out its primary functions. Or that any effects from Covid 19 do not add any significant costs to Council operation.	Medium	Council is unable to carry out some of its planned activities or the cost of providing activities and services increases costs to the ratepayer.

ALL ACTIVITIES			
Assumption	**Detail of Risk**	**Uncertainty**	**Impact**
sustainability of council's funding – the financial sector not least. This need will be particularly acute where local authorities have taken decisions to manage the short-term consequences of the level four alert - for example, borrowing for operating needs or appealing to section 80 and making decisions that are inconsistent with existing plans or policies. The need to demonstrate a 'return to normal' will be all the more pressing. At the same time, issues such as housing supply, climate change, and water quality have not gone away, merely been temporarily pushed to the background. There will be trade-offs between competing priorities. The LTP and the processes that support the LTP provides a key mechanism for making these decisions accountably and transparently. The post-lockdown recovery is different from other recovery scenarios local authorities have faced in the 15 years since the first LTP. Unlike the Canterbury and Kaikoura earthquakes, Covid-19 has not damaged infrastructure networks and assets in any significant way. While local authorities will be restarting services (e.g. reopening community facilities, restoring non-urgent regulatory services) wholesale reconstruction of assets is not required. In a similar vein, significant elements of the information base used to prepare LTPs has not been compromised	That Covid 19 restrictions or effects impact on the ability of Council to carry out its operation or increases cost significantly		
Mitigation measures – monitor, frequent review and adjustment where necessary			

ALL ACTIVITIES			
Assumption	**Detail of Risk**	**Uncertainty**	**Impact**
Natural Disasters It is assumed that there will be limited events during the term of this Plan, but that these events will not be significant.	That there is a significant natural disaster in the District, such as flooding, earthquake or fire	low	Council has insurance in place to cover natural disasters. In the event of a significant event Council may need to re-evaluate its work programmes and implement disaster recovery plans.
Mitigation measures – monitor, frequent review and adjustment where necessary			
Climate Change Council uses the Ministry for the Environment (MfE) guidelines set out in "Coastal Hazards and Climate Change 2017" for estimating Sea Level Rise (SLR).	The potential impacts of climate change might lead to increased costs for Council in both responding to events and building greater resilience into infrastructure	Medium	Climate change is likely to increase the magnitude of some natural hazards in the medium to long term. Therefore it is important to incorporate risk management in the design of infrastructure supporting new developments to maintain the same level of service throughout the design lifetime. The design of infrastructure for land development and subdivision needs to provide for the potential impact of sea level rise and the increased frequency of extreme weather events. Council has budgeted for protection of infrastructure in this plan.
Mitigation measures – monitor, frequent review and adjustment where necessary			
Inflation/Price Changes: In preparing the Long Term Plan Council has utilised the inflation factors as provided by Business and Economic Research Limited (BERL) to be the inflation factors uses to escalate expenses. BERL has provided three	That inflation is higher or lower than predicted.	Low to Medium	There is likely to be some variation in the actual rates of inflation from those assumed particularly due to the uncertainty created by Covid 19 and this will impact on the financial results of Council.

ALL ACTIVITIES			
Assumption	**Detail of Risk**	**Uncertainty**	**Impact**
scenarios to take into account the uncertainty of Covid 19 moving forward. Council has used a mid Covid impact inflation factors from BERL, in this plan.			If the variances are significant, Council may need to consider either increasing or decreasing rates and charges or the levels of services for activities. This would be considered through the Annual Plan process. Council plans to spend $331 million in operating expenditure and $96 million in capital over the term of the plan. A 1% movement in inflation could increase or decrease costs by an average of approximately $427,000pa. There would also be an impact on debt levels. Escalation has been undertaken using the BERL indices.
Mitigation measures – monitor, frequent review and adjustment where necessary			
Useful lives of significant assets Council has made a number of assumptions about the useful life of its assets. These assumptions affect the depreciation charge. Council's assets depreciation rates are contained within of the Statement of Accounting Policies.	That the lives of assets are materially different from those contained within the Plan	Low	If the life of the assets are materially different from those contained within the Plan, the asset values stated in the prospective balance sheet and the profit contained in the prospective statement of financial performance would be affected. If the life was shorter than expected then Council might need to replace the asset sooner than planned and this would need to be funded. Council has a long history of managing assets and has asset management practices in place which reduce the likelihood of assets being very different to projections.

ALL ACTIVITIES			
Assumption	**Detail of Risk**	**Uncertainty**	**Impact**
Mitigation measures – monitor, frequent review and adjustment where necessary			
Significant Asset Condition Council understanding of condition of its assets underpins the renewal forecasts in the Long Term Plan (and also the significant lives of assets discussed above). Council has sufficient information about the condition of its assets to forecast their probable replacement periods. However, further detailed information is desirable to further reduce the risk that actual condition varies from the assumed condition.	That condition information is not a sufficiently accurate representation of the actual condition of assets.	Medium	If the asset condition is substantially worse than expected then there is an increased risk of unexpected asset failure and the increased costs of repairing assets would need to be funded. These costs are not in the Long Term Plan and Council would need to consider how they should be funded - higher rates, use of cash reserves or debt would be options.
Mitigation measures – monitor, frequent review and adjustment where necessary			
Vested Assets Council will receive vested assets as development occurs in the region. Vested assets are engineering assets such as roads, sewers and water mains paid for by developers and which vest to Council on completion of a subdivision.	That actual vested assets may vary from budget.	Medium	Vested assets must be maintained by Council, so if growth is higher than forecast Council will need to increase its budget to maintain those assets. The impact of higher or lower growth is not considered significant.
Mitigation measures – monitor, frequent review and adjustment where necessary			
Return on Investments It is assumed that the return on investments, including dividends from Council Controlled Organisations and retained earnings on subsidiaries will continue at higher than current	That return on investment decreases.	Low	Lower returns will impact on rates as the income will need to be raised from other sources.

ALL ACTIVITIES			
Assumption	**Detail of Risk**	**Uncertainty**	**Impact**
levels for Buller Recreation and WestReef Services Limited.			
Mitigation measures – monitor, frequent review and adjustment where necessary			
Interest Rates – External Borrowings Council has assumed an interest rate of 2.3-3.1% across the 10 years of the plan	Actual interest rates may differ significantly from those estimated.	Medium	Increases in interest rates flow through to higher debt servicing costs and higher rates funding requirements. Council has mitigated these risks with a prudent fixed interest swaps programme developed within the limits of Council's Treasury Policy.
Mitigation measures – monitor, frequent review and adjustment where necessary			
External Borrowings - Renewability It has been assumed that Council will be able to renew existing external loan facility.	Higher interest rates or delay of capital projects	Low	If a loan facility could not be renegotiated with a current debt provider a change in provider could increase finance costs
Mitigation measures – monitor, frequent review and adjustment where necessary			
Interest Rates – Term Deposits Council has assumed an interest rate range of 0.8 – 3.3% across the 10 years of the plan	Actual interest rates may differ significantly from those estimated.	Medium	Decreases in term deposit interest rates would lower investment income which could lead to increased rates.
Mitigation measures – monitor, frequent review and adjustment where necessary			
Rates and Rate Increases Limits on rates and rate increases, as required by the Local Government Act 2002, are set out	That rates increases are above the limits set by Council	Low	If planned rates increases are too high this may have a negative impact on rates affordability within communities.

ALL ACTIVITIES			
Assumption	**Detail of Risk**	**Uncertainty**	**Impact**
in the Financial Strategy on pages 27-40. This plan assumes that Council will remain within these limits.			
Mitigation measures – monitor, frequent review and adjustment where necessary			
Resource Consents It is assumed that resource consents held by Council will not be significantly altered and any due for renewal during the life of the Plan can be renewed accordingly.	That conditions of resource consents are significantly altered and there are accordingly significant new compliance costs or consents cannot be renewed.	Low	Budgets are in place for renewal of resource consents. Any increased compliance costs will be managed through the Annual Plan process. If resource consents are not renewed then Council will need to consider how it delivers these services. These costs could be significant, for example if water extraction rights are not approved.
Mitigation measures – monitor, frequent review and adjustment where necessary			
External Assumptions - Government Legislation (with a focus on proposed Water Reform Legislation) It is assumed that there will be no material changes to existing legislation or additional activity or compliance requirements imposed by Central Government, which has not already been allowed for in this document. Water Reform Legislation Council assumes that the outcome of proposed water reforms will not be known on commencement of this LTP. Therefore Council	That Central Government requires Council to undertake further activities/removes activities, without corresponding funding adjustments or imposes additional compliance costs on Local Government.	Medium	If changes in legislation require Council to provide further services, or significantly increases, levels of compliance or operating costs then this will need to be offset by increases in fees and charges, and/or in increases in rates. It is unlikely that Government will reduce compliance or legislative costs incurred by Council, but if there was a reduction this could enable Council to reduce rates or fees and charges.

ALL ACTIVITIES			
Assumption	**Detail of Risk**	**Uncertainty**	**Impact**
has assumed that the water assets will remain under its control in this plan.			
Mitigation measures – monitor, frequent review and adjustment where necessary			
Repayment of Loans It has been assumed that the loan from Council to Buller Holdings Limited will not be repaid over the term of the Plan.	Inability to service the loan	Low	Debt will be rolled over on an annual basis
Mitigation measures – monitor, frequent review and adjustment where necessary			
Capital Projects Capital projects are based on an assumption that they will occur when they have been identified in the Long Term Plan and for the costs have been identified. However, this assumption has a high level of uncertainty as projects may cost more or less due to more or less work needing to be done and/or a project may need to be delayed.	There is a risk of deferral of projects to later years of the Long Term Plan.	High	This will lower capital expenditure, loans and finance costs. Depreciation would be lower than rated for.
Mitigation measures – monitor, frequent review and adjustment where necessary			
One District Plan The One District Plan Process is well underway and during this time the statutory powers associated with district plan making have been temporarily transferred to the West Coast Regional Council. The proposal is that the plan will be governed by a joint committee of elected	• potential loss of local control over key decisions relating to district planning • potential legal challenge to plan	Medium	Buller not having a plan that aligns or reflects the direction the district wishes to head. Higher costs than Council currently expend on this activity.

ALL ACTIVITIES			
Assumption	**Detail of Risk**	**Uncertainty**	**Impact**
members from all the councils with support from staff across the region. This transfer is for plan making only and Buller would still require a planning team to process consents and administer the plan. Staff are involved in developing the plan therefore we have maintained status quo in terms of planning resourcing			
Mitigation measures – monitor, frequent review and adjustment where necessary			
Westport Harbour It has been assumed that all harbour activities including the port and dredging activities will be ringfenced as a separate activity over the term of the Plan. This means that this would separate all funding and expenditure and surpluses and deficits for the Westport Harbour activity accumulate to a separate reserve and are not ratepayer funded	Westport Harbour does not perform as expected, creating greater cash losses or surpluses than predicted.	Medium	There may be greater than predicted cash surpluses or losses, impacting the level of cash held by Council. If losses are greater than predicted Council may be required to consider loan funding or rate funding the activity in the future.
Mitigation measures – monitor, frequent review and adjustment where necessary			
Data and Information Infrastructure Planning is working to improve data and information quality. Council will actively conduct CCTV and condition assessment of pipes to have better understanding of underground assets.	Council will continue to improve processes to better capture asset data, including true operations and maintenance costs. Council will continue to update and refine the required renewal expenditure based on the improved data.	Medium	This is needed to establish a more reliable basis for decision-making and proposed actions outlined in this Strategy.

ALL ACTIVITIES			
Assumption	**Detail of Risk**	**Uncertainty**	**Impact**
	The renewals programmes will continue to be based on condition and performance monitoring. Asset renewal profiles and depreciation rates/calculations will be reviewed on a regular basis as improved information becomes available.		
Mitigation measures – improve processes, monitor, frequent review and adjustment where necessary			

4.2 Future Risks and Opportunities

Sustainable Growth

Council has actively been preparing and consulting on master plans and economic initiatives to support sustainable economic growth and tourism growth in the district. Further discussion on this topic can be found in Section 5.

Climate Change & Natural Hazards Impacts

Council is continuing to monitor the potential impacts of climate change on district assets and uses the Ministry for the Environment guidelines set out in "Coastal Hazards and Climate Change 2017" for estimating Sea Level Rise. Council consults and works closely with West Coast Regional Council in addressing climate change impacts.

Flexibility to adapt to change is a key design principle that is being incorporated into Council infrastructure management and design. More major climate change impacts are expected in the 50-100 year time period, and infrastructure work required to address this will be included in future revisions of this Infrastructure Strategy. More discussion on this topic is included under Section 5.

Waste Management and Minimisation

The Solid Waste Management Asset Management Plan will be updated as part of the 2021 LTP process. This document along with Councils Waste Minimisation Management Plan forms the planning framework and reference for the solid waste management activity. Waste minimisation and management strategy will be further discussed in Section 7 of this report.

Historic landfills within the district have the potential to impact surrounding receiving environments through the deposition of solid waste as well as interactions of leachates with groundwater and surface water flows. Remediation activities are required to minimise impacts at source before wider environmental dissemination.

Based on the above, Council will lead sustainability initiatives in the district by:

1. Developing a sustainability strategy and policy and establishing baseline information to assess performance across various environmental performance parameters including greenhouse gas emissions, freshwater quality, biodiversity protection, and waste minimisation.
2. Recognising Council's opportunity to lead the community in reducing New Zealand's greenhouse gas emissions through supporting and undertaking various mitigation initiatives.
3. Focusing efforts towards reducing emissions through energy reduction initiatives and alternative transportation options e.g., electric vehicles, as well as practicable off-setting opportunities.
4. Facilitating an alliance between central and regional government, industry, iwi, landowners, and the community through the development and delivery of the Environmental Improvement and Prosperity Strategy 2021/22 and into the future that will translate into tangible improvements to our physical and natural environments.
5. Maximising opportunities presented by the Te Tai o Poutini planning framework to achieve greater consistency, and therefore improved outcomes, in the way our district's biodiversity values are protected.

Future Service Levels & Technology Changes

Buller District Council is focussing forward to a positive and prosperous future for the district communities. This Infrastructure Strategy currently presents a mainly business as usual approach to service levels and infrastructure maintenance and renewals.

Council recognises the changing nature of community expectations and service levels over time and continues to monitor changes such as the adoption of electric vehicles and the development of autonomous vehicles. Council is working with private providers to facilitate the build out of charging facilities for electric vehicles.

Cycleway build out, enhanced pedestrian access and holistic mobility planning have been commenced and will add to the local community and tourist transport modes, opportunities and enhanced service levels over time. This topic is further discussed in Section 5.

Covid-19 Pandemic Recovery

The outlook for the West Coast economy through the COVID-19 pandemic and economic recovery rests on the Region's reliance on its key industries of agriculture, mining and tourism.

Agriculture and food processing have performed relatively well through the COVID-19 pandemic so far, with New Zealand continuing to receive steady returns for our food exports. This is underpinned by our important role providing sustenance and nutrition to the world. It is anticipated that there will be a degree of downside risk for food prices going forward, as a softer global economy affects how much people can afford to spend on our typically premium food exports. Furthermore, restaurant closures overseas adversely affect demand for our premium aquaculture and meat exports, with lower returns expected as these products are redirected to direct-to-consumer channels such as supermarkets. Overall, it is expected that the volume of production will remain steady, meaning that employment in agriculture and dairy processing on the West Coast is likely to hold steady, although returns to primary producers may be softer for a period.

The mining industry on the West Coast is a key employer both directly and indirectly through industries such as construction and professional services. Coal prices have performed well since COVID, with returns for New Zealand exporters no doubt helped by China's trade standoff with Australia, increasing their reliance on New Zealand's coal exports. China's manufacturing activity recovered strongly after their COVID-19 outbreak, leading to a quick recovery in their demand for raw inputs. This means that even if the China-Australia trade standoff is somehow resolved, demand and prices for New Zealand's coal exports should hold up relatively well.

However, the tourism industry paints a different picture.

The West Coast has been hit hard by the loss of international visitors since the onset of COVID-19. While tourism operators have tried to make the most of a surge in domestic tourism, many premium offerings for international visitors cannot easily pivot to lower-priced domestic offerings. The introduction of a trans-Tasman travel bubble (should this eventuate) would help by bringing in more visitors. However, Australia typically represents less than a fifth of international tourism spending in the region. Their return will not fundamentally change the challenging economics of internationally focused tourism operators. Even once our borders are fully open, a prolonged recovery is expected for visitor arrivals as global recession affects household incomes, limiting the number of people able to afford long haul travel to New Zealand. Furthermore, the aviation sector will take years to recover to pre-COVID airline capacity. For these reasons, a return to 80% of 2019 visitor arrivals by 2025 is

anticipated. This creates an immense challenge for tourism operators on the West Coast, with an internationally focused offering – pivoting to domestic visitors will be crucial to keep the lights on.

On the upside, a strong housing market spurred by low interest rates is pushing many out of the main centres, which may serve to raise the profile of the West Coast's affordable housing. This has received national attention through national electronic and print media. Relatively affordable housing may encourage movement of new residents into the region and boost demand for the construction industry.

Overall, while the outlook for the tourism sector is relatively bleak, it is expected that a 'steady as she goes' situation for the rest of the West Coast's key industries will preside.

Council's role through the pandemic recovery has been, and will continue to be, one of advocacy, facilitation and alliance building. Central government funding opportunities have been pursued to the benefit of the District with $20m secured for 'shovel-ready' projects intended to revive or perhaps even transform local economies.

Additional funding opportunities are currently being pursued by Council to create local jobs and upskill the district's workforce. These opportunities include the funds represented under the 'Jobs for Nature' package of funds.

Meanwhile, the existing issues such as essential infrastructure upgrades and climate change have not gone away, merely been temporarily pushed to the background. Due to limited financial resources, this will result in trade-offs between competing priorities. The LTP and the processes that support the LTP provide a key mechanism for making these decisions accountably and transparently.

Council will continue to consult and engage with the Buller communities to ensure that service levels meet community requirements and appropriate infrastructure is available to support the required service levels.

Regional opportunities

Council has worked with Grey District Council and Westland District Council, on regional issues and shared services and will continue to do this going forward. Collaboration between the three councils offers many benefits to the three districts and leads to better, more efficient and improved economical services outcomes.

Collaboration activities between the three councils currently include:

- Combined Land Transport Activity Plan for Waka Kotahi
- Planning for a combined solid waste disposal arrangement
- Connecting cycleways
- Combined Regional Land Transport Plan

Further collaboration efforts are anticipated in the future between the three West Coast district councils.

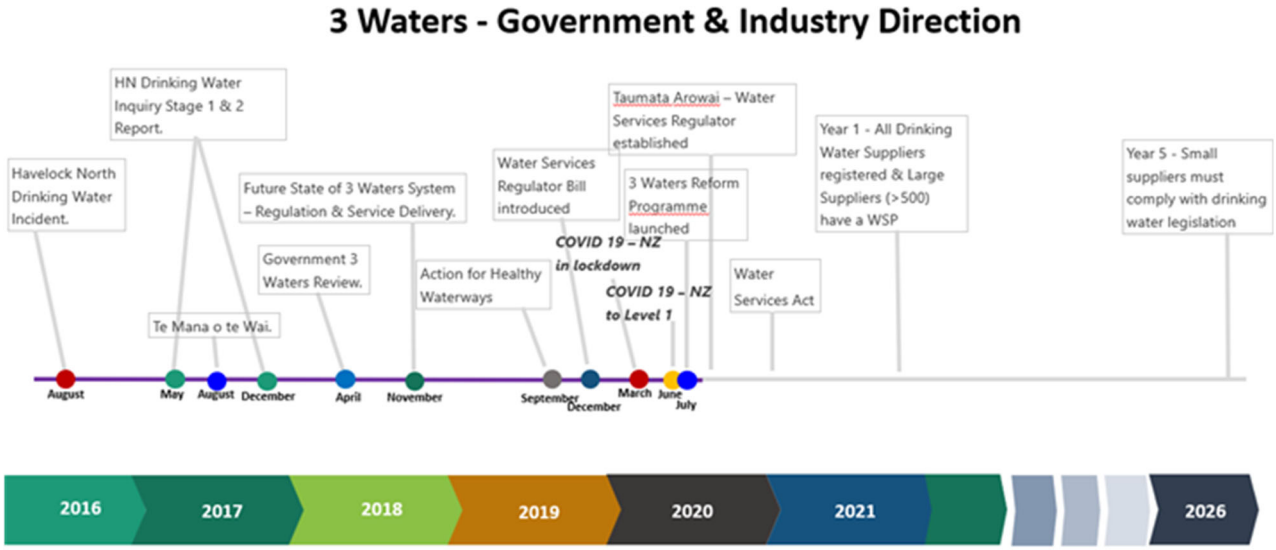
5. STRATEGIC CONSIDERATIONS

5.1 Managing Challenges and Emerging Trends

The task of planning, constructing, operating and maintaining Council's infrastructure assets in an affordable and sustainable manner is becoming increasingly difficult in view of a number of changes in government and external to council and the major ones of these changes will be discussed further in this section of the report as strategic considerations.

5.2 Government and Industry Direction

In providing water, wastewater and stormwater services, the Buller District Council keep a weather eye on the Central Government and Industry direction for the national infrastructure assets and public service provision. This is done through attending conferences and seminars, studying reports released by Central Government agencies and membership of industry organisations e.g. IPWEA, Water NZ, etc.



The August 2016 Havelock North Water incident and subsequent Inquiry has renewed the focus on the very high standard of care and diligence required to supply drinking water.

During 2017 the Minister for Local Government initiated the Government 3Waters Review to assess whether current local government practices and the system oversight are 'fit for purpose'. This review ran in parallel to the latter stages of the Havelock North Inquiry and raised a range of questions around the effectiveness, capability and sustainability of the current water service model.

During 2017 the Government announced changes to the National Policy Statement for Freshwater Management – Te Mana o te Wai. Te Mana o te Wai is a concept for fresh water, which when given effect, the water body will sustain the full range of environmental, social, cultural and economic values held by iwi and the community. This requires councils to involve iwi/hapū in the management of freshwater, work with them to identify their values and interests, and reflect those values and interests in decision-making.

The MfE discussion document 'Action for Healthy Waterways' released September 2019 signals the direction for urban development, rural land and water management including Risk Management Plans for wastewater systems and stormwater systems.

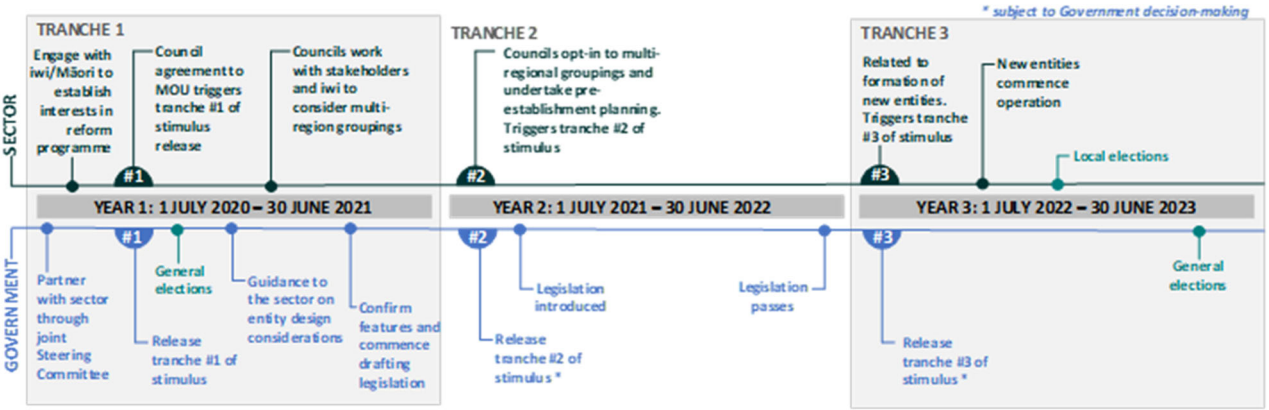
Towards the end of 2019, the Government agreed to establish a new drinking water regulator as an independent Crown entity. Associated legislation is expected to be passed in 2020/21 and the establishment and roll out of the new Regulator will follow and is expected to take a number of years.

Following the global outbreak of the Corona Virus the Government announced New Zealand's four-level COVID-19 Alert System specifying public health and social measures to be taken against COVID-19. New Zealand went into Level 4 on Thursday 26 March 2020. Level 4 requirements included the general public to stay at home, educational facilities closed, only essential services & lifeline utilities remain open & operational, severe travel limitations, major reprioritisation of healthcare services, etc. NZ progressively reduced the alert levels from 27 April and returned to Level 1 on 10 June 2020.

The response to COVID 19 will have a significant impact on the economy and the ability to implement and progress the abovementioned Government initiatives. Several Councils already signalled no rates rises for the 2020/21 year.

July 2020 saw the Government announce the 3 Waters Reform Programme consisting of a $761m funding package over the next three years to provide immediate post Covid 19 stimulus to local authorities to maintain and improve three waters infrastructure. Initial funding will only be made available to councils that sign up to the Memorandum of Understanding. Buller District Council signed up to the Memorandum of Understanding.

Below is an indicative timetable for the full reform programme. While this is subject to change as the reform progresses, this provides an overview of the longer-term reform pathway.



The following themes are also signalled:

Source	Direction
Insights into local government: 2019 OAG June 2020	Among a range of observations the OAG states "*I remain concerned that Council's might not be adequately reinvesting in their critical assets*". To do this well, councils need to improve their asset management information. In particular, they need:

Source	Direction
	• good data about their critical assets in order to value, depreciate, and plan renewals; • good processes and sufficient resources to maintain and update their critical asset data; • effective working relationships between asset management, finance, and strategic planning staff, all of whom have an important role to play in supporting a council's asset management function; and • timely engagement with, and involvement by, elected members.
Managing the supply of and demand for drinking water OAG Sept 2018	**Common challenges** • Working with iwi • Completeness and reliability of data • Staff capability and capacity • Under-delivery of planned capital spending
Reflecting on our work about water management OAG Feb 2020	**A more strategic and integrated approach to water management is needed** • The Government is responding to the need for a more strategic and integrated approach to water management • A strategic and integrated approach would support targeting of investment decisions • A stronger focus on implementation is needed when setting strategy • Long-term thinking is needed when setting a strategic and integrated approach **Understanding of water resources needs to improve** • A national picture of the state of freshwater quality would support a more strategic and integrated approach • Information gaps can limit the ability to make well-informed decisions • Information needs to be understandable both to decision-makers and to those holding them to account • Good information depends on collecting quality data • There will always be some uncertainty **Water management challenges require adaptive ways of working** • Balancing different views and values requires flexible frameworks • Collaboration needs to translate into action • More can be done to involve Māori in water management • Water management challenges require both central and local government response.
Matters arising from our audits of the 2018-28 long-term plans OAG Feb 2019	**Recommendations** • that councils prioritise collecting condition and performance information of critical assets and, in the meantime, take a precautionary approach for significant services where the condition information of critical assets is unknown;

Source	Direction
	• that the Department of Internal Affairs and the local government sector review the required content for long-term plans to ensure that they remain fit for purpose, particularly: – the current suite of mandatory performance measures; – the disclosure requirements for financial and infrastructure strategies; – disclosures required under the Local Government (Financial Reporting and Prudence) Regulations 2014; and – how assumptions are disclosed in long-term plans; • that the Productivity Commission, in its review into the adequacy and efficiency of the existing funding and financing options for councils, consider the trends arising in the 2018-28 long-term plans, particularly the trends and concerns we have raised about increasing debt; and • that central government and local government continue to consider how increased leadership can be provided for climate change matters, particularly: – what data is needed and who collects this; – the quality of this data; and – how councils should consider this in future accountability documents, including the long-term plan.
Local Government NZ	LGNZ are working on four significant projects with the sector at present: Water 2050; Climate Change; Housing 2030 and the Localism Project. **Water 2050** - The Water 2050 project promotes discussion and contribute to policy development by central and local government, particularly in regards to the Government's Three Waters Review, across five key areas: • Allocation • Water Quality • Infrastructure • Cost and funding • Governance **Climate change** - leading and championing policy to deal with the impacts of climate change is a key policy priority for LGNZ. Climate change poses an unprecedented level of risk and adapting to and mitigating the impacts of climate change is a new priority focus for councils. **Housing** is a significant issue for our communities' social and economic futures. Unaffordable housing is having a negative impact on local economies, discretionary household expenditure and social well-being. This means addressing matters of supply, how social and community housing needs are met and the importance of healthy homes. Underpinning the issue is the need for appropriate funding and financing. LGNZ efforts are focussed in three general areas: • Supply; • Social and community housing; and • Healthy homes. **Localism** - Local government is calling for a shift in the way public decisions are made by advocating for greater self-government at the local and an active programme of devolution and decentralisation. This document provides councils with guidance to

Source	Direction
	• Assist with understanding and managing climate risk to the essential infrastructure that they own – particularly in relation to sea level rise, coastal hazards (such as storm inundation and erosion), and inland (pluvial) flooding; • Assist councils with addressing the issues that completion of the previous survey, which fed into the Vulnerable report, identified; and Help our community leaders prime and test council staff, constituents and stakeholders to engage in the most effective long-term planning for infrastructure investment, and make sensible investment decisions now, which don't preclude future options for infrastructure provision.
Vulnerable: the quantum of local government infrastructure exposed to sea level rise Local Government NZ January 2019	This project has two intended outputs. • The first is to research the current quantity and value of infrastructure (roads, 3Waters and buildings) exposed to sea level rise at four increments; 0.5, 1.0, 1.5 and 3.0 metres, and to quantify replacement value. The second and more important output of this research is to provide responses to rising sea levels. This study intentionally avoids specific and local costs, and targets discussion at a regional and national level in order to highlight trends and general areas of high and low priority. It raises questions about how to improve procurement, appropriately share management of risk, and communicate with stakeholders about priorities.
Water NZ Competency Framework Water NZ	This document explores the workforce skills and capabilities for an effective, efficient, accountable and resilient three waters sector in New Zealand. It describes what people should be able to do and what they need to know to competently undertake their work. It is a work in progress and includes the following roles. • Drinking Water Treatment Operators • Wastewater Treatment Operators • Drinking Water Distribution Operators (to be developed) • Wastewater Network Operator (to be developed)

5.3 Three Waters Reform Programme

Three Waters Reform: change is coming to the way we manage our drinking water, wastewater and stormwater

The background to change

In 2016, a water-borne outbreak of campylobacter in Havelock North resulted in up to 5,500 people becoming ill. Four people are thought to have died from associated causes. Following the outbreak, a review was undertaken which raised questions about the effectiveness of the regulatory regime for the three waters, and the capability and sustainability of the current water service providers.

Safe drinking water for all New Zealanders and visitors is a reasonable expectation, and high-performing drinking water, wastewater and stormwater services are essential for the protection of public health and the health of the environment. Recognising this vital importance, the Government agreed to create a new Water Services Regulator to administer and enforce the new drinking water

regulatory system, while contributing to improved environmental outcomes from wastewater and stormwater networks. This new regulator is known as Taumata Arowai.

In July 2020, on the back of the establishment of Taumata Arowai, the Government launched the Three Waters Reform Programme – a three-year programme to change the way councils manage and deliver water, wastewater, and stormwater services. These reforms will represent not only a significant change to the way water services are delivered, but also a significant change to the scope and function of local government.

Currently, 67 different councils own and operate the majority of the drinking water, wastewater and stormwater services across New Zealand. Many of these councils, including your Council, are facing urgent challenges in the provision of these services including funding infrastructure deficits, complying with safety standards and environmental expectations, building resilience to natural hazards and climate change into three waters networks, and supporting growth. Rather than piecemeal solutions, Government has determined that comprehensive, system-wide reform is needed to achieve lasting benefits for the local government sector, our communities, and the environment. The reform would see councils joining together – on a regional or multi-regional level – to set up new, and much larger, entities to deliver water services.

The Government's starting intention is to reform local government's three waters services into a small number of multi-regional entities with a bottom line of public ownership. Through collaboration and significant efficiency gains, costs to ratepayers across New Zealand will be reduced.

The reform programme is being progressed through a voluntary, partnership-based approach with the local government sector, alongside iwi/Māori as the Crown's Treaty Partner and in acknowledgement of the significant interest iwi have in te mana o te wai.

Sourced from Te Tari Taiwhenua:

Time for change

The Government is expecting to make substantive policy decisions relating to the reforms in May 2021. This means that Council does not yet have access to sufficient detail to meaningfully engage with our communities within this Long-Term Plan.

In August 2020, Council "opted in" to the reform by signing a Memorandum of Understanding (MOU) with central government. Under the MOU, Council agreed to work with central government to consider what the water service delivery entity may look like and how it would work. By signing the MOU, Council is saying that we are willing to share information on our water network and services with neighbouring councils and central government and that we are open to having discussions about how we might be able to work together in the future.

In addition, by signing the MOU, Council received $4.54M stimulus and reform funding to be used to invest in critical water infrastructure and services and stimulate the local economy.

It is important to note that signing the stage one MOU does not commit us to anything more than that. While signing the MOU sees us participating in the early stages of the reform process, it does not commit us to changing the way we currently deliver three water services, either now or in the future.

Late in 2021, before Council makes any decision on whether to progress to the second stage of the central government's water reforms, we will engage fully with iwi to ensure we maintain our commitment to an authentic Treaty-based relationship with mana whenua.

Similarly, we will engage with our wider communities and with territorial authorities across the South Island to establish an understanding of what opportunities and benefits any potential future commitment might realise. Regardless of the entity that provides the services, whether Council delivers them or not, our communities will still need the three waters services, and these will continue to be reflected in the Financial Strategy.

Following consultation, should Council decide to participate in the reform, that decision will likely be given effect to at some point in the 2023/4 financial year.

Further information on the Three Waters Reform programme can be accessed at https://www.dia.govt.nz/Three-Waters-Reform-Programme. Refer to **APPENDIX A: THREE WATERS REFORM PROGRAMME**.

Council's LTP position

Due to timeframe constraints, the information regarding the provision of drinking water, wastewater and stormwater services within this Long-Term Plan has been developed without consideration of the reform and its financial effects, with forecasting assumptions and disclosures reflecting the status quo approach.

Three waters is a national infrastructure challenge and Buller has many of the same systemic issues to address as the rest of New Zealand including mandatory compliance, significant backlog of renewals and increased regulation. Whilst reforms are supported in principle and considered essential for the future well-being of our district, we have maintained a "business as usual" approach for Three Waters consistent with central government best practice advice for this Long-Term Plan. This includes presenting the community with a clear set of information about the likely financial requirements of providing water services under the present delivery arrangements and current/expected future regulatory settings and ensuring that the base of underpinning information and the systems that manage the information are as robust and up-to-date as possible. In other words, able to provide any new service provider with all of the information and systems that are needed to manage the services from day one.

The following are a summary of notes taken at the NZ Water Conference in September 2020.

5.3.1 Taumata Arowai – the Water Services Regulator Act

Taumata Arowai – the Water Services Regulator Act received Royal Assent on 6 August 2020. The Act establishes Taumata Arowai–the Water Services Regulator and provides for its objectives, functions, and governance arrangements.

Taumata Arowai – the Water Services Regulator Act creates a new regulatory body to oversee, administer and enforce a new and strengthened drinking water regulatory system. It will also have a national oversight role to improve the environmental performance of storm water and wastewater networks.

A separate Bill, the Water Services Bill, expected to be enacted mid-2021, will give effect to decisions to implement system-wide reforms to the regulation of drinking water and source water, and targeted

reforms to improve the regulation and performance of wastewater and stormwater networks. The Regulator's detailed functions and powers are located in that Bill.

5.3.2 Te Mana o te Wai

Te Mana o te Wai is a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. Te Mana o te Wai is relevant to all freshwater management and not just to the specific aspects of freshwater management referred to in this National Policy Statement.

It provides for the three healths of Te Mana o te Wai –

- Te Hauora o te Wai (the health and well-being of the water),
- Te Hauora o te Tangata (the health and well-being of people), and
- Te Hauora o te Taiao (the health and well-being of the environment)

Te Mana o Te Wai is given effect through the National Policy Statement for Freshwater Management. (Refer to Section 4.2 of the NPS).

During September 2019 the Ministry for the Environment (MfE) released the discussion document 'Action for Healthy Waterways' which highlighted the Government's objectives to:

- Stop further degradation of New Zealand freshwater resources
- Reverse past damage
- Address water allocation issues

This strengthens and upholds Te Mana o te Wai – the health and well-being of the water and signalled the direction for urban development, rural land and water management.

Add to this the regulatory changes requiring a multi-barrier approach to drinking water safety, including mandatory disinfection of water supplies, stronger obligations on water suppliers and local authorities to manage risks to sources of drinking water; and strengthened compliance, monitoring and enforcement of drinking water regulation.

5.3.3 Water Services Bill

- Framework consistent with international best practice.
- Introduced June 2020.
- Select Committee before Christmas, submissions until end of February 2021.
- Aiming to have Act passed June 2021, provides Taumata Arowai powers to regulate and enforce.
- Authorisations regime in Bill – detail will be in regulations over next 2-3 year – organisations will need to be accredited, new occupational regulation standards. Accreditation by year 5.
- Te Mana o te Wai key principle and driver.
- Duties of drinking water suppliers set out in Bill – officers, employees and agents must comply with professional due diligence requirements (similar to H&S).
- WSP must be implemented and continuously reviewed. Review and audit process, not approval process. WSP in place one year after Act i.e. July 2022.
- Registration on drinking water register one year after Act i.e. July 2022.

5.3.4 Taumata Arowai Compliance Intentions

- Duty to provide safe water is absolute (Clause 21).
- Requirement to comply from commencement date, cost not a factor.
- >500 pop. 1-year compliance, say July 2022.
- <500 pop. 5-year transition, compliance = templated WSP, policy, regs, operational guidance = safe harbour for compliance. Expecting many 1,000's of these.
- Compliance tailored to scale and risk.
- WSP - Taumata Arowai will review and monitor compliance but not approve (Clause 32).
- WSP – one year transition to new system.
- WSP – supplier best placed to manage risks, Taumata Arowai will follow up if required, Implementation of WSP will be covered during audits.
- WSP – revised plans forward to Taumata Arowai whenever material changes are made. Dynamic approach to risk management.
- Use of Enforceable Undertakings is expected (similar to Worksafe and USEPA), plus infringement notices and prosecutions. Proportionate use of enforcement tools.
- Outcome focus not minimum compliance with a clear public health focus.
- Taumata Arowai only enforcement and safe drinking water requirements, source water -more thinking required about Regional Council interface.
- Auditors capability gap – 3rd party auditors (maybe), still being considered.

5.3.5 Changes Required to 3 Waters

- Absolute requirement to comply, will create a very risk adverse environment.
- Increased focus on monitoring and reporting.
- WSP still required, WHO standards apply with some updates – exposure drafts before Christmas 2020.
- Te Mana o te Wai – much better integration of Te Tiriti principles into 3W.
- Te Mana o te Wai – much more cultural engagement and relationship building required. Holistic approach to water. Process not an event.
- Suppliers will be required to comply before formation of new 3W entities i.e. for 1-2 years at least.

5.3.6 Sector Capability

- Variable, needs to change.
- Need best possible training, education and skills development.
- Sector needs to get ahead of the curve in this.

5.3.7 Drinking Water Standards and Rules

- Separation of MAVs from operational requirements. So, MAVs, Operational Requirements, Rules.
- Draft new rules aiming for Christmas 2020 exposure drafts, July 2020 adoption at start of Taumata Arowai.
- Segmentation of rules by supply size, with rural agricultural being treated separately. Acceptable and standard solutions will be published.

- Backflow and Hygiene not up to standard at the current time.
- Source Water Risk Management Plans will be required as part of the WSP – see Ontario for examples.

5.3.8 NES – Sources of Human Drinking Water

- 2008 RMA Regulation., RMA reform will impact.
- Update proposals for NES being considered – spatial, inclusion of small water supplies (25 people).
- Included in Regional Plans, District Plans and land use consents to protect supply sources.
- Public consultation for any changes expected mid-2021.

5.3.9 Nanaia Mahuta – Minister of Local Government – Water Reform

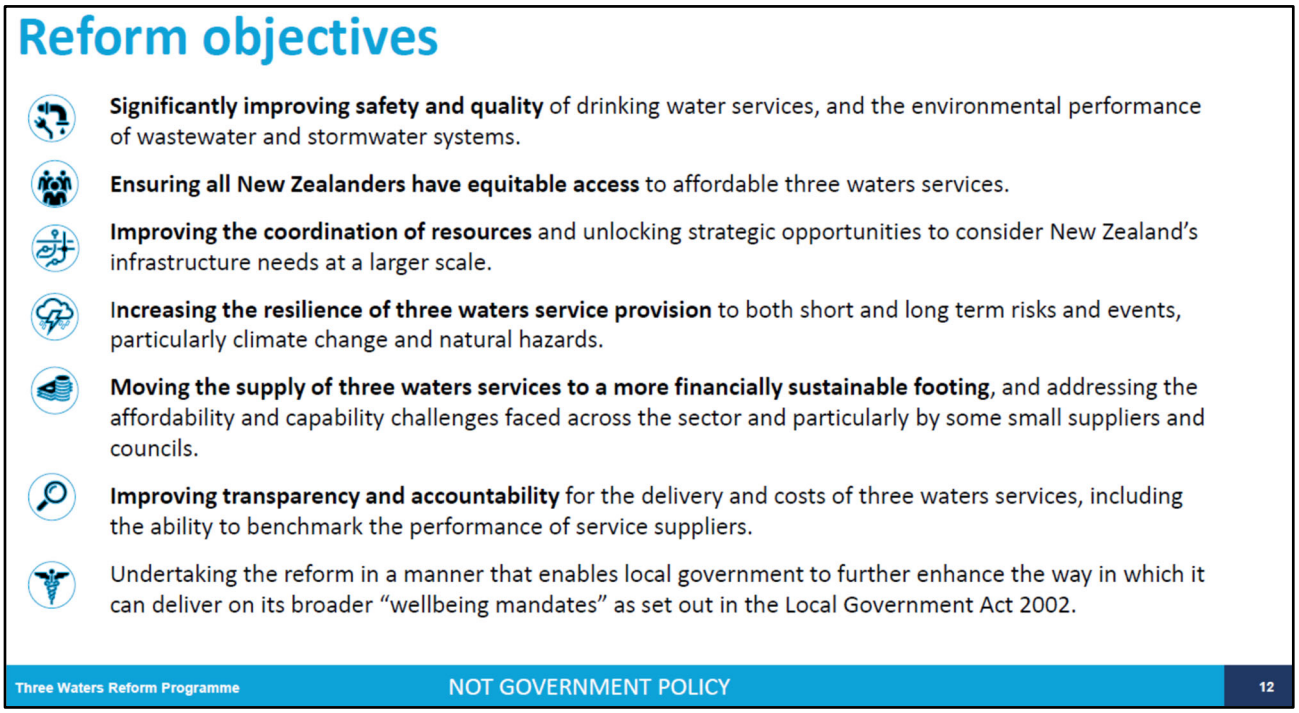
- Three Pou:
  - Pou tautahi: Taumata Arowai, water regulator.
  - Pou taurua: Regulatory Reform, Water Services Bill.
  - Pou tautoru: Service delivery reform. Equitable access to more affordable and reliable water services. Refer to **APPENDIX B: THREE WATERS SERVICES DELIVERY REFORM PROGRAMME**.
- Three-year horizon for change requiring close collaboration and input from Iwi/Maori.
- Reform design features:
  - Large scale entities (multi-regional)
  - Asset owning to support improved access to capital
  - Structured as statutory entities
  - Iwi/Maori and community input mechanisms
  - Publicly owned with preference for collective council ownership (e.g. TasWater model)
  - Water and Wastewater services priority, stormwater maybe
- Target for new entities starting is 1 July 2022.
- Hawkes Bay model on hold until government decisions on model are made.
- Bill Bayfield, Economic regulator under consideration in 3W reform. 3W reform moving at pace.
- Bill Bayfield, there will be Authorised persons and organisations.
- Model currently presented in DIA material seems to be the TasWater Model.

5.3.10 RMA Reform

- Major change coming, Randerson Report, accelerating momentum for water and environment protection.
- National Built Environments Act.
- Strategic Planning Act (30yr spatial plans a required output – big picture, long term planning view).
- Managed Retreat and Climate Change Adaptation Act.
- Freshwater Planning
  - Regional Plan updates required by 13 Dec 2024
  - Te Mana o te Wai
  - NES Freshwater has further regulation – nitrogen, wetland, stream works
  - NES Sources Human Drinking Water amendments proposed

- Take away - Significant reform, huge amount of work.

The following reform objectives were presented by the Department of Internal Affairs on 24 February 2021 as part of their webinar titled *"Three Waters Reform Programme: Reform programme background and overview".*



5.4 Drinking Water Supplies

Overview

Council remains committed to working with district communities to provide drinking water supplies that are affordable and meet the required service levels.

There are currently seven drinking water supplies for which Council are registered under section 68J of the Health Act 1956:

- Inangahua Junction
- Little Wanganui
- Mokihinui
- Punakaiki
- Reefton
- Waimangaroa
- Westport

As Council is ultimately responsible under legislation, it is incumbent to ensure all of these drinking water supplies provide safe, reliable and adequate drinking water in compliance with:

- Health (Drinking Water) Amendment Act
- Drinking Water Standards of New Zealand

Five-Point Plan

Council accepts its responsibilities and will take all practicable steps to ensure the health and well-being of all consumers. This will be achieved through the strategic direction outlined by our five-point plan:

1. Responsibility - Waterworks owned or under the control of the Water Supplier
2. Authority - Relevant consents and access permissions held by the Water Supplier
3. Application - Protection of waterworks, environment and public safety
4. Coordination - Organised management of water supply programs of work
5. Implementation - Best-practice processes for delivering water supply projects

Aligned to our five-point plan, Council is targeting the following direct actions initiatives:

- Water Safety Plans and Catchment Risk Assessments
- Resource Consents, Easements and Land Acquisitions
- Water Supply Bylaw
- Accountability for delivering the water supply work program
- Best practice project delivery model to ensure successful outcomes

The Ministry of Health has provided the following statement in regard to Council's role as a registered drinking water supplier:

"The MoH acknowledges the Buller District Council's strategic direction in managing drinking water infrastructure within its District. Councils are ideally placed to provide these services to fulfil their obligations under the Local Government Act, Resource Management Act and Health Act as they relate to the provision of safe drinking water. The safe operation of drinking water supplies requires specific expertise and co-ordination between agencies to ensure management is holistic and sustainable. Failure in these key areas were identified as contributing factors to the Havelock North water supply contamination incident."

5.5 Demographic Changes

Buller's population is forecast to be relatively stable over the coming decade, holding at around the 2020 level of 9,600. However, due to a weak outlook for employment growth, we expect the District's population to ease for the remainder of the projection period, ultimately leading to a smaller population of 8,800 in 2051. 2013 and 2018 Census for Buller Geographies estimates that more than 30% of the population in the district is 65 and older. This could have an impact on affordability. Council may need to invest more in providing facilities to cater for the ageing population such as upgrade and make safe footpaths, pedestrian crossings and islands, ramps at intersections for mobility scooters,

The council is maintaining assets at present to ensure that they are functioning, with renewals kept as low as possible.

5.6 New Technologies

Technology is constantly changing and improving and is likely to have a significant effect especially in terms of providing and managing more efficient and effective infrastructure and services in the district. Clearly over the thirty-year period of this strategy there might be some huge advancement in technology that affect the demand for infrastructure and the have implications on the operation and maintenance of the infrastructure. The challenge for Council is to make use of new technology to advance their management of the infrastructure services.

In preparing this strategy while we are aware that there will be advancement we have by necessity based our projections and maintenance costs on the methods that in use today.

5.7 Changing Government Priorities and Legislative Environment

The New Zealand Infrastructure Commission – Te Waihanga – was established in 2019 as an Autonomous Crown Entity to carry out two broad functions – strategy and planning and procurement and delivery support on infrastructure investment.

InfraCom - Te Waihanga will work with central and local government, the private sector, iwi and other stakeholders, to develop a 30-year infrastructure strategy to replace the National Infrastructure Plan, which will be tabled in Parliament in late 2021. The strategy will cover the ability of existing infrastructure to meet community expectations; current and future infrastructure needs and priorities; as well as any barriers which could impede the delivery of infrastructure or services arising from it.

They have developed a discussion document called Infrastructure Under One Roof: Standardising how we think about the shared services around us.[2] The aim of the strategy is to improve New Zealand's long-term economic performance and social, cultural, economic and environmental well-beings.

The strategy will[3]:

- Assess the overall fitness for purpose of New Zealand's infrastructure system
- Determine how well the current system is working
- Identify priorities
- Identify barriers to good outcomes
- Identify the root cause of systemic issues
- Determine how best to meet future community expectations
- Use foresight planning to consider a range of future possibilities.

The Strategy will take long-term trends into account, such as and focus on strategic issues rather than individual projects:

- Climate change
- New technologies

[2] https://infracom.govt.nz/strategy/

[3] https://infracom.govt.nz/strategy/strategy-development/

- Demographic change

"The Strategy will allow for a standardised approach to analysing infrastructure problems to develop strategic recommendations." This strategy will replace the 30-year National Infrastructure Plan. The Infrastructure Commission will also support central and local government entities to procure and deliver major infrastructure projects.

National Policy Statement

The National Policy Statement for Freshwater Management (NPSFM) 2020 came into force on 3 September 2020 and documents the objective to ensure that natural and physical resources are managed in a way that prioritises:

a. first, the health and well-being of water bodies and freshwater ecosystems

b. second, the health needs of people (such as drinking water)

c. third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

The NPSFM includes a requirement to manage freshwater in a way that 'gives effect' to Te Mana o te Wai, including by actively involving tangata whenua in freshwater management, working with tangata whenua and communities to set out a 'long-term vision' in the regional policy statement, and through a new 'hierarchy of obligations' which prioritises the health and wellbeing of water bodies, then the essential needs of people (e.g. drinking water), followed by other uses.

Te Mana o te Wai is a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It protects the mauri of the wai. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community.

'Action for Healthy Waterways' (Ministry for the Environment) signals the direction for urban development, rural land and water management including Risk Management Plans for wastewater systems and stormwater systems, likely regulatory requirements under a new 3 Waters regulatory framework.

These initiatives will flow through respective Regional Councils Policy Statements & Regional Plans.

Improving our Freshwater

Although much of our freshwater resource across the district is of higher quality when compared with national measurements, we should and can do better, particularly where land use practices and urbanisation have impacted the quality of our wetlands and freshwater resources.

National Policy Statement on Urban Development Capacity

The National Policy Statement on Urban Development Capacity 2016 (NPS-UDC) sets out the objectives and policies for providing development capacity under the Resource Management Act 1991.

The NPS-UDC came into effect on 1 December 2016 and has been described by the government as "the core issue of increasing land supply".

The NPS-UDC directs local authorities to provide sufficient development capacity in their resource management plans for housing and business growth to meet demand.

Development capacity refers to the amount of development allowed by zoning and regulations in plans that is supported by infrastructure. This development can be "outwards" (on greenfield sites) and/or "upwards" (by intensifying existing urban environments).

NZ Water Competency Framework

Assessment of staffing levels needs to consider the skill requirements to meet the demands of the infrastructure that Council does and will own and operate.

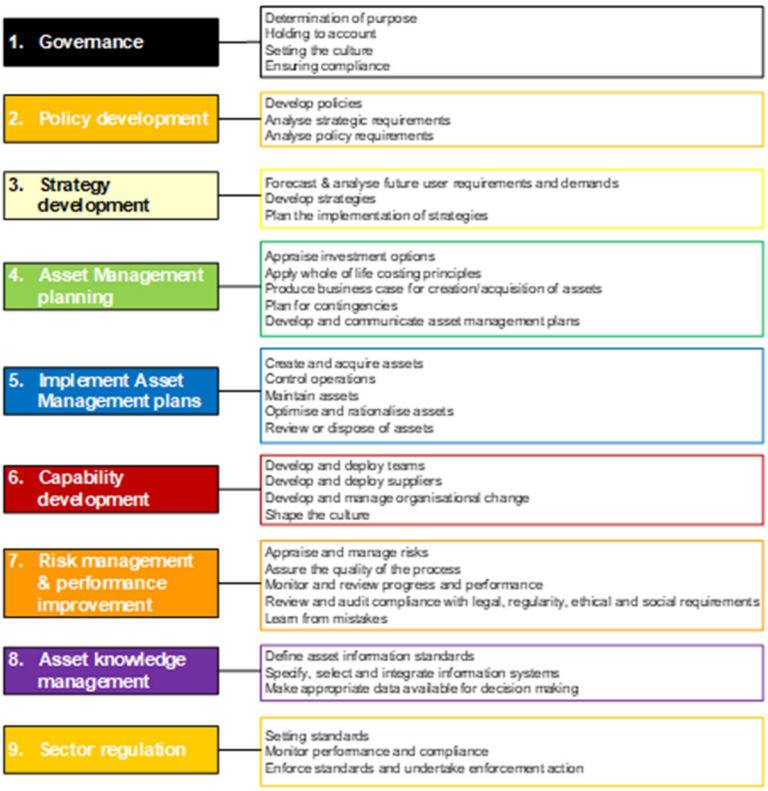
Increases in the complexity of water and wastewater treatment plants will occur as drinking water and environmental standards increase. The complexity of these plants and their associated resource consent compliance will require skilled and trained engineers for their operation, maintenance and supervision. Council needs to stay abreast of any resource requirements and qualifications to ensure the most appropriate method for delivery of the required levels of service.

During 2020 Water New Zealand released its draft Competency Framework which describes what people should be able to do and what they need to know to competently undertake their work. The Competency Framework use treatment operator roles, the people who operate, monitor and maintain water and wastewater services, as a starting point. Network/Distribution operators are still to be developed.

The Water Industry Professionals Association (WIPA) was jointly established by the Water Industry Operations Group and Water New Zealand to provide a system of recording the professional development of people working in the water and wastewater industry to ensure a high level of competency within the industry was maintained. At the time of writing this Plan registration is voluntary but may become compulsory under the new regulatory framework.

The Competency Framework[4] identifies nine areas as shown below.

[4] Water NZ – Competency Framework

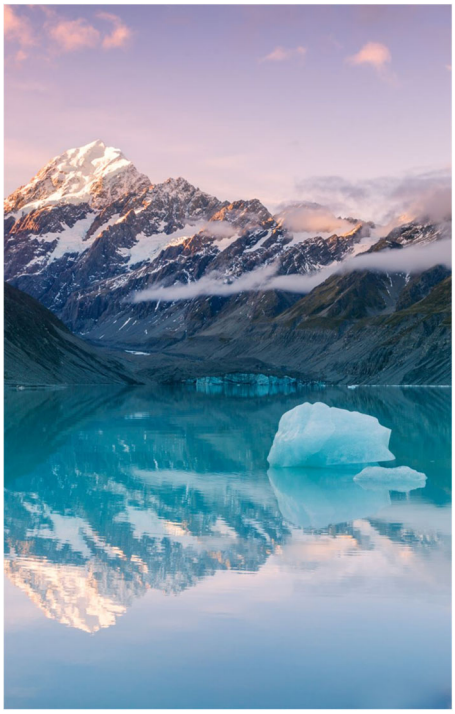


It documents core skills and knowledge needed by operators to competently undertake work within the water industry. It is envisaged that the industry will be able to use the final document as a guide to:

- assess levels of staff training,
- develop training programmes,
- determine the knowledge and skills required by a workforce, or
- other matters related to staff competence.

Council will keep abreast of developments in this area to ensure staff training meets industry best practice and standards.

5.8 Climate Change Resilience and Environmental Sustainability



5.8.1 Climate Change and Sea Level Rise

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

The effects of climate change include both effects on our climate (such as temperature increases or flooding), and a wide range of secondary effects (such as damage to strategic infrastructure).

Coastal erosion is a long-term natural hazard that affects the West Coast of New Zealand in particular due to the prevailing wind conditions. Significant erosion can occur due to storm events, throughout New Zealand.

One asset affected by coastal erosion that is within Council's responsibility is the Westport Airport. Protection works have been undertaken to ensure the airport remains in service. Loss of the airport would be significant for the area in terms of economic activity and transport resilience.

Severe storms and resulting flooding is a particular concern for the Westport township located on the banks of the Buller River. Flooding puts lives at risk as well as causing significant damage to homes and infrastructure such as stormwater systems and roading.

The New Zealand government has been looking at the natural hazards issue for a long time now. With the potential risk of increased frequency and magnitude of severe storms in the future due to climate change, the government will be taking the lead. They have provided some direction to local government on this.

The National Climate Change Risk Assessment (MfE August 2020) identifies 43 priority risks across five value domains (natural environment, human, economy, built environment and governance) and highlights 10 risks considered to be the most significant. This MfE report highlights, among others, the following two domains (particularly applicable to Council infrastructure) as extreme risks:

Domain	Risk	Consequence
Economy	Risks to governments from economic costs associated with lost productivity, disaster relief expenditure and unfunded contingent liabilities due to extreme events and ongoing, gradual changes.	Extreme
Built environment	Risk to potable water supplies (availability and quality) due to changes in rainfall, temperature, drought, extreme weather events and ongoing sea-level rise.	Extreme
	Risks to buildings due to extreme weather events, drought, increased fire weather and ongoing sea-level rise.	

Water may become scarcer in quantity and quality due to changes in climate and rainfall patterns, resulting in increased frequency of flooding and droughts. Many factors contribute towards the scarcity of drinking water: consumption and run-off; an increase in water-intensive industrial activities; a lack of adequate pre-treatment arrangements; leaks and losses from inefficient water distribution; and inadequate wastewater collection systems.

It is assumed that climate change will impact on the district in ways similar to that noted in the Ministry for the Environment guidance. Climate change has been acknowledged within our Infrastructure Strategy explicitly and as part of the discussion on resilience. We will take account of the impact of climate change in a number of ways, but predominantly through design and construction standards, identification of hazards, redundancy and mitigation (such as insurance) over the life of the Long Term Plan and Infrastructure Strategy.

It is considered that additional work is required to ascertain the long term effects (if any) on the Water Services assets within Buller District and development of policies to take into account the effects of climate change.

In the meantime the Council is working with the other West Coast councils and the West Coast Regional Council on strategies for managing natural hazards, and the issue of longer term climate change adaption and mitigation.

5.8.1.1 Project AF8

Project AF8 is a cutting-edge risk scenario-based earthquake response planning project, informed by thorough earthquake source, expression, and consequences science. The focus of the project is New Zealand's South Island Alpine Fault. Project AF8 commenced in July 2016, with funding from the Ministry of Civil Defence & Emergency Management's Resilience Fund and is managed by Emergency Management Southland on behalf of all South Island CDEM Groups.

Project AF8 has been initiated to introduce outline planning for response actions, resources, and overall coordination within and between CDEM Groups across the South Island.

The South Island Alpine Fault Earthquake Response (SAFER) Framework provides a concept of coordination of response and priority setting across all six South Island Civil Defence Emergency Management (CDEM) Groups and their partner organisations in the first seven days of response. It is not intended to replace existing plans within agencies but to provide a coordinated picture of response across the South Island.

The SAFER framework includes:

- Scenarios
- Response assumptions
- Secondary and compounding risks such as:
    - Aftershocks
    - Ongoing structural failure
    - Cascading landscape effects
    - Tsunami
    - Severe weather
    - Communicable human diseases
    - Impacts on response operations

- Consolidated response framework

Council will keep a keen eye on the response actions and resources from the AF8 project and work with CDEM Groups.

5.8.1.2 Ministry for Environment National Climate Change Risk Assessment

The Report identifies the most significant risks and opportunities and also highlights the gaps in the information and data needed to properly assess and manage these risks and opportunities. The 43 priority risks will enable Council to prioritise action.

5.8.2 Zero Carbon Act Requirements and Implementation

The Climate Change Response (Zero Carbon) Amendment Act 2019 provides a framework by which New Zealand can develop and implement clear and stable climate change policies that:

- contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5° Celsius above pre-industrial levels; and
- allow New Zealand to:
  - develop and implement clear and stable policies to reduce GHG (greenhouse gas) emissions (i.e., 'mitigation')
  - respond to the inevitable effects of climate change (i.e., 'adaptation').

The amendments establish four key items.

1. set a new domestic greenhouse gas emissions reduction target for New Zealand to:
   a. **reduce net emissions of all greenhouse gases (except biogenic methane) to zero by 2050**
   b. reduce emissions of biogenic methane to 24–47 per cent below 2017 levels by 2050, including to 10 per cent below 2017 levels by 2030
2. establish a system of emissions budgets to act as stepping stones towards the long-term target
3. require the Government to develop and implement policies for climate change adaptation and mitigation
4. establish a new, independent Climate Change Commission to provide expert advice and monitoring to help keep successive governments on track to meeting long-term goals. See the Climate Change Commission website.

The original proposal was for a separate piece of legislation called the Zero Carbon Bill to be passed into law. In May 2019, the Government decided to introduce it as an amendment to the Climate Change Response Act 2002. The objective was to ensure that all key climate legislation is within one Act.

Council and the Community have all a part to play in reducing emissions. Council can become the role model and if the community see Council demonstrating tangible commitment to reducing emissions, they are more likely to also make positive changes to their own carbon footprint.

LGNZ conducted a "Councils climate change mitigation work" stocktake survey in 2018[5] and the following are some of the responses received through the survey:

- Exploring and implementing more efficient alternatives for day to day activities such as reducing waste to landfill and increasing recycling activities, replacing conventional streetlights with LED, education programmes across communities and schools (Enviroschools programme) on reducing waste and adopting a culture of recycling waste at source.

  Since 2014, the overall quantity of waste deposited at the transfer stations has decreased by 3.75%. Council is actively involved with communities that want to support recycling initiatives. Enviroschool is a holistic environmental education framework supported by the National Organisation Totaima Foundation and focusses on ensuring children and young people become lifelong sustainability aware champions. Council is actively involved with the Enviroschool programme.

  Council is currently in discussions with the other west coast councils around a combined landfill site and more investigations and agreements will be explored during this LTP.
- Encourage the non-use of vehicular transport means by providing more walking and cycle ways. Council is actively involved with the establishment of walking and cycling tracks in its district. The first West Coast Regional Walking and Cycling Strategy was published in 2009 and progressively trails have been constructed across the district.
- Council's sustainable fleet management principles - combination of cleaner vehicles and council moving towards replacing where practically possible their vehicle fleet with electrical/hybrid vehicles. Includes providing a network of electrical/hybrid vehicle charge stations across the district. There are currently several charging stations across the district for electrical/hybrid vehicles.
- Planting of more trees in parks and reserves and wetland rejuvenation projects. Encouraging landowners to protect areas of bush/forest with significant biodiversity value.
- Participating in the climate change working groups and submitting on the Climate Change Commission's Draft Advice in March 2021 to represent the District's interests, opportunities and constraints.
- Investigate alternative sources and funding to support for more home heating efficiency practices.
- Investigations and solutions to phase out coal fired boilers.
- Encouraging contractors to use more eco-friendly products.
- Implement and improve reporting around energy consumption and carbon emissions monitoring.

In addition to the above, Council has also identified its role in environmental sustainability leadership as a priority for the coming triennial.

The concepts of sustainable development under the Local Government Act 2002, and sustainable management of an area's natural and physical resources under the Resource Management Act 1991, imply the ongoing ability of communities and people to respond and adapt to change in a way that avoids or limits adverse consequences. Living sustainably touches on many environmental

[5] LGNZ, Councils' climate change mitigation work – A stocktake of emissions reduction activities, September 2018

aspects; foci for our district include reducing greenhouse gas emissions, improving the quality of our freshwater resources, protecting our biodiversity, and better managing and minimising our waste.

Greenhouse Gas Emission Reduction

In 2014, New Zealand contributed 0.17% to the world's total greenhouse gas emissions. However, on a per capita basis, New Zealand is a significant emitter – the 21st highest contributor in the world and fifth highest within the OECD. The Climate Change Response (Zero Carbon) Amendment Bill amends the Climate Change Response Act 2002 to provide a framework for New Zealand to develop and implement climate change policies that contribute to global efforts under the Paris Agreement to limit the global average temperature increase to 1.5 degrees Celsius above pre-industrial levels. New Zealand ratified the Paris Agreement in October 2015. Its nationally determined contribution is to reduce greenhouse gas emissions by 30 per cent below 2005 levels by 2030.

5.9 Biodiversity Protection and Enhancement

Across New Zealand and within the district, native plants, animals, and ecosystems are under threat, and there continues to be degradation and loss of native vegetation and wetland systems and the associated ecosystem services they provide. National direction regarding biodiversity management and significant natural areas on private land is currently ‘in train’ and will dictate the requirement for tighter regulation based on a precautionary approach.

5.10 Infrastructure Resilience

Customers have a high expectation of continuing functionality and service delivery. While communities are resilient themselves, they are reliant on services provided to support they long term wellbeing. As the impact of risks such as coastal erosion, earthquakes and floods are better understood, there is an opportunity to identify better infrastructure management.

Resilience is based on a design philosophy which acknowledges that failure will occur at some point in time. Resilience requires early detection and recovery, but not necessarily through re- establishing the failed system through maintenance or capital works.

Buller District Council has undertaken a thorough analysis of resilience issues relating to natural disasters and the managing and mitigating the risks to, and the resilience of, our infrastructure assets from natural disasters. This is discussed in the Buller District Council Lifelines Assets Report (August 2017), and has also informed the level of insurance Council holds against natural disaster events.

In all renewal projects the resilience of the design and materials being used is a factor when determining designs and construction methods.

Flooding is the most frequently experienced natural hazard in the District, and the likelihood of a major flood occurring in any year is high. Council will continue to engage with the Regional Council for future planning and mitigation efforts.

An earthquake could potentially cause devastation to both above- and below -ground infrastructure in developed areas through ground rupture, liquefaction or ground deformation. Council has insurance in place for such a likelihood.

We have to consider managing and mitigating the risks to, and the resilience of, our infrastructure assets from natural disasters.

5.10.1 Hector Landfill

In 2018, ex-cyclone Fehi exposed waste from within the historic landfill at Hector to the sea. Through $1M funding from the Covid-19 Response and Recovery Fund, the landfill waste extent and nature were investigated, as was the feasibility of three remediation options, these being:

1. Excavation of all historic waste for removal and disposal elsewhere,
2. Selective mining and processing of historic waste most at risk to sea inundation, and removal and disposal elsewhere, or
3. Construction of a protective rock wall to limit the majority of sea inundation events.

Option three was selected as the only feasible option. Construction of the protective 310 metre long, 5.5-metre-high rock wall is currently underway with completion scheduled for mid-2021. Modelling undertaken suggests decades of protection will be conferred before additional climate change adaptations will be required.

5.11 Aging infrastructure

Areas of the District have been built over decades, and today there is both underground and aboveground infrastructure that is well past its expected life. As ageing occurs reactive maintenance will increase. A key challenge for the District is the balance between reactive maintenance, programmed maintenance, and the inevitable rehabilitation or replacement of assets that have both physically and economically run past the point of repair.

There are risks of high running maintenance costs and loss of service through failure of old assets. A significant part of the proposed asset renewal programme aims to reduce these risks by replacing assets that have reached an age where ongoing performance is lost.

Council has historically fallen short in the level of renewals required to keep networks in appropriate condition and performance levels. Within each Activity, the renewals backlog has been identified and we intend to bridge those backlogs in this planning period (within 30 years). If the existing assets are not maintained there is a risk of failing to meet the Levels of Service agreed with community, and the possibility of unexpected and unplanned capital expense to meet the Levels of Service, which could affect Council's financial performance.

5.12 Economic Change

With an underpinning economy of mining and developing agriculture and tourism sectors, Buller economy is very prone to external influences. New opportunities are developing and there is a positive outlook. Council is mindful that infrastructure investments must be 'in-tune' with the current economy and future opportunities unfolding.

5.13 Affordability

Affordability is one of the key challenges (and priorities) that many Councils, including Buller, faces. In the past 3 years leading up to this plan Council has demonstrated that it has been prudent in the allocation of is expenditure and has come well within its predictions of expenditure and the resultant rates increases. It also rates well in prudence measures by third party rates watchdog organisations.

For this LTP and Infrastructure Strategy to be sustainable Council also needs to be affordable both in the short and long term and to continue with this philosophy. Looking at this LTP operating expenditure is prudent, and the resulting rates predictions are, in the majority of cases, close to the benchmarks that Council has set. These benchmarks have been developed keeping affordability for communities at the forefront.

Council continually looks at ways that it can provide better services or provide the same service a different way at a cheaper cost to the ratepayer. Shared services with other West Coast Councils are one way that costs can be saved and this will be driven for our Three Water assets through the central government-led Three Waters Reform process.

5.14 Community Assets

The community looks to Council to help maintain its links to the past and provide for its future wellbeing. At times this involves Council expanding its assets portfolio to includes assets that would otherwise be lost or not provided at all. Providing venues for Government agencies and other services such as medical centres are becoming more common in provincial New Zealand.

Until 2018, the Westport harbour was a commercial operation under Buller Holdings Limited, a holding company of the Buller District Council. Council is now undertaking a transition to direct control.

The port is currently in another stage of evolution, its international facilities have ceased and there is a greater focus on the harbour function. Council's role in the harbour is expected to include a new asset management approach to the harbour, which is likely to be discussed in a future Infrastructure Strategy.

Westport Waterfront's The Riverbank project, a $2m project funded from the Provincial Growth Fund, is the revitalisation of the current industrial area between the Buller River and the town centre. It forms part of the Westport master plan and features the "Toki Poutangata" bridge over the existing railway line. The bridge allows people to easily transition from the main street to a new riverbank space in a safe way.

This is the first significant step in Westport turning to face the river, our town's greatest natural asset. The jewel in The Riverbank project is the "Toki Poutangata" bridge. As well as connecting the town centre to the river, it will also provide linkage to the Kawatiri Coastal Trail and complement the Pounamu Pathway concept, enabling our community and visitors alike to enjoy active transport and recreation opportunities in Westport.

5.15 Karamea Highway Special Purpose Road

Waka Kotahi New Zealand Transport Agency (NZTA) and funding of the Karamea Special Purpose Road (SPR)

Karamea Highway – its history in a Nutshell.

In northern Buller, the 49km section of road over the Karamea Bluff between Mokihinui and Karamea forms the majority of the Karamea SPR. A 12km section from Karamea to Kohaihai completes the 61km of special purpose road designation in our district.

The SPR is historically known as the Karamea Highway, and was originally constructed, operated and funded by NZTA as part of State Highway 67. In the early 1990's, the designation was changed by Waka Kotahi NZTA to special purpose as part of a wider review and state highway strategy. At that time, SPR's attracted 100% of funding for their maintenance and upgrading from Waka Kotahi NZTA.

In 2003, the legislative power to create SPR's was removed leaving Waka Kotahi NZTA with a process of gradually phasing them out. All affected road controlling authorities have been developing transition plans to agree the terms for this process and how these SPR's will be funded into the future.

The challenges we need to address…

There are many challenges related to managing the Karamea Highway, especially the Karamea Bluff section. This goes back to its original corduroy construction, which included using organic materials such as trees, brush, and soil, to build its foundation. Decomposition over time has caused instability, which together with slips and washouts due to the natural terrain, leads to what has been described as significant risk and safety concern, as well as high repair and maintenance costs.

A strategic business case was completed in collaboration with Waka Kotahi NZTA. The following are some of the key findings.

- Karamea Highway is the only road access north of Mokihinui and services a population of approximately 700 people.
- There is no commercial access to the region by sea and the airport at Karamea is limited to small charter flights with a maximum of 12 seats.
- Records indicated that approximately 240 vehicles use the highway daily, of which, approximately 60 people from Karamea Township stated that they commute in or out using Karamea Highway daily.
- The Karamea Highway provides access to the Heaphy Track and Oparara Arches which are major tourist attractions for this area.
- Costs of emergency works are highly variable and unpredictable.
- Locations requiring emergency works in the past have been around the Karamea Bluff section. There is little correlation between slips, slumps and locations of corduroy pavement.
- The route from Little Wanganui to the Heaphy Track access is reasonably stable.

Following the strategic business case, Council commenced an SPR transition plan process in collaboration with Waka Kotahi NZTA.

Where we are going…

For the upcoming Long-Term Plan, the Karamea Highway will remain at 100% Waka Kotahi NZTA funding for Special Purpose Roads.

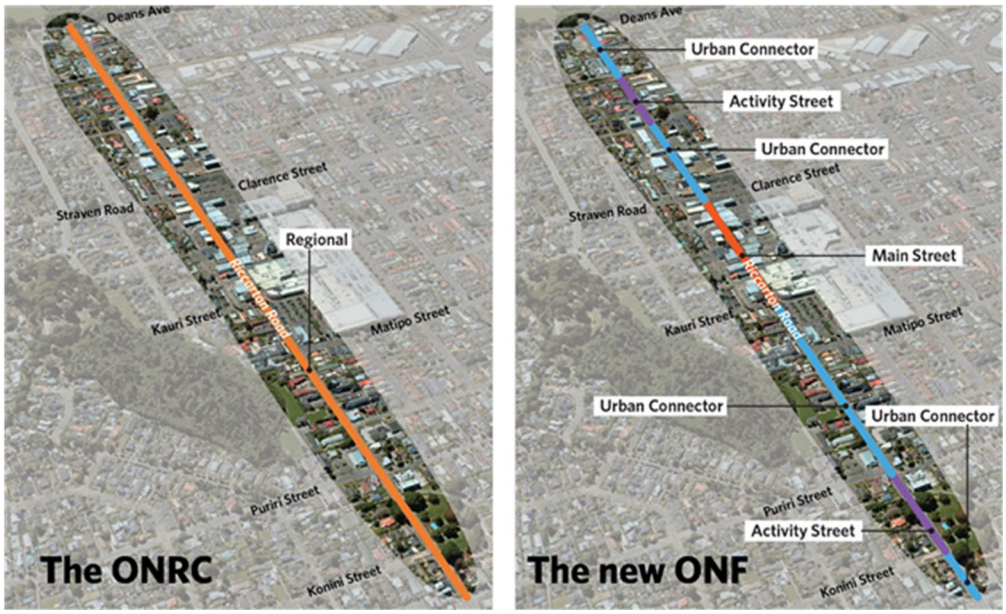
Whilst a draft Special Purpose Road transition plan has been prepared and considered for the Karamea Highway, no agreement has been reached between Waka Kotahi NZTA and Council for a

change to Local Road status, nor has there been Council acceptance of responsibility for funding specific activities following any transition.

As such, while the forward work programme and financial assessment have been mindful of a potential change in SPR status beyond 30th June 2024, no final decision has been made by Council.

5.16 Waka Kotahi One Network Framework

The One Network Framework (ONF) is a national road classification system for all roads in New Zealand. This Framework classifies roads based on movement (walking, cycling, public transport, traffic, freight) and the type of place (urban/rural and surrounding land use). The ONF replaces the One Network Road Classification (ONRC) to better align with GPS priorities. The ONF gives a more granular classification of streets and develops an integrated approach between transport and land use planning:



The ONF aims to:

- Cater to active and public transport modes and 'off road' routes, making it a useful planning tool in urban and rural environments.
- Emphasis the overall movement of people and goods by any mode, rather than just the overall volume of vehicles.
- Consider the role streets play in providing social spaces for people to interact and enjoy.
- Consider the aspirational use of the corridor in the medium to long term so planning can be put in place to achieve that aspiration.

The ONF is expected to be implemented over 2021-24, for Buller District Council this is not expected to be a large task, key actions to fully adopt the ONF are outlined below. Buller District Council is well placed to progress these tasks using available data and long term strategies including the 2021-24 Transport Asset and Activity Management Plan:

- Determining classifications for the initial application of the ONF.
- Adopting the ONF 'movement and place elements into Activity and Asset Management Plans and Long-Term Plans.

- Describing medium to long-term aspirations for different corridor classifications.
- Integrating the ONF with level of service targets.

Transport funding

Waka Kotahi (NZ Transport Agency) is the sole funder for State Highways and the Karamea Highway Special Purpose Road, and majority funder for local roads in our district. Local roads funding is determined by the Funding Assistance Rate (FAR), for 2021-24 Waka Kotahi funds 72% of our local roads, with district ratepayers contributing the 28% balance. The FAR is reviewed every three years to ensure the costs of the land transport network are appropriately shared between land transport system users and local communities, Waka Kotahi's contribution to local roads has increased, in 2018-21 the FAR was 66%.

The above information is based on REG information as of March 2021 and is subject to change.

5.16.1 Revitalisation of Town Centres

The revitalisation of key town centres is a district wide project that is outlined in the LTP. The objective of the revitalisation project is to action our key strategies including facilitating growth, providing reliable and sustainable infrastructure and ensuring we are an attractive district to live, work, invest and play.

The project is still at concept stage, including development strategy, design framework and master planning. Infrastructure capital, operations and maintenance implications will be addressed in future revisions of this Infrastructure Strategy.

5.16.2 Other Infrastructure Management Scenarios Considered

Given the current economic context, Buller District Council has three broad options in terms of infrastructure management and provision.

1. Reduce the level of spend; this would result in a decrease in the level of service, or an increased level of risk of sustainable asset performance.
2. Continue with the 'current' approach
3. Increase expenditure where investment in infrastructure may assist economic growth.

Since 2015, the outlook for Buller district has improved and the population is relatively stable. Investment in infrastructure remains tight, but economic opportunities are being developed. Council is working more closely with the other councils in the region, such as a combined business for roading investment.

Specific options are discussed under each activity area.

6. THIRTY YEAR STRATEGY

In its role as Local Authority Buller District Council will comply with the relevant New Zealand legislation, while the following Strategic Statements will guide decision-making over the next 30 years.

These statements have been derived from Council's Community Outcome Statements and Draft Long Term Plan Community Outcomes are the goals that Council wants to achieve for the Community. They reflect what the Community sees as important for its well-being and they help to build up a picture of the collective vision for the District's future. The outcomes guide decision-making by Council. The Council links its activities and services back to the outcomes.

#	Strategic Statements
1	Social: A vibrant, healthy, safe and inclusive community.
2	Affordability: our communities are supported by quality infrastructure, facilities, and services that are efficient, fit-for-purpose, affordable, and meet our current and future needs
3	Prosperity: quality technology and an innovative and diverse economy that creates opportunities for self-sufficiency, sustainable growth and employment.
4	Culture: our lifestyle is treasured, our strong community spirit is nurtured, and our inclusive and caring communities understand our whakapapa and heritage and support lifelong learning.
5	Environment: the distinctive environment and natural resources are healthy and valued.

6.1 Applying the Strategic Statements (Community Outcomes) to Infrastructure Planning

Social: A vibrant, healthy, safe and inclusive community.

Infrastructure provision actions discussed in this strategy that support this statement include:

- Provide access to quality amenities for physical activity (roading and footpaths)
- Quality drinking water (water supply)
- Number of traffic accidents (roading and footpaths)
- Improved safety in public places (roading and footpaths)
- Emergency Management Programmes and preparedness (all)

Affordability: our communities are supported by quality infrastructure, facilities, and services that are efficient, fit-for-purpose, affordable, and meet our current and future needs.

Infrastructure provision actions discussed in this strategy that support this statement include:

- Provide access to quality amenities for physical activity (roading and footpaths)

Prosperity: quality technology and an innovative and diverse economy that creates opportunities for self-sufficiency, sustainable growth and employment.

Infrastructure provision actions discussed in this strategy that support this statement include:

- Provide access to quality amenities for physical activity (roading and footpaths)
- Improved safety in public places (roading and footpaths)

Culture: our lifestyle is treasured, our strong community spirit is nurtured, and our inclusive and caring communities understand our whakapapa and heritage and support lifelong learning.

Infrastructure provision actions discussed in this strategy that support this statement include:

- Provide access to quality amenities for physical activity (roading and footpaths)
- Improved safety in public places (roading and footpaths)
- Emergency Management Programmes and preparedness (all)

Environment: the distinctive environment and natural resources are healthy and valued.

Infrastructure provision actions discussed in this strategy that support this statement include:

- Provide access to quality amenities for physical activity (roading and footpaths)
- Quality drinking water (water supply)
- Emergency Management Programmes and preparedness (all)

6.2 The Organisations' Priorities

The Buller District Council updated its vision in 2020 to be "Fit for Future" by being agile and positive for our communities. The theme of 'Fit for Future' runs through the 2021-2031 Long Term Plan and this Infrastructure Strategy.

As a result of engagement with the community and iwi, an Environmental Scan and SWOT Analysis, Council also reviewed and updated its Community Outcomes. 'Affordability' was a key recurring priority that stemmed from this process, with the resulting Community Outcome developed to address this priority:

Affordability
Our communities are supported by quality infrastructure, facilities, and services that are efficient, fit-for-purpose, affordable, and meet our current and future needs.

Council is aware of the role of infrastructure in providing the basic needs of residents and underpinning economic activity. Alongside a commitment to affordability, this infrastructure strategy will guide Council's investment in future infrastructure.

When Council reviewed its vision, Community Outcomes, priorities and projects, and its key significant strategic issues, it conducted an Environmental Scan and a SWOT and PESTLE Analysis (an evaluation of Buller's strengths, weaknesses, opportunities and threats and a range of factors which could influence the district). From this, it became apparent that the Buller has a lot going for it, as well as several challenges. Our particular strengths relate to our resilient communities, mild climate, comparatively affordable land and housing, abundant natural resources, unique natural assets and environment, and endless recreational choices.

The main challenges identified related to socio-demographic factors, including our ageing population and the loss of our youth from the region, as well as geographic vulnerabilities including a geographically isolated and widely spread-out district with high infrastructure needs and a low rate-payer base. It acknowledged the increasing socio-economic problems in the community that have resulted from the loss of hundreds of industry-based jobs from the district over recent years and correlated with an increased reliance on unemployment benefits and a drop in our resident population. Our district's reliance on a few major employers has historically created considerable vulnerability to extractive industry boom and bust cycles, although recent drives to diversify our economy have succeeded in reducing this reliance somewhat. Natural hazards and vulnerability to climate change, in terms of our exposed coastline as well as an economy underpinned by highly vulnerable industries e.g., coal mining and dairy farming, where emissions reduction pressures will threaten their ongoing viability, are also key challenges to our district. Finally, there is a public perception of our district, our region, and our climate, held by many people across New Zealand, as outdated, backwards and a place where it always rains.

However, we also know that our district and region have many positive attributes and a balance of offerings that we must recognise in order to represent a well-rounded view as our community's Council. These include:

- A beautiful natural environment, which is reflected in the >85% of our District's land being under stewardship, a coast road drive with world-class scenic views, pristine and untouched nearby national parks, a large coastline with wild seascapes, ancient native rain forests, clean rivers and streams, and a mild climate – especially in winter months,
- A desirable location post-COVID e.g., remote and isolated,
- World-class tourist destinations, including the inland Old Ghost Road, the limestone pancake rock formations at Punakaiki, the Oparara Arches and the Heaphy Track in Karamea,
- A valued heritage with significant places of historical interest, including Denniston, and the ancient Maori village (circa 1350AD) located near Martin's Creek on the banks of the Buller River,
- Abundant mineral and water resources,
- Versatile infrastructure, comparatively low-cost land and homes, and no parking meters, traffic lights or traffic jams,
- Resilient and reliable public infrastructure and transport options
- Positive relationships with community and partner organisations including local and regional Department of Conservation staff, iwi and central government,
- High-quality schools, and teaching and teaching support staff that strive to provide the best quality education and consistently aim to turn out well-rounded and high achieving students,
- First class leisure and recreational facilities and opportunities for families of all ages, as well as many more adventurous opportunities for school aged youth and adults,

- An engaged community, and a well-developed and well-tried sense of community and community pride, manifesting as huge volunteer and charity activity, and friendly, resilient, adaptable, generous, egalitarian, people with 'no class structure' communities,
- Increasing ethnic diversity and a willingness to accommodate different cultures,
- Strong and connected social networks and public spaces, and a wide-range of community groups,
- An increasingly diversified economy with greater resilience to the 'boom and bust' extractive industry cycles of the past.

Creating a more prosperous, diversified, and sustainable economy and attracting people to our district to live, work, invest in and visit, must be founded in our strengths. We must build on the strengths and offerings listed above, and we must reinvent ourselves in the eyes of the rest of New Zealand to change the often-negative perceptions of the past.

The Revitalisation of our District has been identified as one our key Strategic Issues and is a priority for Council (discussed in Chapter 3 of this Strategy).

Our district has several initiatives and projects which have been in progress for many years. Some are responses to opportunities, others to challenges. Together these are best viewed at the scale of the whole district and include the Kawatiri Coastal Trail and associated river and beach trails, the wider network of district-wide biking and hiking trails, the Waimangaroa Town Heart project, the Reefton Strand Project, the NBS outdoor area, the Pounamu Pathway, the Punakaiki Masterplan and Dolomite Point Redevelopment Project, the Westport Riverbank, and the community hall and war memorial upgrades.

Some of these projects have been led by volunteers and community groups. Others have been led by iwi or the Department of Conservation. At times, Council has taken a lead role in ensuring the delivery of these initiatives, and at other times, Council's role has been as a facilitator and a supporter, through the provision of grants or by ensuring that the people doing the work have everything they need to succeed. Some of these projects have now been completed. On others, work is still underway.

All these things paint a picture of what 'fit for future' could look like.

Council will continue to provide grants to fund community-led revitalisation projects. These projects will support our community groups, facilitate community connectedness, and contribute to building places that have energy and are attractive and liveable. Council will identify and pursue central government funding opportunities that will bring investment into our district, develop jobs and training opportunities (especially for our youth), support social equity, inclusion, and connectedness, and make our places more liveable. By focusing effort on working collaboratively and in partnership with iwi, and through building local and regional capabilities and alliances, we will deliver environmental, recreational, and socioeconomic benefit across all our communities.

However, Council's main role for achieving our vision is primarily as a facilitator. Council will provide reliable, affordable services and infrastructure that meet the community's needs, help develop attractive towns and a district that people will want to visit and reside in. Finally, Council's role as an advocate cannot be understated. Our district requires its share of regional development to be successful now and in the future and to help transformation into modern, attractive locations with all the quality services that are now expected in 21st century communities. Council will work closely with other West Coast councils and Development West Coast to ensure that high speed Broadband

access to the internet becomes available across the district along with comprehensive mobile phone connectivity.

Council recognises the need to continue its path of transition to new ventures with ways to grow the district, create employment opportunities and make our towns more liveable and attractive to investors and newcomers.

A vibrant, diverse, and flexible local economy that provides sustainable jobs will enable the population to stabilise, and the prosperity of the district to improve.

The district's socioeconomic prosperity will be supported and improved by diversifying the district's economy and increasing affordability by diversifying the Council's income base (discussed in Chapter 3 of this Strategy).

Proposed approaches include:

1. Encouraging and enabling new industry via proactive initiatives and actions that lower barriers to establishment and investment within the district.
2. Facilitating added-value opportunities to future-proof existing business and deliver better margins and returns through encouraging mature industries to identify opportunities for productivity improvements, higher value processing, or new products and services.
3. Continuing support for the tourism industry and specific initiatives such as the Pounamu Pathway and other recreational, environmental, or cultural initiatives through advocacy, advice, or other forms of support.
4. Advocating to central government and facilitating the process to enable low value conservation land to be used for higher value purposes, as well as optimising the use of stewardship land.
5. Working cohesively with central government, iwi, other councils, and regional development organisations to collectively drive innovation and growth for prosperity, including identifying emerging industry sectors that would be suited to the West Coast regional environment.

Preparing for the significant changes that will be brought by climate change is also a priority for Council (discussed in Chapter 3 of this Strategy).

For the Buller district, climate change means we are going to get warmer, wetter, and windier. Over the coming decades, NIWA's likely scenario includes greater frequency and intensity storm events, including higher intensity rainfall, leading to changes in storm surge and wave height and thus more frequent or higher magnitude coastal flooding outcomes, as well as changes in fluvial flooding. Additionally, sea level is expected to keep rising for at least several centuries posing an ongoing challenge for us and future generations to create more sustainable coastal communities.

Local communities face an increasing burden because of natural disasters, weather events, and the effects of climate change on our coastal regions. Assets are at risk from sea level rise as well as fluvial flooding, and the impacts are most significant for water infrastructure and roads. There is a mismatch between the resources available to local authorities and the scale of their adaptation challenges. Many local areas with ageing populations will struggle to raise the capital necessary for future-proofing their infrastructure.

Council is responsible for developing strategies to ensure current risk exposure does not increase unmanageably in the future. The need to replace, protect, modify, or remove buildings, amenities

and infrastructure in vulnerable coastal areas increasingly exposed to natural hazards, is a major responsibility, where local government (along with central government) will have leadership roles.

Adapting to ongoing sea-level rise and flooding will require individuals, families, communities, businesses, infrastructure and utility providers, and local and central government to make choices about the future. Different interests, expectations, values, and world views may result in a lack of consensus. In addition, the impacts of sea-level rise and the consequences of planning decisions will not be the same for everyone. For these reasons, it is widely accepted that community engagement will be essential and that communities should play a central role in decision-making.

Council's work will be guided by relevant government requirements and its intention is to align the Council and the community through setting up a community stakeholder group.

Council will manage these challenges by engaging with central government to ensure a fair allocation of regional funding is secured for our district. Council will support a research-based approach and proactively partner with scientific agencies while strengthening its existing relationship with the West Coast Regional Council, to secure the necessary support for the process of developing a climate change strategy.

Council will also prioritise sustainability leadership for the district through:

1. Developing a sustainability strategy and policy and establishing baseline information to assess performance across various environmental performance parameters including greenhouse gas emissions, freshwater quality, biodiversity protection, and waste minimisation.
2. Recognising Council's opportunity to lead the community in reducing New Zealand's greenhouse gas emissions through supporting and undertaking various mitigation initiatives.
3. Focusing efforts towards reducing emissions through energy reduction initiatives and alternative transportation options e.g., electric vehicles, as well as practicable off-setting opportunities.
4. Facilitating an alliance between central and regional government, industry, iwi, landowners, and the community through the development and delivery of the Environmental Improvement and Prosperity Strategy 2021/22 and into the future that will translate into tangible improvements to our physical and natural environments.
5. Maximising opportunities presented by the Te Tai o Poutini planning framework to achieve greater consistency, and therefore improved outcomes, in the way our district's biodiversity values are protected.

The above priorities for achieving a prosperous, liveable, and attractive district together mean that Council needs to continue to invest in infrastructure assets. Over the life of this plan Council expects to spend $53m to maintain the level of service we currently have and to modernise our towns if the district is to be truly competitive as a place to live and work and play.

Affordability is one of the key challenges (and priorities) that many Councils, including Buller, faces. In the past 3 years leading up to this plan Council has demonstrated that it has been prudent in the allocation of is expenditure and has come well within its predictions of expenditure and the resultant rates increases. It also rates well in prudence measures by third party rates watchdog organisations.

For this LTP and IS to be sustainable Council also needs to be affordable both in the short and long term and to continue with this philosophy. Looking at this LTP operating expenditure is prudent, and

the resulting rates predictions are, in the majority of cases, close to the benchmarks that Council has set. These benchmarks have been developed keeping affordability for communities at the forefront.

Council continually looks at ways that it can provide better services or provide the same service a different way at a cheaper cost to the ratepayer. Shared services with other West Coast Councils are one way that costs can be saved and this will be driven for our Three Water assets through the central government-led Three Waters Reform process.

Council is adopting a shared services approach already with information technology, insurance, finance, civil defence, and the processing of building consents and planning.

Right sizing the district's infrastructure to service the district's future population, as well addressing climate change pressures and the way these can impact upon existing infrastructure, is a key focus of prudent infrastructure management and is also a priority for Council's management of its infrastructure assets.

6.3 Infrastructure Strategies

6.3.1 Asset and Service Management Strategy

Council's asset and services management strategy is to provide safe, affordable, sustainable core infrastructural services to the community and visitors that fully meet the environmental, social and economic needs of the district. Managing and maintaining these assets to ensure consistent and reliable service delivery to the community requires good asset management practices and strategic thinking. Buller District Council's approach will be a focus on maintaining its infrastructural assets to provide services in the most cost effective manner by following a long term strategic view and making prudent decisions regarding the funding of any further development of networks, and maintenance and renewal of the existing assets. This will be achieved through:

- Improving the maturity of asset information
- Systematic condition assessment to improve our evidence-based knowledge on the condition of buried piped networks
- Improving knowledge about network demand and risks
- Planning and managing using a prioritised approach (greatest risks and or greatest benefits)
- Programming works based on priority and cost-effectiveness
- Improving targeted maintenance tactics
- Enhancing works management systems to maximise efficiencies
- Improving renewal modelling for future budgeting

Council's lifecycle management approach is relatively straightforward with a priority on security of service and resilience. Condition monitoring is undertaken to refine renewal programmes. Systems thinking is applied to maintenance works, to seek improved service delivery and reduce costs. As affordability will be an ongoing challenge, lifecycle management practice will be key to driving savings and works prioritisation.

The delivery of roading services relies heavily on the services of contractors. Outsourcing is bundled as regular maintenance work requiring a local presence, or project type work that can be undertaken by a range of contractors who can undertake more finite works.

Council's Professional Services Business Unit plays a key part in the delivery of services as representatives of the asset owner (Council) and supervisor of contracts. The systems, processes and personal involved are responsible for ensuring the deliverables provided by contracts (inputs) and transferred into the outputs and outcomes sought by Council.

In summary, this strategy aims to ensure continued service reliability, stable asset conditioning, prudent growth provisions, maximising operational efficiencies and the enhancement of asset management practices based on evidence.

Funding of the identified improvement projects are included in the financial forecasts for each asset class.

6.3.2 Cost Effective Delivery of Services

In terms of section 10 (Purpose of local government) there is a clear requirement to meet the current and future needs of communities for good-quality local infrastructure in a way that is most cost-effective for households and businesses.

(2) In this Act, good quality, in relation to local infrastructure, local public services, and performance of regulatory functions, means infrastructure, services, and performance that are:

(a) efficient;
(b) effective; and
(c) appropriate to present and anticipated future circumstances

Efficient, effective and value for money service delivery in the maintenance and management of our public utility assets is paramount for our communities. Council is committed to ensuring maintenance contracts have clear outcome based performance measures. Service Delivery Reviews (LGA 2002 section 17a) are being undertaken for council activities to assess their effectiveness and efficiency. A service delivery review for the District Roading Maintenance Contract was undertaken in 2020. This review set out to ensure; assurance as to value for money, the roading asset management delivery is fit for purpose, inclusion of improved KPI measurement focusing on alignment between KPI and Waka Kotahi NZTA performance measures and it clearly defined H&S accountability for both the contractor and Council.

Throughout the timeframe in this LTP similar service delivery reviews will be undertaken for the both the Solid Waste Management contract and the Three Waters (Utilities Maintenance) contracts.

Challenges	Goals	Success	Barriers
• How do we know we are achieving value for money? • Health check of contract • NZTA requirement to go to market • Procurement plan or process not visible (no one stop shop) • Current contract does not include KPI's and frequency of measure • Higher level performance requirements are not written into the contract • Data capture • NZTA evidence score 57/100 • High customer expectations • Communication and service request tracking	• Assurance as to value for money • Roads are fit for purpose • To develop the leading roading contract model in NZ • Encourage streamlining of data collection • Improved KPI measurement • Alignment between KPI and NZTA performance measures • Contract model transferrable to other areas in council • Achieve best in class NZTA score • Clearly defined H&S accountability for both the contractor and BDC • Improved systems and processes (on-call, 24/7 response, pre-approved works) for managing service requests • Increased responsibility and efficiency in data capture • Improved alignment with Annual Report/Audit KPI's and external performance measures	• The asset long term plan aligns with and provides a benefit to the community • Future NZTA audits confirm roads are fit for purpose • Formation of a leading edge contract structure and content • Performance based drivers (key result areas, objectives, KPI's) are clearly defined and monitored • Clear accountability for H&S and communications are communicated • Improved alignment to section 17A in regard to cost effective service delivery and governance • An appropriate scope of services and specifications are developed and listed in the contract document	• Contract changes will be based on NZTA requirements • Grey areas from NZTA around road service levels • Contractors appetite for investment in improvements

Council is increasing its collaborative and shared services approach. This is generally with other West Coast Local authorities with initiatives such as the common District Plan, funding business cases for roading and Emergency Management. More integration of services should be expected, but without loss of local decision making and character.

6.3.3 Addressing Resilience

There is a need to increase the sophistication of how we think about resilience, shifting beyond a narrow focus on shock events or infrastructure failure and thinking more about interdependencies, levels of service and community preparedness. A longer-term view needs to be taken with increased focus on adapting to slower changes over time, including climate change. The graphic over the page shows key elements of resilience. Importantly, increased resilience is not necessarily about making things stronger or investing more and is quite often achieved by operational changes.

Council is aware that physical and system resilience is crucial. Resilience takes account of:

- Design and construction standards (where cost effective) that ensure infrastructure is able to withstand natural hazards and long term changes in circumstances such as those resulting from climate change.
- Organisations and networks of organisations with the ability to identify hazards must share information, assess vulnerabilities, and plan for and respond to emergencies.

Acknowledging the value of adaptability and redundancy in the network to improve business confidence. Identification and management of inputs into our infrastructure such as power supply.

In order to improve resilience Council approach will be to:

- Actively participate in CDEM planning and activities, at both regional and local levels
- Consider and action recommendations in Lifelines Reports

- Investigate options for alternative service provision and system redundancy (Current state: These are considered when any upgrades are completed.)
- Identify critical assets and ensure mitigation methods are developed (Current state: Critical assets have been identified, this ensures they have a higher focus from the team, with robust maintenance interventions, however more work is required to more formally document renewal strategies).
- Obtain insurance where this is deemed to be the most cost effective approach (Current state: Insurance is reviewed annually).

6.3.4 Evidence Base

Council acknowledge there may be limitations with its data that affect decision-making. Council's actions items are to improve data collection, recording and analysis.

Council intends to focus over this LTP period to undertake a complete audit of the Three Waters asset registers contained currently in AssetFinda and for roading to embark on asset data collection/verification programme to update asset data in RAMM. Refer to **Table 6-1**.

Council will continue to improve processes to better capture asset data, including operations and maintenance costs. We will update and refine the required renewal expenditure based on improved data. The renewal programmes will continue to be based on condition and performance monitoring including considerations around the criticality of assets and ensuring resilience in events of loss of service have been worked into the renewal programme. Asset renewal profiles and depreciation rates/calculations will be reviewed on a regular basis as improved information becomes available.

Table 6-1: Data Improvements

Activity	Data to be collected	Data to be analysed	Value this data provides
Land Transport	RAMM data	All asset tables in RAMM	Complete and comprehensive asset inventory for all roading assets such as bridges, retaining walls, signs, etc.
Roading	As per Waka Kotahi's ONRC Performance Report requirements	Traffic counts, road visual condition assessment	Heavy traffic counts will help identify key routes and align these with pavement management
Three Waters	AssetFinda data	Asset data such as extent, condition, material type Demand/ consumption readings Water leaks	To understand pressures in the network, unaccountable water loss, leaks, renewals, capacity constraints, network capacities, etc.
All	Subdivision consents granted and building consents granted for new houses	Infill data Capacities	Confirm sufficient supply capacities in treatment plants and networks due to additional users

The approach to data collection and management will be discussed in the respective asset management plans and budgets included where appropriate.

6.4 Significant Decisions Required

Taking a long term view to the management of infrastructural Assets, Council needs to make key decisions in a timely manner. In addressing Community desires and priorities the following key decisions in **Table 6-2** have been identified. All of the significant decisions has been translated into projects in the determining of the budget requirements for this strategy and will be further discussed in **Section 7**.

Table 6-2: Significant Infrastructure Decisions

Key Decision	Indicative Timeframe
Water Supplies – Water Quality and Management Programme of upgrades required and the role of community members as operators	2021/22 - 2023/24
Westport Wastewater Treatment Plant Consent 408/2 - discharge to river during storm overflow expires July 2023.	2021/22 - 2022/23
Stormwater improvements	2021/22 following WCRC flood protection decisions
Bridge renewals and upgrades (timing and level of service to be provided)	2021/22-2051/52
Special Purpose Road – options for future management	2021/22-2023/24 Decision prior to 2024
Planning around current trends of development in the District: • Analysis of latest development areas in district (Westport and Reefton recorded increase in new houses being built) • Modelling of plants and network capacities • Understanding potential need to expand current networks • Improved processes in the Development Engineer space	2021/22 – 2023/24
Separation of wastewater and stormwater – planning and way forward	2021/22 – 2023/24
Installation of backflow prevention valves in District – programme to implement	2021/22 – 2051/52
Non-complying Water Supply areas in District	2021/22 – 2023/24
Implications on Three Waters imposed by new Regulator Taumata Arowai	2021/22 – 2023/24

7. SIGNIFICANT STRATEGIC INFRASTRUCTURE ISSUES

The Local Government Act 2002 Section 101B – Infrastructure Strategy states:

(2) The purpose of the infrastructure strategy is to—

"(a) identify significant infrastructure issues for the local authority over the period covered by the strategy; and

The overall strategic position for this Infrastructure Strategy is one of **"affordable asset preservation and compliance"**, mindful of known infrastructure condition, remaining useful life and mandatory priorities; constrained only by district ratepayers ability to afford the costs.

As part of the LTP Significant Strategic Issues, Infrastructure, Affordability & Reform, Climate Change Resilience & Environmental Sustainability were identified and raised the following questions about Council's Infrastructure:

- Is the district's infrastructure sized correctly, fit-for-purpose, reliable and affordable?
- What are the climate change implications for the district's infrastructure?
- What savings can be made whilst still maintaining assets in a sustainable manner?
- What are we doing about central government's Three Waters Reform?
- What are we doing about the Karamea Special Purpose Road (SPR)?

The Infrastructure Strategy and corresponding Asset Management Plans will aim to address these key questions and expand on the following principles:

- Addressing infrastructure backlog i.e. the deficit of renewal works required to meet Level of Service outcomes
- Applying new strategies (e.g. "bring to satisfactory", satisfying expectations and needs) i.e. cost to bring assets from "poor/adequate" to "fair/good", and not necessarily excellent
- Introducing new Key Performance Indicators (KPIs) to measure and communicate strategic performance i.e. Infrastructure Backlog Ratio, Asset Maintenance Ratio and Asset Renewal Ratio

Since improving the affordability of the services provided to the community and addressing legislative reform (e.g. compliance requirements) are typically competing tensions, the above three principles will provide the necessary basis to develop an IS position appropriate for the LTP from the following options:

- More: Asset Management Budget – Level of Service basis, increase from previous LTP budget, resulting in additional costs for ratepayers, with or without known external funding/FAR
- Same: Status Quo Budget – reduced scope matched to previous LTP budget plus known external funding/FAR, resulting in no change for ratepayers
- Less: Opportunity Budget – further reduced scope matched to previous LTP budget minus known external funding/FAR, resulting in savings for ratepayers

The key areas to be addressed by this Infrastructure Strategy are:

- Level of service
- Asset preservation
- Asset renewal

The key considerations which has been described amongst other topics in detail in Section 5 and have been accounted for in the financial forecasts are:

- Three Water Reforms, Taumata Arowai and Water Services Bill
- Resource Management Act Reforms
- Freshwater Policy Statement
- Environmental Impacts
- Climate Change and Climate Adaptation
- NZTA Waka Kotahi FAR 72%
- COVID-19 pandemic recovery
- Community outcomes in relation to infrastructure needs

The Infrastructure Key Strategies are:

- Reform risks & opportunities, including external funding
- Addressing the infrastructure backlog by accelerating renewals
- Define success targets and “bring to satisfactory” concepts
- Introduce measurement tools and metrics to track performance
- Improve asset data, in particular for roading (RAMM)
- Apply Waste Minimisation & Management Plan (WMMP) strategies:
    - Reduction in the quantity of waste generated
    - Improving recycling material via education and regulation
    - Management of special waste
    - Providing waste services and local facilities for solid waste
    - Compliance and appropriate management of Landfills

The following are Infrastructure’s Key Projects for the 2021-2031 LTP:

- Transport & Roading:
    - Increased investment for bridge renewal and replacement
    - Continued investment in footpaths, walkways and cycleways
    - Ongoing improvement in asset management capability and capacity
    - Uplift in sealed road surfacing
    - Consideration of the Special Purpose Road Transition Plan.
- Drinking Water:
    - System upgrades to DWSNZ and regulator compliance
    - Trunkmain renewals
    - Backflow prevention
    - Resolution of non-treated supplies

- Condition assessment/modelling
- Compliance monitoring/reporting

- Wastewater:
  - Treatment plant consenting and compliance
  - Network separation of wastewater and stormwater
  - Deep sewer and pipeline renewals
  - Condition assessment/modelling
  - Compliance monitoring/reporting
- Stormwater:
  - Flooding mitigation works
  - Pipeline renewals
  - Condition assessment/modelling
  - Compliance monitoring/reporting
- Solid Waste:
  - Landfill management plans
  - Waste minimisation costs
  - Promoting good practices to effective management of waste:
    - Waste management bylaw
    - Enviroschool programme
    - Education campaign
    - Management of special waste
  - New or renewed service contract (current expires February 2024)
  - New landfill site planning (if key break-even parameters are met)
  - Closed landfills risk assessment and after care
  - Renew resource consents
  - Compliance monitoring/reporting
  - Leachate pond investigations at closed landfill sites
  - Composting greenwaste recovery facilities
  - Compacting/crusher machine/resource recovery centre investigations
  - Feasibility for a local reprocessor plant
  - Collaborative planning for Regional Landfill Management (long term)
  - Transfer station renewals and upgrades.

Special Note on Transport & Roading:

The Land Transport Combined Activity Management Plan and Programme Business Case (PBC) was prepared and submitted to NZTA Waka Kotahi during December 2020. The PBC approach and theme has been 'Preparing for Change', which involved developing a combined regional approach to then align with the Regional Land Transport Plan (RLTP).

The objective is to continue building the strongest case for investment in roading assets. The investment priorities focussed on resilience, asset condition, freight and tourism (post Covid-19).

The option proposed for Buller's Economic Case is "Preserving our assets", as summarised below:

- Well aligned with our investment objectives, delivering benefits for asset condition, freight, road safety and resilience.
- Condition-based replacement of bridges and other structures is a core focus, these will achieve some Level of Service (LoS) improvements.
- Road maintenance and renewals are enhanced.
- Detailed investigations and assessment are building our evidence and knowledge base.
- Increasing staff capability and capacity for Asset Management.

7.1 Council's Asset Data

7.1.1 Asset Data

Council's asset data is currently stored on two Assets Management System's "AssetFinda" (all non-roading assets) and "RAMM" (for roads). All historical asset data for Three Waters and Roading has been loaded into both systems with continual data updates from our service providers through interfaces into the systems. This system is managed by staff and all inputted data is checked against the service providers KPI's with any further information (financials) also added.

Infrastructure planning is working to improve data and information quality. This is needed to establish a more reliable basis for decision-making and proposed actions outlined in this strategy. Council has actively conducted CCTV and condition assessment of pipes to have better understanding of underground assets. These assumptions related to asset data are that:

- We will continue to improve processes to better capture asset data, including true operations and maintenance costs
- We will update and refine the required renewal expenditure based on the improved data
- The renewals programmes will continue to be based on condition and performance monitoring; and
- Asset renewal profiles and depreciation rates/calculations will be reviewed on a regular basis as improved information becomes available.

An assessment of confidence in the data underlying the current Asset Management Plans is shown in **Table 7-1**.

Table 7-1: Asset Data Confidence Rating

Asset class	Data confidence grade	Method of assessment
Water	B - Data based on sound records, but has minor shortcomings. Dataset is complete and estimated to be accurate ±10%. *Asset data is being updated with work orders on monthly basis.*	Register analysis
Wastewater	B - Data based on sound records, but has minor shortcomings. Dataset is complete and estimated to be accurate ±10%. *Asset data is being updated with work orders on monthly basis.*	Register analysis
Stormwater	B - Data based on sound records, but has minor shortcomings. Dataset is complete and estimated to be accurate ±10%. *Asset data is being updated with work orders on monthly basis.*	Register analysis

Asset class	Data confidence grade	Method of assessment
Roading	B - Data based on sound records, but has minor shortcomings. Dataset is complete and estimated to be accurate ±10%. *Asset data is being updated with work orders on monthly basis.*	Register analysis

The expected life of each asset type in each Activity is also set in the Asset Management Plans and the Asset Valuation to help determine how long the assets are expected to last for. Refer to **APPENDIX C: THREE WATERS INFRASTRUCTURE ASSET VALUATION**.

A data confidence grading system is used for describing the confidence Council has in the accuracy of the asset data; i.e. if the data was taken from "as-built" drawings, the data would have a high confidence rating but if most of the data is based on estimate, the confidence would be low.

7.1.2 Asset Renewal and Conditions

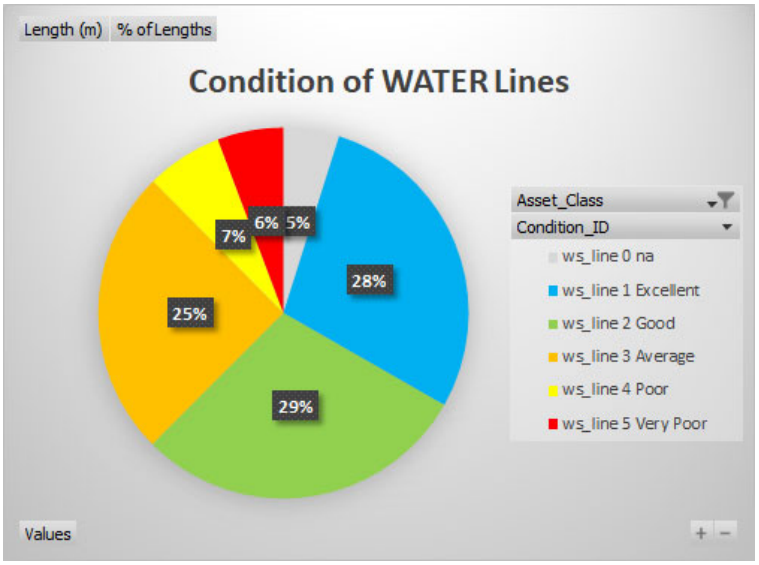
Asset conditions are updated by Council's contractors into the asset management systems. This data is used to generate planned/preventative maintenance and asset renewal projects.

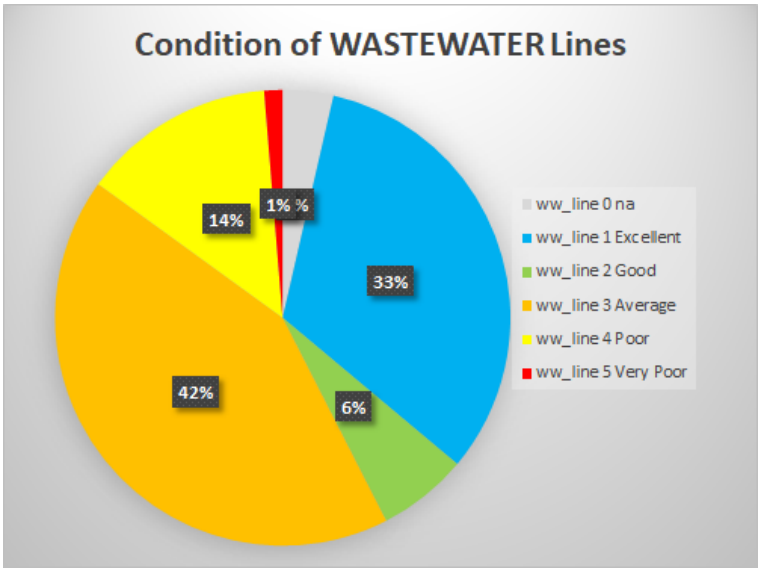
A large amount of the District's infrastructure was built in the 1960s and 1970s. With an average age of 60 years, many of these assets are now reaching, or have already passed, the end of their expected life. Maintaining these ageing assets becomes more difficult as their age increases. The District is now facing the challenge of balancing the increasing maintenance and renewal costs.

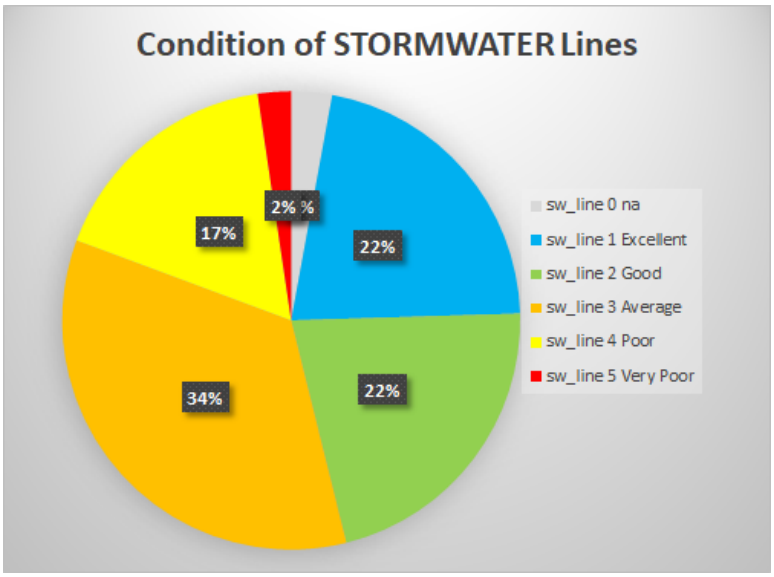
The key issue for Council's infrastructure assets is not what needs to be provided, but how to maintain existing assets funded over time. Managing infrastructure assets well is the foundation for Council's ability to provide new facilities for the community in the future.

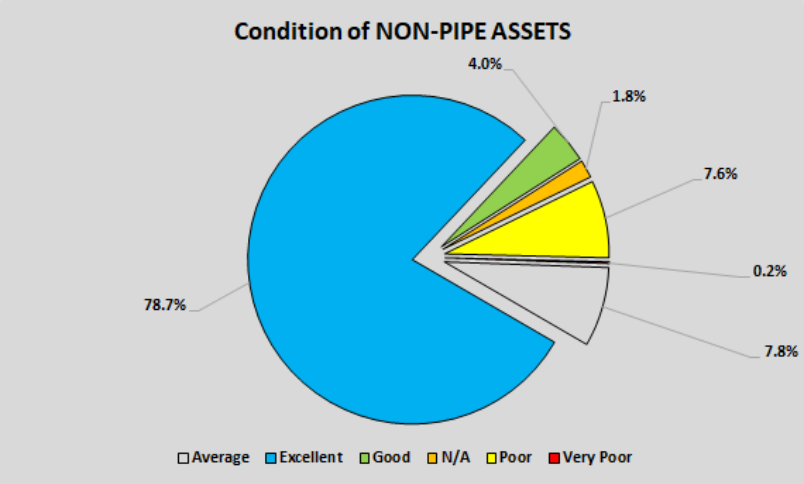
Developing partnerships with other Councils or service providers can be complex and has risks. However, there are local government financial constraints that can make it difficult to ensure infrastructure continues to meet the needs of the community. Council has an operations and maintenance contract to operate and maintain Council's Three Waters network and treatment plants.

Another key risk is around Council's knowledge of its assets and financially planning for renewals. As the asset database is updated, asset condition may get adjusted and new assets can be found. This affects rate valuations, which in turn affects annual depreciation and renewal needs. This ongoing improvement process affects Council's annual operating expense and is currently causing an increase in the expected funding of renewals. The following graphs reflect the condition of three waters assets in the District at the time of writing this Strategy.


Length (m)
% of Lengths
Condition of WATER Lines
28%
29%
25%
7%
6%
5%
Asset_Class
Condition_ID
ws_line 0 na
ws_line 1 Excellent
ws_line 2 Good
ws_line 3 Average
ws_line 4 Poor
ws_line 5 Very Poor
Values


Condition of WASTEWATER Lines
33%
6%
42%
14%
1%
ww_line 0 na
ww_line 1 Excellent
ww_line 2 Good
ww_line 3 Average
ww_line 4 Poor
ww_line 5 Very Poor


Condition of STORMWATER Lines
22%
22%
34%
17%
2%
sw_line 0 na
sw_line 1 Excellent
sw_line 2 Good
sw_line 3 Average
sw_line 4 Poor
sw_line 5 Very Poor



Three Waters non-pipe assets are an aggregate of small to medium sized assets listed in AssetFinda (Pump, Valve, Filter, Switchboard, Screen, etc) under Plant with each assets condition being updated when replaced.

The following information reflect the condition of land transport assets in the District at the time of writing this strategy.

2.6.3 FOOTPATH CONDITION

Source: Footpath Condition Data Analysis, Beca, Sept 2020

Condition surveys are done bi-annually from 2002-2019. The surveys rate the network on a 1 (Good) to 5 (Very Poor) scale. The condition results are shown below by km length reported in each grading.

Table 11: Footpath Condition Summary

Survey Year	1	2	3	4	5	total
2002	0.51	27.14	30.51	15.84	5.87	79.87
2005	3.92	28.69	22.38	20.91	4.25	80.15
2007	4.92	40.26	27.08	7.68	0.21	80.15
2009	12.32	41.91	19.08	8.46	0.05	81.82
2011	7.28	58.75	14.49	1.74	0.26	82.53

Survey Year	1	2	3	4	5	total
2013	8.83	53.98	17.32	2.82	0.94	83.89
2015	3.21	30.60	8.08	0.37	0.59	42.85
2017	6.89	63.07	12.64	0.38	0.00	82.98
2019	6.26	67.86	9.78	1.20	0.00	85.10

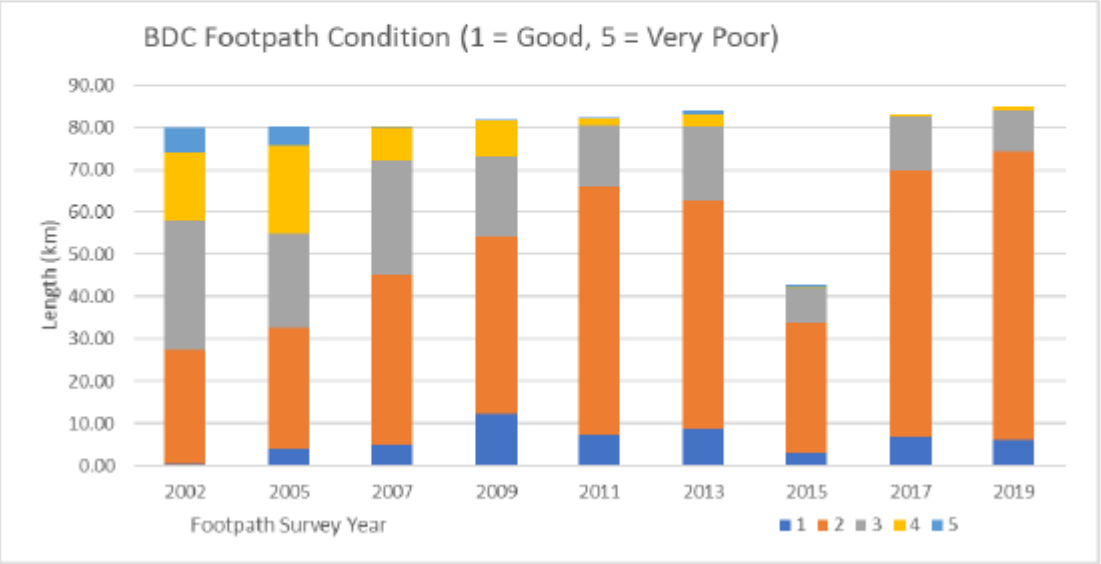


Figure 8: Buller Footpath Condition Trend

2.7.2 DRAINAGE CONDITION DATA ANALYSIS

Sealed road condition surveys are done bi-annually with results shown from 2011. The surveys rate the lined (kerb and/or channel) and earth channels. The condition results for each rated fault type are shown below by percentage length reported in each grading.

Table 14: Drainage Condition Summary – Lined Channels

Lined Channel: Survey Year	Broken Channel	Broken Surface	High Lip	Uphill Grade	Blocked Channel
2011	1.4%	0.9%	1.0%	0.1%	0.2%
2013	2.1%	0.7%	1.3%	0.5%	0.4%
2015	2.2%	0.8%	1.3%	0.3%	0.4%
2017	2.2%	1.1%	1.2%	0.5%	0.6%
2019	3.0%	1.2%	1.5%	0.7%	0.7%

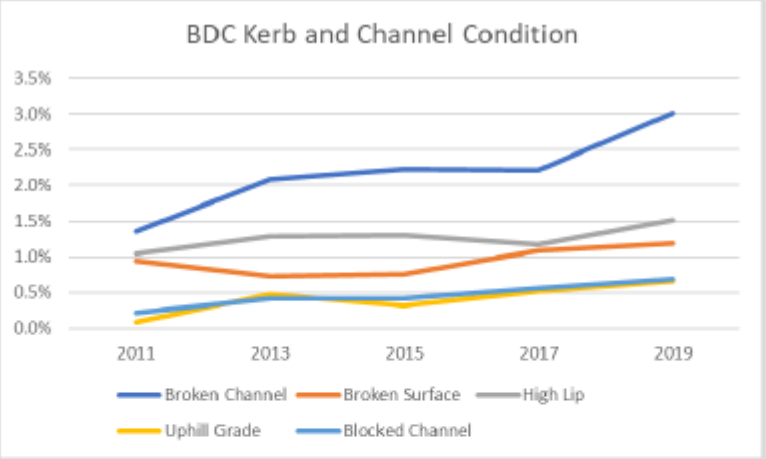


Figure 9: Buller Kerb & Channel Condition Trend

Table 15: Drainage Condition Summary – Earth Channels

Earth Channel: Survey Year	Blocked Earth Channel	Ineffective Shoulder	Inadequate Earth Channel
2011	0.0%	7.9%	5.3%
2013	0.0%	12.8%	3.8%
2015	0.0%	9.6%	3.4%
2017	0.1%	9.0%	4.8%
2019	0.0%	5.5%	2.2%

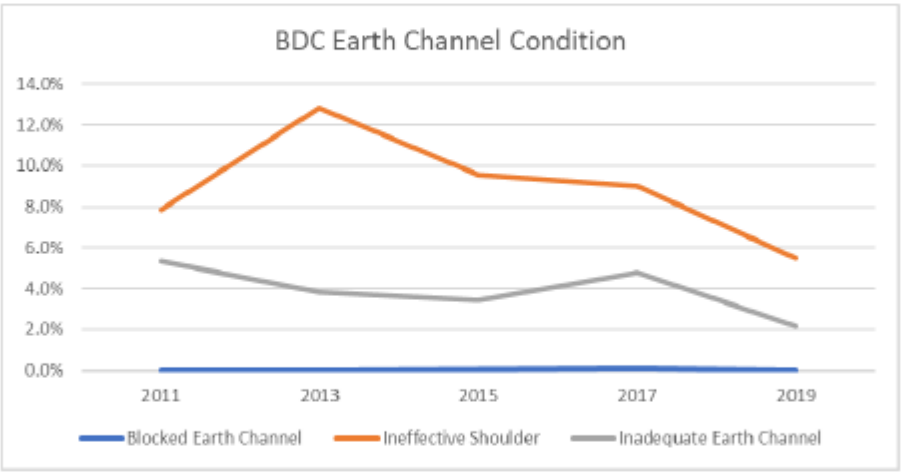


Figure 10: Buller Earth Channel Condition Trend

The results show a steady deterioration in condition of the lined channels. Unlined channel condition is improving.

3.3 Condition rating

	General Rating	Foundation Rating	Waterway Rating	Superstructure Rating	Overall Rating	No. Structures
Bridges	1.64	1.75	1.92	1.85	1.74	101
Culverts	1.69	1.90	2.05	1.76	1.76	43
All Structures	1.66	1.80	1.96	1.83	1.75	144

The overall condition of the BDC bridge stock is very good. The areas of lowest rating are waterways and foundations, with defects typically related to scour damage, abrasion damage to inverts and decay of timber substructure elements.

Works that should be undertaken to combat the deterioration of BDC's bridge assets include:

- Continuing to renew old timber bridges. Where this is not economical, sealing the approaches, installing running deck planks and clearing abutment shelves are proactive measures to prolong the life of these assets;
- Removing willows adjacent to bridges and undertaking scour protection works.
- Painting steel beams;
- Undertaking concrete repairs;
- Constructing inverts to corroded metal culverts.

For bridge inspection report and programme of works refer to **APPENDIX D: BRIDGE INSPECTION REPORT AND PROGRAMME OF WORKS 2018**.

7.2 Levels of Service

This Infrastructure Strategy provides a guide to Councils long term service provision over a thirty-year period based on the current service levels provided by Council and known and agreed changes in Councils service levels. The assumption is that Council's Levels of Service targets won't change and due to the uncertainty around regulatory changes the levels of service has been kept the same. This will be reviewed once there is more certainty around the regulatory implications for Council in terms of the levels of service they need to provide to be complaint with the then proposed changes.

This Infrastructure Strategy does not provide commentary on annual service levels or current service level performance measurement of the services that Council currently provides. Councils Long Term Plan provides detail on annual service levels, performance measures and achievements. This Infrastructure Strategy forms part of Councils Long Term Plan document suite that includes the Long Term Plan, Financial Strategy, Infrastructure Strategy and Consultation Document. This Infrastructure Strategy should be read in conjunction with the other documents in the Long Term Plan document suite for full disclosure of required information.

The levels of service for Council's asset groups for this infrastructure strategy are summarised in **Table 7-2** below.

Table 7-2: Levels of Service

Activity	Community Outcome	Activity Contribution	Level of Service	Mandatory Performance Measure
Work types or 'activities' Council undertakes on behalf of its ratepayers	***High level visions and commitments made by Council to the community it represents***	***The way in which Council's work contributes to achieving its commitments to the community***	***The specific service Council provides to the community***	***How we will know if we are meeting our LOS commitments to the community***
LAND TRANSPORT LEVELS OF SERVICE				
Roads and Transport	Our communities are vibrant, healthy, safe, and inclusive	Roads, footpaths, and transport links help to achieve an integrated, safe, responsive, and sustainable land transport system	No change or reduction in the safety quality of the road network from the previous financial year in the number of fatalities and serious injury crashes Ensure District Roads remain safe	No change or reduction in the safety quality of the roading network from the previous financial year
Roads and Transport	Our communities are vibrant, healthy, safe, and inclusive	Roads, footpaths, and transport links help to achieve an integrated, safe, responsive, and sustainable land transport system	The sealed and unsealed roads are fit-for-purpose and provide for comfortable, efficient and safe travel Smooth Travel Exposure (STE) is measured on our sealed road network Sealed and unsealed roading network is being maintained	Smooth Travel exposure (STE System Scoring Count) is greater than 90STE performance per km of road roughness The ten-year average for sealed local road that is resurfaced is greater than 5.8% per annum based on network length Unsealed network surfacing renewal annual target of greater than 2,500m^3
Roads and Transport	Our communities are vibrant, healthy, safe, and inclusive	Roads, footpaths, and transport links help to achieve an integrated, safe, responsive, and sustainable land transport system	Footpaths are fit-for-purpose and provide for comfortable and efficient travel Footpaths are maintained within the level of service standard for the condition of footpath	Continue to achieve 75% of District footpaths ranked as Grade 1 and 2 (Satisfactory) Continue to achieve 95% of District footpaths ranked as Grade 1 through to 3 (Satisfactory – Fair)
Roads and Transport	Our communities are vibrant, healthy, safe, and inclusive	Roads, footpaths, and transport links help to achieve an integrated, safe, responsive, and sustainable land transport system	It is important to be response to, and focus on, the customer Ensure that the customer service requests relating to road and footpaths are acknowledged and placed into the forward works programme (as appropriate in relation to priority)	Service requests are managed through the service request systems and 85% of requests are planned for action, inline with level of service criticality, within 15 working days
SOLID WASTE MANAGEMENT LEVELS OF SERVICE				

Activity	Community Outcome	Activity Contribution	Level of Service	Mandatory Performance Measure
Solid Waste	By 2040 Buller District Council will be a District where its population transformed their behaviours and waste practices and the majority of all discarded materials are reused, recovered and diverted from landfills	Council provides ethical, economical and efficient waste management services, where the concepts of sustainability and social responsibility are equally valued alongside cost. The goal is to annually decrease the quantity of waste generated per capita and to increase the diversion rate from landfill	Council provides a kerbside refuse collection and recycling in Zone 1 Karamea and Springs Junction communities are serviced by landfill operation Residents will be encouraging to reduce waste, reduce the recycling contamination and follow the local recycling rules Explore opportunities to extract value from resources making the waste management system more financially and environmentally sustainable in the long term	100% of compliance with regulations set in the RMA, the resource consents and environmental national regulations Undertake 2 community engagement events, community education events to encourage the reduction of waste generated and increase of diversion from landfill
WATER SUPPLY LEVELS OF SERVICE				
Provide an adequate quality of water	Our communities are vibrant, healthy, safe, and inclusive	Safe drinking water supports the health of our community	Council Water supplies conform to Part 4 and Part 5 of the Drinking Water Standards	Full Compliance (100%) with Part 4 (Bacteria compliance criteria) Full Compliance (100%) with Part 5 (Protozoa compliance criteria)
Provide a reliable supply of water	Our communities are vibrant, healthy, safe, and inclusive	A reliable supply of water is provided through a maintained network	No more than a percentage of real water loss from the networked reticulation system	No more than 30% water loss from the reticulation system
Provide a reliable supply of water – Fault response times	Our communities are vibrant, healthy, safe, and inclusive	A reliable supply of water is provided through a maintained network	Response to network outages, faults and unplanned interruptions are measured	Attendance for urgent call-outs: from the time that the local authority receives notification to the time that service personnel reach the site is to be 2 hours Resolution of urgent call-outs: from the time that the local authority receives notification to the time that service personnel confirm resolution of the fault or interruption is to be 8 hours Attendance for non-urgent call-outs: from the time that the local authority receives notification to the time that service personnel reach the site is to be 1 working day Resolution of non-urgent call-outs: from the time that the local authority receives notification to the time that

Activity	Community Outcome	Activity Contribution	Level of Service	Mandatory Performance Measure
				service personnel confirm resolution of the fault or interruption is to be 5 working days
Provide a reliable supply of water – Demand Management	Our communities are vibrant, healthy, safe, and inclusive	Demand on the water supply is managed through a maintained network	Meet the average consumption of drinking water per day per resident within the Buller District	700 litres per resident per day
Provide an acceptable supply of water – Customer Satisfaction	Our communities are vibrant, healthy, safe, and inclusive	An acceptable supply of water is provided through a maintained network to communities	Stated performance delivery of the supply does not exceed the total complaints received target on the following aspects of the drinking water: • Clarity • Taste • Odour • Pressure or flow • Continuity of supply	Less than 50 valid complaints per 1,000 connections for these measures
WASTEWATER LEVELS OF SERVICE				
Provide adequate wastewater and sewerage systems	Our communities are vibrant, healthy, safe, and inclusive	Wastewater and sewerage systems contribute to maintaining public health	Wastewater and sewerage systems provide adequate capacity in relation to dry weather overflows	less than 5 sewerage overflows per 1,000 connections
Wastewater and sewerage discharge compliance	Our communities are vibrant, healthy, safe, and inclusive	Provision of wastewater and sewerage collection and disposal systems that contribute to ensuring minimal environmental impact	Wastewater and sewerage systems are managed within resource consent parameters, with less than 5 abatement notices and no infringement notices, enforcement orders and convictions in relations to those resource consents	less than 5 abatement notices 0 infringement notices 0 enforcement orders No convictions received
Provide reliable wastewater and sewerage systems – Fault response time	Our communities are vibrant, healthy, safe, and inclusive	Fault response provides a reliable wastewater and sewerage collection and disposal systems	Response to network overflows resulting from a blockage or other fault in the system	Attendance time: from the time that the territorial authority receives notification to the time that service personnel reach the site is to be 2 hours Resolution time: from the time that the territorial authority receives notification to the time that service personnel confirm resolution of the blockage or other fault is to be 1 working day
Provide acceptable wastewater and sewerage	Our communities are vibrant,	An acceptable wastewater and sewerage collection and	Stated performance delivery of the system does not exceed the total complaints received	less than 5 complaints per 1,000 connections for each of these measures

Activity	Community Outcome	Activity Contribution	Level of Service	Mandatory Performance Measure
systems – customer satisfaction	healthy, safe, and inclusive	disposal systems is maintained for communities	target on the following aspects of the sewerage and wastewater system: • Odour • System faults • System blockages • Council response to any of these issues	
STORMWATER LEVELS OF SERVICE				
Provide adequate stormwater drainage capacity	Our communities are vibrant, healthy, safe, and inclusive	Stormwater systems contribute to maintaining public safety	The number of flooding events in the stormwater systems are managed to an target level of service set in the performance measure	No target has been set for the number of flooding events as it is deemed that flooding events are outside of Council control For each flooding event, the number of habitable floors affected (expressed per 1,000 properties connected Councils stormwater system) is not more than five houses flooded for each event
Stormwater environmental discharge compliance	Our communities are vibrant, healthy, safe, and inclusive	Provision of stormwater collection and disposal systems that contribute to ensuring minimal environmental impact through its discharge	Stormwater systems are managed within resource consent parameters, with no abatement notices, infringement notices, enforcement orders and convictions in relations to those resource consents	0 abatement notices 0 infringement notices 0 enforcement orders No convictions received
Provide reliable storm water systems – Fault response time	Our communities are vibrant, healthy, safe, and inclusive	Fault response provides a reliable stormwater collection and disposal systems	Response to flooding overflows resulting from a blockage or other fault in the system	The median response time to attend a flooding event, measured from the time that Council receives notification to the time that service personnel reach the site is to be 1 hours
Provide acceptable stormwater systems – customer satisfaction	Our communities are vibrant, healthy, safe, and inclusive	An acceptable stormwater system is maintained for communities	Stated performance delivery of the system does not exceed the total complaints received about the performance of the stormwater system	less than 10 complaints per 1,000 connections

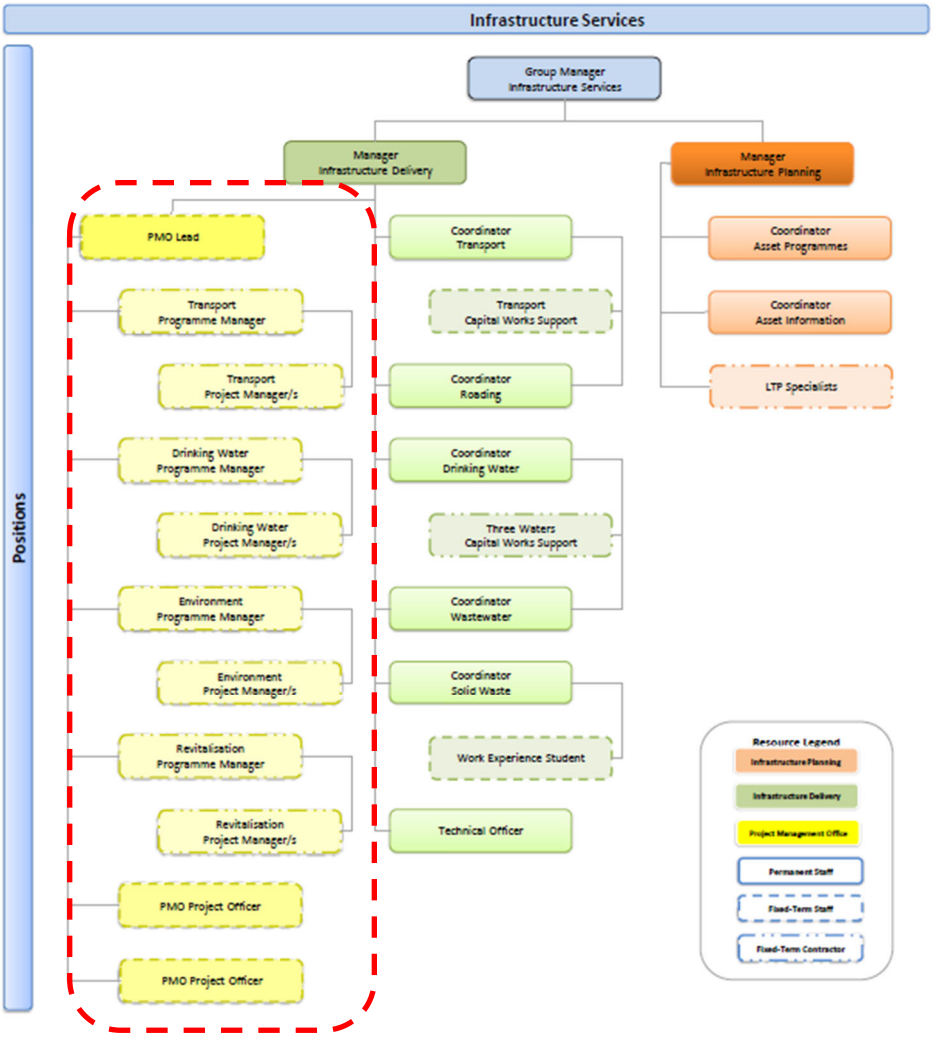
7.3 Capital Works Programme

Council's Infrastructure Services have established a dedicated Project Management Office (PMO) to deliver an extensive capital works programme across all portfolios. Reporting through the Infrastructure Delivery function, the PMO has the capacity to expand according to the level of capital investment, including externally funded projects additional to our Long Term Plan. The PMO has a key objective of being the preferred service provider and trusted partner of internal and external customers to deliver projects successfully for asset owners and key stakeholders. This will be

achieved by applying best practice planning and implementation principles to achieve value-for-money objectives in terms of scope, budget, schedule, quality, risk and safety management through the following PMO statement of intent:

Key Objectives	Expected Results	Means
• Set and maintain the highest standards in managing successful project outcomes using proven knowledge areas and methodologies, including PMBoK and PRINCE2 for predictable and consistent results. • Establish effective and transparent procurement processes which achieve value for money in the interest of asset owners and key stakeholders. • Ensure comprehensive asset owner and stakeholder representation, quality monitoring and ongoing maintenance considerations for all capital works projects	• Develop and refine a scalable PMO framework of systems, processes and procedures consistent with Council's major project delivery model. • Drive effective project lifecycle principles and quality control reviews through the PMO to maximise benefits and opportunities, reduce impact of change and manage risk. • Ensure all purchasing is in accordance with probity principles and in a competitive environment conducive to Council achieving best outcome and certainty in the award of orders and contracts. • Enable appropriate inputs to the PMO via collaboration and advice from asset owners, key stakeholders and subject matter experts.	• Coordinate and control programme/project reporting deliverables including implementation plans, status reports, Council or Committee papers, communications, stakeholder engagement, public messaging including media releases and community updates. • Create a suite of tools and guidelines for broader Council implementation as a value-add benefit of the PMO function. • Ensure compliance with local government rules, Council's Procurement Policy and consideration to legislation, regulations and best practice. • Target Cost Performance Indicators (CPI = Earned Value/Actual Costs) and Schedule Performance Indicators (SPI = Earned Value/Planned Costs) for all projects to be > 1.0

The organisation structure of the PMO is illustrated below.



Further information regarding Infrastructure Services approach to capital works delivery can be found in our Major Project Delivery Model guideline G01, refer to **APPENDIX E: MAJOR PROJECT DELIVERY MODEL**.

Considering emerging issues, and to manage risks around constructability and uncertain market forces in the current COVID climate (including matters such as material supply, freight and labour availability), Council has successfully adopted additional control measures. These include establishing specific steering committees, terms of reference with appropriate delegated authorities and effective procurement models such as Early Contractor Involvement (ECI).

This has enables speed to market engagement, integration of the contractor's constructability assessments and skills that in turn allows parties to manage and procure key lead critical items to minimise construction risk. It is worth noting that through the life of this Infrastructure Strategy; market conditions may change again. As they do, Council will remain flexible in its approach to align with delivery processes which are fit for purpose and attain best value for money outcomes.

7.4 Three Waters

In the preparation of the financial budgets to support the Infrastructure Strategy for the 2021-2031 Long Term Plan (LTP), the following matters were considered to address key issues of compliance and national reforms for Three Waters in a measured and practical manner:

- Capital investments have been “smoothed” over the LTP period.
- Since the preferred asset investment programme has been reduced due to affordability constraints, Council will be accepting residual risk of asset failure.
- Consequences of asset failure include non-compliance, public health events, loss of service level and unplanned expenditure.
- The preferred renewal programme has been reduced in accordance with financial depreciation modelling to achieve lower rates, but results in an insufficient funding.
- The portfolio of Three Waters is facing a perfect storm:
    - Meeting mandatory compliance while keeping expenditure low
    - Addressing historic backlog of scope inclusions and renewals while keeping expenditure low
    - Facing increased regulation of which the implications are currently unknown while keeping expenditure low
- Installation of backflow preventors and the preparation of water safety plan have been identified as priorities and will be implemented in a progressive manner.
- By deferring renewals and “smoothing” level of service improvements over multi-year rollouts has resulted in lowering the rates but has increased the risk to council over the LTP period.

In summary, the principal options considered across all three waters infrastructure (drinking water, wastewater and storm water) have been based on financial strategy settings, budget constraints and ratepayer affordability.

Since the preferred asset management programme is considered unaffordable to ratepayers, the remaining options can be simplified as being either to increase investment in an affordable way, or continue with the previous Long Term Plan investment and do nothing additional to the known key issues. Refer to the **Table 7.3** below.

Table 7-3: Three Waters Option Analysis

Option	Advantages	Disadvantages
1. Affordable Asset Preservation & Compliance	• Increased investment to achieve some mandatory compliance requirements, resolve some historic backlog and manage increased regulation requirements with more resourcing. • Moderate increase in rates • Expenditure approximately $80M over LTP period, $19M over the first 3 years	• Key issues not fully or urgently resolved leaving residual risk of asset failure, non-compliance, public health events, loss of service level and unplanned expenditure on essential infrastructure. • Increases backlog of essential renewal and upgrade capital works.
2. Previous Long Term Plan Investment	• Minimal expenditure, minimal increase in rates. • Expenditure approximately $50M over LTP period, $14M over the first 3 years	• Significant risk of asset failure, non-compliance, public health events, loss of service level and unplanned expenditure on essential infrastructure.
3. Preferred Asset Management, Preservation & Compliance	• Appropriate investment to achieve mandatory compliance requirements, resolve historic backlog and manage increased regulation requirements as soon as possible. • Significant increase in rates. • Expenditure approximately $80M over LTP period, $29M over the first 3 years.	• Significant increase in rates.

7.5 Water Supply

Council's strategic goal for the water supply activity is:

"to provide an adequate supply of water that is of sufficient quality for household, agricultural, commercial and industrial use, which meets the current and future needs of the community, in a cost effective manner."

7.5.1 Value of Water Supply Infrastructure Assets

Buller District Council manages **$61.84m** of water infrastructure assets. The Buller District Infrastructure Assets' Replacement Costs as of 30 June 2019 are shown in **Table 7-4** and **Figure 7-1**.

Table 7-4: Water Supply Asset Value as at 30 June 2019

Asset Group	2019 Valuation Summary			
	Quantity	ORC	ODRC	AD
Lines	188,347	$44,693,344	$17,211,336	$433,671
Points	6,746	$4,232,915	$1,965,298	$66,554
Plant	632	$12,918,662	$8,462,805	$317,841
Total	195,725	$61,844,921	$27,639,439	$818,067

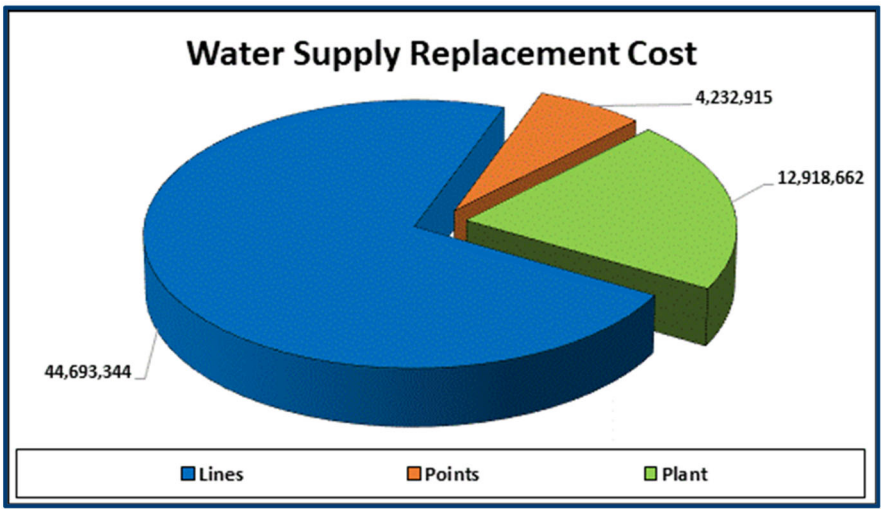


Figure 7-1: Water Supply Asset Value as at 30 June 2019

7.5.2 Strategies

The following are our Infrastructure Strategies for Water Supply:

- Reform risks & opportunities - Improving water and compliance to meet the new regulator's water standards and become compliant with regulations, including applying for external funding to support the upgrades required for water schemes that cannot afford the costs to become complaint.

- Develop Water Safety Plans that meets the regulator requirements and ensure safe water to the community.
- Installation of backflow preventers to ensure safe water supply
- Firefighting capability in network
- Resource consent conditions to enable a network that is compliant with regulatory and council standards
- Installation of backflow preventors in council's network particular critical locations that could cause contaminant entering into the pipe network.

- Addressing the infrastructure backlog by accelerating expenditure on renewal programmes through improved planning techniques. Develop and implement programme of condition assessments to ensure failing or deteriorated assets are replaced. The focus in this LTP will be to replace all galvanised steel and asbestos cement pipes.
- Define success targets and "bring to satisfactory" concepts at planning and maintenance level to ensure improved service delivery and asset management.
- Introduce measurement tools and metrics to track performance.
- Improve our asset register data, asset management practices and asset maintenance management.
- Prepare for natural disasters by ensuring an alternative source of supply be it a separate supply pipe or a dedicated storage reservoir to ensure water is available at selected points in each town.

7.5.3 Issues and Options

The following key issues informed the Infrastructure Strategy budget considerations. Refer to **Table 7-5**.

Table 7-5: Water Supply – Issues and Options

Issue	Options	Discussion
Water supply schemes including looking at private schemes needs to be improved to meet the new Regulator standards.	New or upgrading of water treatment plants to meet the new water regulator standards and be complaint.	Nationally, safe drinking water is a priority and delaying necessary upgrades without sound reasoning should be avoided. Current indications are that drinking water standards will increase and there will a requirement to include additional interventions to provide safe water. Operating more complex schemes is likely to be beyond the capability of (pro-bono) community members
Installation of backflow preventers in industrial, commercial, residential and farming supply networks.	Programme of implementation to first focus on critical locations where contamination could occur posing a threat to the community.	Providing a safe water supply to people is of utmost importance to council. The prevention of any contaminant getting into council's water pipes should be one of the highest priorities.

Issue	Options	Discussion
Backlog/deferred maintenance.	Replacement of galvanised steel pipes and asbestos cement pipes as first priority. Increased pipe condition assessment via sampling and testing.	Asset renewal has not occurred as dictated by asset age and performance. To ensure a reliable supply, pipes needs to be replaced when they have reached the end of the useful life or as determined from maintenance records. Loss of supply to the community will have a negative reputational implication for council.

These options are translated into actions tabulated below.

7.5.4 Investment Proposal

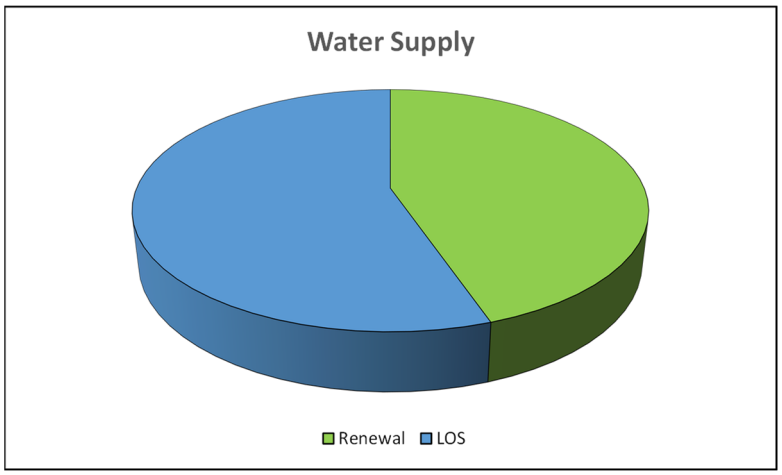


Table 7-6: Water Supply Proposals

Issue	What are we doing?	What is the benefit?	How much will it cost?	When are we doing it	Growth	LoS	Renew
Drinking Water needs to be improved to meet the new Three Water Regulator requirements	Upgrading Water Treatment Plants, monitoring & reporting, water safety plans, Taumata Arowai risks & opportunities, DWS & consent renewals	Improve public health and schemes to become compliant to new regulator's requirements	$3.0m	2021/22 – 2030/31		✓	
	Assumptions	The upgrade will improve the quality of the drinking water Uncertainty around the cost implications of the Taumata Arowai requirements.					
Non-complaint water schemes	Upgrading of water supply schemes to become complaint with the new regulator's requirements	Be compliant	Included above – initial planning fees	2021/2022		✓	
	Assumptions	Final costs are not known as extent of upgrades required for these schemes to be compliant are not know at this stage.					

Issue	What are we doing?	What is the benefit?	How much will it cost?	When are we doing it	Growth	LoS	Renew
Installation of backflow preventors in all council supplied water schemes	Backflow preventing devices (non-return) will be installed at the boundary of properties to ensure that contaminants from property pipes do not enter back into council pipelines	Ensure a safe water supply	$3.5m	2021/22 – 2025/26		✓	
	Assumptions	This increased level of service is a compulsory requirement that will ensure the water supply in council's pipe network is not contaminated from activities on properties such as supplies to farm paddocks where contamination could come from animal faeces.					
Condition assessment and modelling	Determine the condition of our underground pipes. Improve our modelling capability for pressure and demand management and identify capacity constraints	Improve renewal programme. Reduce water loss and improve network performance by applying pressure management.	$ 2.6m	2021/22 – 2030/31			✓
	Assumptions	Water Demand Management will improve the network functioning, reduce bursts and pipe leakages, provide council with an instrument to ensure the network has sufficient capacities for new large developments, identification of leaks in the network.					
Renewal of assets	Renewal programme of deteriorated assets – first priority galvanised steel and asbestos pipes	No interruption to supply due to bursts in deteriorated pipes and no water wastage due to leaking old pipes. No failing equipment at treatment plants.	$ 6m	2021/22 – 2030-2031			✓
	Assumptions	Assets need to be replaced at the end of their expected useful lives to prevent failure of the asset and interruption to the delivery of that service.					

For the water supply service, meeting Taumata Arowai's requirements and replacing deteriorated pipes (galvanised steel and asbestos) are an immediate priority, while over the long term further pipe renewals and renewals at the water treatment plants make up the largest portion of the budget.

7.6 Wastewater

Council's strategic goal for wastewater over the next ten years is:

"to provide cost effective sewerage services for townships, as required by the community, and to continue investigations into minimising any adverse impact of effluent discharges into the environment."

7.6.1 Value of Wastewater Infrastructure Assets

Buller District Council manages **$50.62m** of wastewater infrastructure assets. The Buller District Infrastructure Assets' Replacement Costs as of 30 June 2019 are shown in **Table 7-7** and **Figure 7-2**.

Table 7-7: Wastewater Supply Asset Value as at 30 June 2019

Table 14: Wastewater Valuation

Asset Group	[redacted]	30 June 2019 Valuation ORC	ODRC	AD
Lines		25,671,736	13,091,141	282,899
Points		3,615,554	1,986,394	46,881
Plant		21,336,732	12,933,043	488,850
Total		$50,624,022	$28,010,578	$818,630

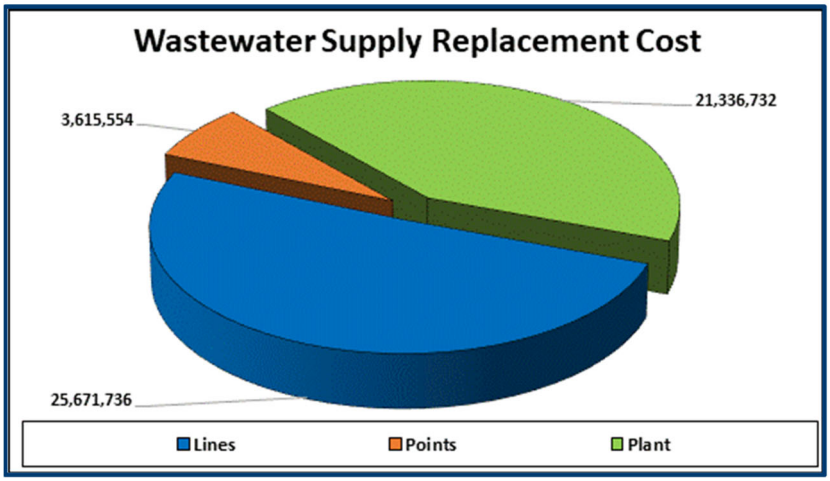


Figure 7-2: Wastewater supply Asset Value as at 30 June 2019

7.6.2 Strategies

The following are our Infrastructure Strategies for Wastewater:

- Reform risks & opportunities - Improving quality of wastewater and compliance to meet the new regulations, including applying for external funding to support the upgrades required to meet the new regulations.
  - Renew Westport resource consent.
- Addressing the infrastructure backlog by accelerating expenditure on renewal programmes through improved planning techniques. Develop and implement programme of condition assessments to ensure failing or deteriorated assets are replaced. The focus in this LTP will be to improve our renewal programme with CCTV and smoke testing programmes.
- Define success targets and “bring to satisfactory” concepts at planning and maintenance level to ensure improved service delivery and asset management.
- Introduce measurement tools and metrics to track performance.
- Improve our asset register data, asset management practices and asset maintenance management.
- Wastewater and stormwater network separation.

Performance of the systems is generally satisfactory.

7.6.3 Issues and Options

The following key issues informed the Infrastructure Strategy budget considerations. Refer to **Table 7-8**.

Table 7-8: Wastewater – Issues and Options

Issue	Options	Discussion
Consent is to discharge primary treated and untreated sewage during storm overflow events	Continue discharge as is	With a higher frequency of intense storms, catering for 'all rainfall events is unrealistic This issue should be worked through with the regional council to identify a satisfactory approach this is expected to be a compromise for all stakeholders.
	Establish a treatment process	
	Undertake complete separation of networks	
Backlog/deferred maintenance (includes stormwater and wastewater separation)	Replacement of pipes that have reached the end of their expected useful lives. Increased pipe condition assessment via CCTV and smoke testing.	Asset renewal has not occurred as dictated by asset age and performance. To ensure a reliable service, pipes needs to be replaced when they have reached the end of the useful life or as determined from maintenance records. Spillage from broken pipes or pump stations will not be acceptable to the community or regional council.

These options are translated into actions tabulated below.

7.6.4 Investment Proposal

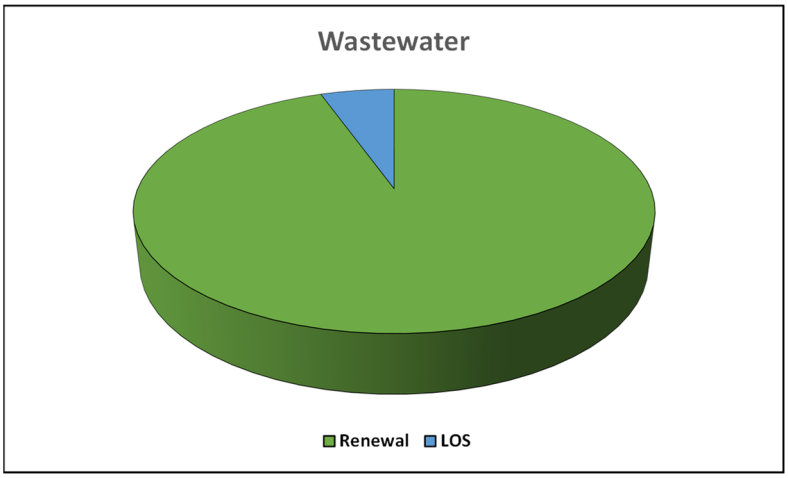


Table 7-9: Wastewater Proposals

Issue	What are we doing?	What is the benefit?	How much will it cost?	When are we doing it	Growth	LoS	Renew
Westport WWTP - Renew consent to discharge primary treated and untreated sewage to river during storm overflow events.	A new consent application needs to be prepared for submission to WCRC.	Address issue of potential environmental and cultural impacts in an affordable manner	$0.1m	2021/22 – 2022/23		✓	✓
	Assumptions	West Coast Regional Council will renew the discharge consent for Westport WWTP. If not, alternative options will need to be investigated such as irrigation to land. Should WCRC not approve the renewing of the consent, the budget will need to be increased.					
Taumata Arowai, incl. wastewater bylaw, monitoring and reporting, SCADA system upgrades	Be complaint with the new requirements from the Regulator.	Be compliant	$1.2m	2021/22 – 2030/31		✓	
	Assumptions	Final costs are not known as extent of work required to meet the new requirements are not know at this stage.					
Work to be undertaken at all the WWTPs	Renewals, upgrades and O&M at the WWTPs and ponds	Renewal of assets and de-sludging of ponds to increase capacity again	$4.3m	2021/22 – 2030/31			✓
	Assumptions	Ponds has not been de-sludge since constructed. Will entail doing an initial survey to determine the level of sludge. Normal renewals and O&M at the treatment plants.					
Condition assessment and modelling	Determine the condition of our underground pipes. Improve our modelling capability of our network's spare capacity.	Improve renewal programme. Reduce spillage during flood seasons	$0.9m	2021/22 – 2030/31			✓
	Assumptions	CCTV inspections and smoke testing will improve the renewal programme to replace deteriorated assets.					
Renewal of assets	Renewal programme of assets that have reached the end of their expected useful lives.	No spillage of sewage as a result of broken pipes or during floods. No failing equipment at pump stations.	$5.1m	2021/22 – 2030-2031			✓
	Assumptions	Assets need to be replaced at the end of their expected useful lives to prevent failure of the asset and interruption to the delivery of that service.					

For the wastewater services, renewing the consent for Westport's WWTP, de-sludging the ponds, raising the pump stations, and meeting Taumata Arowai's requirements are an immediate priority, while over the long term renewals to pipes, pump stations and plants make up the largest portion of the budget.

7.7 Stormwater

Council's strategic goal for the stormwater activity is:

"to provide for the collection and disposal of stormwater to acceptable environmental standards."

7.7.1 Value of Stormwater Infrastructure Assets

Buller District Council manages **$22.88m** of stormwater infrastructure assets. The Buller District Infrastructure Assets' Replacement Costs as of 30 June 2019 are shown in **Table 7-10** and **Figure 7-3**.

Table 7-10: Stormwater Asset Value as at 30 June 2019

Table 19: Stormwater Valuation

Asset Group	[redacted]	30 June 2019 Valuation ORC	ODRC	AD
Lines		19,125,943	8,092,532	234,552
Points		3,368,011	2,079,792	35,169
Plant		386,765	383,280	193
Total		**$22,880,719**	**$10,555,603**	**$269,914**

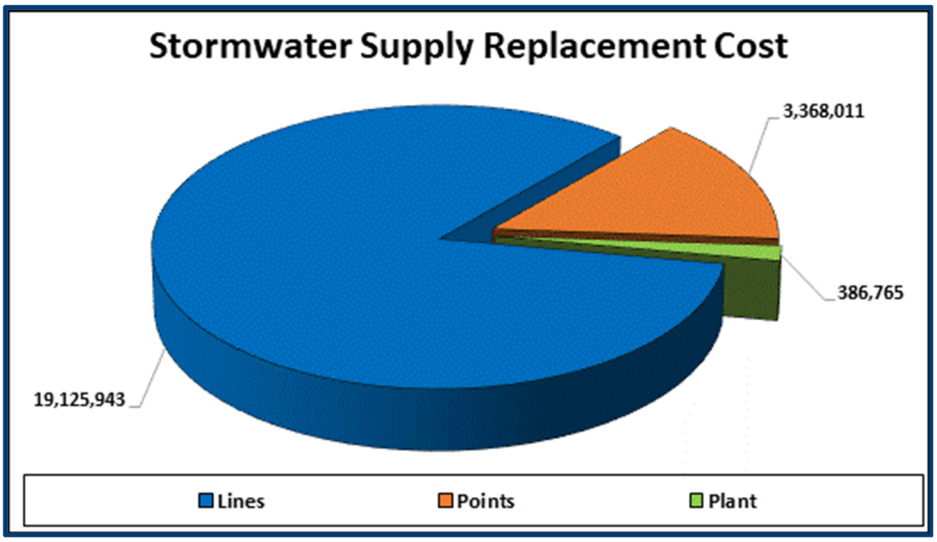


Figure 7-3: Stormwater Asset Value as at 30 June 2019

7.7.2 Strategies

Stormwater services are provided to nine communities, draining roads and/or private property.

The following are our Infrastructure Strategies for Stormwater:

- Reform risks & opportunities - Improving stormwater discharge and compliance to meet the new regulator's standards and become compliant with regulations, including applying for external funding to support the upgrades required to become complaint.
- Addressing the infrastructure backlog by accelerating expenditure on renewal programmes through improved planning techniques. Develop and implement programme of condition assessments using CCTV and smoke testing to ensure broken pipes are replaced and wastewater and stormwater is separated.
- Define success targets and "bring to satisfactory" concepts at planning and maintenance level to ensure improved service delivery and asset management.
- Introduce measurement tools and metrics to track performance.
- Improve our asset register data, asset management practices and asset maintenance management.
- Further studies around flooding mitigation work.

7.7.3 Issues and Options

Issues with the stormwater system are few, although with more intense storms some systems struggle to meet customer expectations. This issue is tied in with the West Coast Regional Council's approach to flood protection for Westport. In 2017 WCRC consulted on six options.

- Option A - Do nothing
- Option B - Extensive floodwalls
- Option C - Partial stopbanks and floodwall
- Option D - Flood relief cut to sea from Orowaiti Lagoon
- Option E - Combined stopbanks with Orowaiti cut
- Option F - Partial stopbanks with Orowaiti cut

Until there is some clarity on the future option that will be pursued, localised stormwater improvements will be delayed. Note: This is a West Coast Regional Council (WCRC) initiative and added for information purposes only.

7.7.4 Investment Proposal

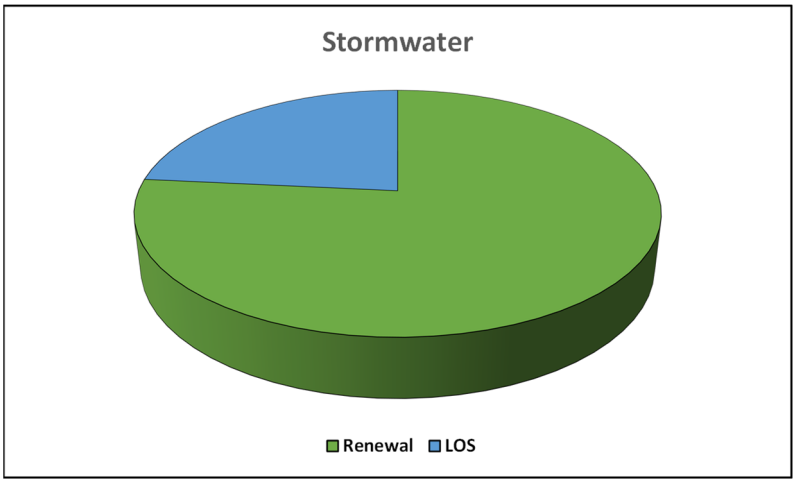


Table 7-11: Stormwater Proposals

Issue	What are we doing?	What is the benefit?	How much will it cost?	When are we doing it	Growth	LoS	Renew
Localised flooding in Westport	Work collaboratively with WCRC to see flood protection progressed	Protection of property from flooding	$0.6m	2021/22 – 2024/25		✓	
	Assumptions	A coordinated approach to flooding in Westport will proceed, and that it will provide a satisfactory level of protection for levels and business					
Condition assessment and modelling	Determine the condition of our underground pipes. Improve our modelling capability of our network's spare capacity.	Improve renewal programme. Reduce flooding during rain events	$0.62m	2021/22 – 2030/31			✓
	Assumptions	CCTV inspections and smoke testing will improve the renewal programme to replace deteriorated assets.					
Renewal of assets	Renewal programme of assets that have reached the end of their expected useful lives.	No flooding due to broken pipes during floods.	$3.0m	2021/22 – 2030/31			✓
	Assumptions	Assets need to be replaced at the end of their expected useful lives to prevent failure of the asset and interruption to the delivery of that service.					

7.8 Land Transport

Council's strategic goal for the roads and footpaths activity is:

"to provide and maintain a network of roads for the movement of vehicles, goods and people in a safe and efficient manner throughout the District in accordance with Council and Waka Kotahi (NZTA) standards."

" to provide a safe, affordable, sustainable land transport system that fully meets the environmental, economic and social needs of the district.

7.8.1 Value of Land Transport Infrastructure Assets

Buller District Council manages **$348.9m** of land transport infrastructure assets. The Buller District Infrastructure Assets' Replacement Costs as of 30 June 2019 are shown in **Table 7-12** and **Figure 7-4**.

Table 7-12: Land Transport Asset Value as at 30 June 2019

Table 2.1: 2019 Valuation Summary

Asset	Unit	Quantity	ORC ($)	ODRC ($)	ADR ($)	Count
Bridges & Major Culverts	m^2	12,015	62,620,245	26,597,418	662,135	129
Drainage	each/ m^2	-	22,429,654	9,377,527	285,548	2,651
Footpaths	m^2	204,730	12,677,199	8,006,346	245,550	792
Pavement Base	m^2	3,772,736	106,705,168	88,178,510	416,103	1,282
Pavement Formation	m^2	4,393,428	106,911,613	106,911,613	0	1,307
Pavement Surface	m^2	3,292,884	23,677,069	8,977,386	1,284,366	1370
Street Lights	each	846	1,269,671	368,809	35,593	846
Surface Water Channels	m	610,637	11,509,965	5,310,839	132,869	2,212
Traffic Facilities	each	8,704	1,101,637	436,976	77,303	8,704
Total 2019 Valuation			**348,902,220**	**254,165,424**	**3,139,467**	

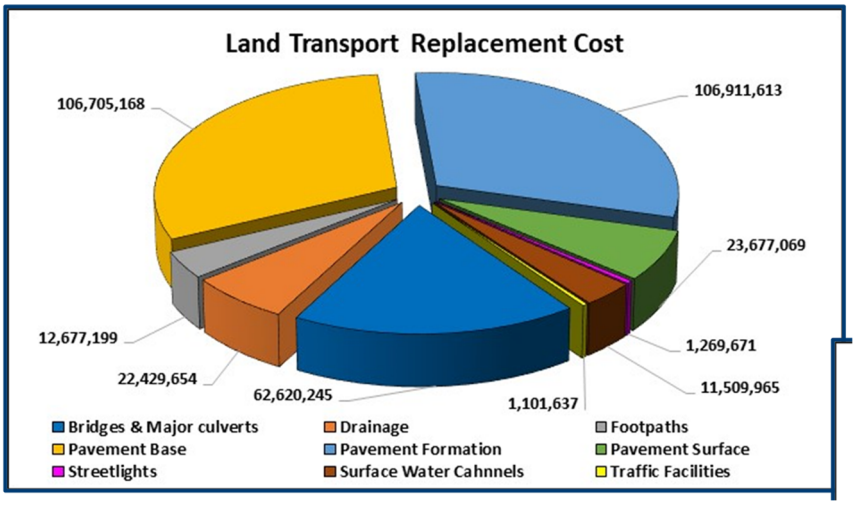


Figure 7-4: Land Transport Asset Value as at 30 June 2019

7.8.2 Land Transport Strategy & Options

A comprehensive Transport Programme Business Case (PBC) has been developed by staff for consideration into Councils next Long Term Plan (LTP) and endorsement to the 2021-24 National Land Transport Programme (NLTP).

The National Land Transport Fund (NLTF) is the key source of funding for local roads. From 1 July 2021, Waka Kotahi NZTA will provide 72% of funding for Buller under the Financial Assistance Rate (FAR) scheme, an uplift of 6% from the current rate.

The case for investment has been developed in regional collaboration with West Coast councils (Grey and Westland) and Waka Kotahi NZTA to improve efficiency and value for money. Four options were considered for this Strategy as with the advantages and disadvantages shown in **Table 7-13** below.

The Transport PBC provides the strategic context for investment, identifying issues and opportunities, and recommends a 2021-24 funding programme.

Stakeholder engagement, community survey, Council staff input, and detailed investigation and assessment of Council transport assets has identified a need for increased investment to:

- Reverse a trend of historic under-investment in some activities that has led to poor performance and asset condition.
- Address a backlog of urgent maintenance and renewals across the network.
- Replace and improve key bridge infrastructure that is assessed as being in poor condition.
- Increase the capability and capacity of the Council's roading and asset management staff to strategically plan and deliver effective transport outcomes into the future.

Table 7-13: Land Transport Option Analysis

Option	Advantages	Disadvantages
1. Status quo (business as usual)	• Least cost: total cost to Council $3.61m 2021-24 ($1.20m/year) • Delivered by existing staff and resources.	• Worsening condition of assets – leading to higher future cost. • Increasing backlog of urgent work preventing routine maintenance being carried out. • Does not improve safety for residents and visitors. • No improvements for freight and economic development.
2. Optimised status quo (do-minimum)	• Pragmatic changes to some work categories to ensure that existing assets are maintained and renewed to a satisfactory level. • Effectively a continuation of the current programme, this can generally be achieved with a minor change to staff levels and external support.	• Increased cost: total cost to Council $3.99m 2021-24 ($1.33 m/year) • Does not provide for both the backlog of urgent maintenance and routine maintenance activities, so some balancing will be needed, and a backlog will remain and will grow into future years. • No condition-based replacement of bridges identified as needing urgent investment means there is a risk of asset failure and no improvement for freight on bridges and loss of District resilience.

Option	Advantages	Disadvantages
3. Preserving our assets – enhanced maintenance programme	• Addresses both backlog of maintenance and routine maintenance that is needed in 2021-24. • Condition-based replacement of key bridges will improve network resilience and freight capacity. • Increased capability and capacity of Council roading teams for asset management and strategic planning. • Improved network resilience, with increase in budget to address frequent storm damage to roads and drainage systems. • Safety improvements through low-cost low-risk investment at intersections and on local roads that have experienced increasing volumes of resident and visitor traffic and changes of use. • Scale and type of works across all three Councils (e.g. bridge replacements) will be attractive for professional providers increasing competition in the market to deliver technical engineering services.	• Increased cost: total cost to Council $4.56m 2021-24 ($1.52m/year). • Scale and type of works will require skills and experience that are not currently available at Council, or on the West Coast in some instances.
4. Improved levels of service	• Level of service improvements to bridges across the district (seismic strengthening, two-laning, heavy vehicle capacity) will enhance resilience and improve freight outcomes. • Town-centre amenity and pedestrianisation improvements in Westport (in tandem with existing PGF investment).	• Highest cost and assessed as unaffordable / not providing value for money at this time. • Large and complex programme is likely to be unachievable for staff and contractors.

Option 3 (Preserving our assets) is the recommended programme. This option is highly aligned with the views and priorities expressed by stakeholders and the community and is informed by robust evidence collected through detailed investigations and the condition assessment of assets.

Following review of the draft Transport PBC and selection of the preferred option, the final submission was made to Waka Kotahi NZTA on the 11 December 2020 for assessment, thus completing a significant, collaborative assignment over the past two years.

The PBC requires Council support for consideration into the next LTP and endorsement to Waka Kotahi NZTA for inclusion into the 2021-24 NLTP.

The Transport PBC has been developed in collaboration with West Coast councils (Grey and Westland) and Waka Kotahi NZTA based on the regional Combined Transport Activity Management Plan (C.AMP). These are key documents for all Councils seeking funding from the 2021-24 NLTF and development of each Councils Long Term Plan.

Local roads across the district are co-funded between Council and Waka Kotahi NZTA. For 2021-24, Waka Kotahi NZTA will fund 72% of the investment in local roads. This is an increase in assistance of 6% from the current triennial rate of 66% through 2018-21. The Karamea Highway will remain at 100% for Special Purpose Roads until 30th June 2024 at which stage it is recommended by Waka Kotahi to revert to the normal FAR.

Whilst a draft Special Purpose Road (SPR) transition plan has been considered for the Karamea Highway, no agreement has been reached between Waka Kotahi NZTA and Council for a change to Local Road status, nor has there been Council acceptance of responsibility for funding specific activities following any transition.

As such, while the forward programme and financial assessment have been developed on the assumption of a 1st July 2024 transition, this is not an endorsement from Council of Waka Kotahi's NZTA's preferred approach.

The Transport PBC provides the strategic context for investment, sets investment objectives, and identifies the recommended investment option. The C.AMP goes into detail about levels of service, future work programmes, funding requirements and performance measures.

Since 2017, the three West Coast Councils have increasingly taken a collaborative approach to transport activity management planning. This has made more efficient use of staff time and transport budgets through sharing of resources and has improved our evidence base for investment decision making.

Relative to our peer group, the West Coast Councils have historically invested less in network and asset management activities. This has created challenges for attracting and retaining staff with the right capability to plan and deliver our transport programmes.

Collaboration has helped to improve our performance in this area through sharing of resources and procured services. This is an area of focus and ongoing improvement, to increase the performance of network management, strategic planning, data collection and analysis.

In 2019 and 2020, widespread engagement was undertaken with Council transport staff, key stakeholders (freight, tourism, business), including a regional community survey across the West Coast.

Alongside this engagement, detailed investigations and assessment of transport assets were carried out to provide an evidence base about the current condition of the assets and inform investment decisions for the future.

A key finding of these investigations is that some deferred maintenance has led to a backlog of urgent work, and some assets in poor condition. Addressing these issues is recommended to reduce

the likelihood of asset failure and avoid an increasing network risk. This is particularly important for bridges across the district.

This information was used to identify problems and opportunities, and shape the transport investment objectives for 2021-24; these are:

- Reducing asset failure risk, as assets are maintained and renewed appropriately.
- Improving network resilience.
- Increasing freight task optimisation through appropriate network investment.
- Visitors continue to travel widely and are more dispersed, as more attractions are accessible having appropriate facilities.

These objectives were used to develop a package of investments that optimises value for money and delivers effective outcomes for transport now and into the future.

A draft Transport PBC was submitted to Waka Kotahi NZTA on 21 September 2020. This document was assessed alongside the national level of investment being sought from the NLTF. In turn Waka Kotahi NZTA has provided feedback on investment proposals and level of co-funder investment that has shaped the final Transport PBC.

Initial feedback from Waka Kotahi NZTA was positive, indicating that the evidence base and investment proposal made by the Transport PBC is strong and balances value for money with effective outcomes. There was good support for seeing all West Coast Councils address resources and asset management investments in skills, staff and delivery.

Following final review of the C.AMP, Transport PBC and selection of the preferred option, the final submission was made to Waka Kotahi NZTA on the 11 December 2020 seeking co-investment into the 2021-24 NLTF.

The recommended programme is Option 3 (Preserving our assets), which has been assessed to have the highest benefits, provide the best value for money, and have the lowest overall risk profile based on all considerations, including:

- Asset condition – addressing the backlog of urgent maintenance while not deferring routine maintenance over the next three years, and making condition-based replacement decisions for bridges, will reduce asset failure risk.
- Optimised value for money – while an initial increase in investment, Option 3 provides value for money over the long-term as maintenance and renewals do not continue to be deferred and grow in cost and complexity. Further deferral will lead to higher future costs as assets will need to be replaced before the end of their intended life; this is avoidable with an uplift now.
- Resilience – reduced risk of asset failure caused by natural or environmental events (e.g. damage caused by weather, instability, erosion and inundation).
- Freight – condition-based replacement of bridges will achieve benefits for freight as old structures are replaced with modern versions that are stronger and can support larger and modern industry standard freight loadings.
- Capability – Option 3 includes an increase in investment in the Council's asset management capability and roading team capacity. This is being undertaken in collaboration with Grey and Westland Districts to improve efficiency and value for money.

Option 3 is an enhanced maintenance programme that is supported by robust data and evidence and is well aligned with the views and priorities expressed by key stakeholders, the community, and roading team staff.

If an increase in investment is not made in some areas the already large backlog of urgent maintenance works will continue to grow, causing further decline in the condition of bridges and roads across the district. Investment in maintenance and renewals now will reduce the risk of asset failure and avoid the need for costly replacement of assets in the future.

With the increase in funding assistance from Waka Kotahi NZTA to 72%, this is an ideal opportunity to leverage the higher co-investment funding to improve the condition and performance of the transport network and address known issues.

7.8.3 Special Purpose Roads (SPR)

Whilst a draft Special Purpose Road (SPR) transition plan has been considered for the Karamea Highway, no agreement has been reached between Waka Kotahi NZTA and Council for a change to Local Road status, nor has there been Council acceptance of responsibility for funding specific activities following any transition.

There is one Special Purpose Road (SPR) in Buller District:

Karamea Highway (including Karamea-Kohaihai Road)

This road is part of the national transition of SPR roads to local road status, and subsequent change in funding from the current 100% funding assistance rate (FAR) to the normal rate of each local authority. This transition is planned to occur on 1 July 2024.

A transition plan has been developed for Buller to show the recommended transition approach and identify core investment activities to be completed ahead of 2024 (described below). As at September 2020 Waka Kotahi have indicated to Council that the preferred approach to future investment in the SPR's is:

- Complete major capital works, pavement renewals, and low-cost low-risk projects ahead of 30 June 2024 while the roads have 100% FAR status.
- Major capital works after 1st July 2024 assessed on a case by case basis using a means tested principle for an enhanced FAR where appropriate.
- From 1st July 2024 emergency works managed as per Waka Kotahi's existing emergency policy which considers the scale of event and financial hardship in each financial year.

At the time of writing no agreement has been reached between Waka Kotahi and Buller District Council for the transition of the SPRs to Local Road status, and the responsibility for funding specific activities following any transition. As such, while the forward programme and financial assessment in this document have been developed on the assumption of a 1st July 2024 transition, this is not an endorsement from either council of Waka Kotahi's preferred approach as communicated in September 2020.

7.8.4 Low Cost Low Risk

One decision identified in the first iteration of the infrastructure strategy related to the replacement of footpaths – like for like or all concrete. Any saving associated with Holcim have been lost and the

decision to apply a hierarchy approach has been made. Replacements will generally be like for like, except high use areas which will be wider and asphaltic concrete.

7.8.5 Problems and opportunities

This information was used to identify problems and opportunities, and shape the transport investment objectives for 2021-24; these are:

- Reducing asset failure risk, as assets are maintained and renewed appropriately.
- Improving network resilience.
- Increasing freight task optimisation through appropriate network investment.
- Visitors continue to travel widely and are more dispersed, as more attractions are accessible having appropriate facilities.

7.8.6 Investment Proposal

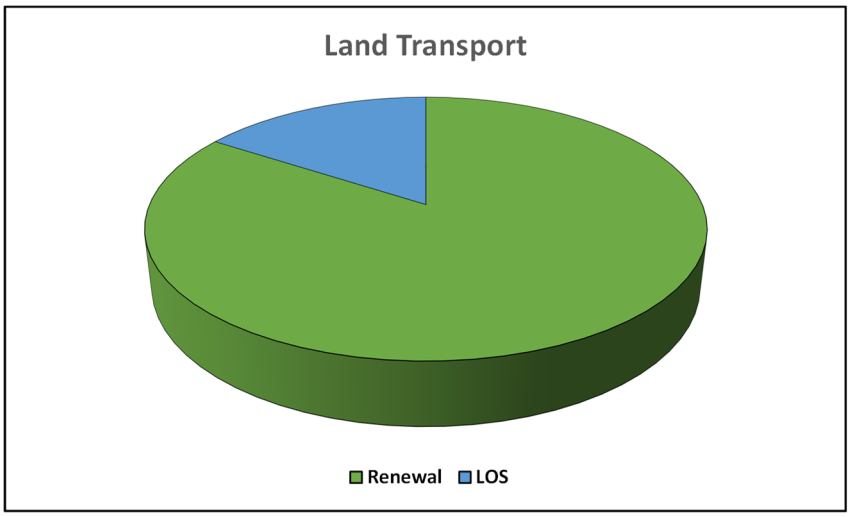


Table 7-14: Land Transport Proposals

Issue	What are we doing?	What is the benefit?	How much will it cost?	When are we doing it	Growth	LoS	Renew
Special Purpose Road: funding	Negotiate for NZTA management of the road as a State Highway, including replacement of 2 bridges	Ensure this portion of the area is sustainably funded to ensure levels of service can be met	$ 8.98m	2021 /22 – 2023/24		✓	✓
Local roads	Sealed road resurfacing, drainage renewals, footpath renewals, pavement rehabilitation, etc.	Ensure continuity of service in a reliable manner	$ 7.53m	2021/22 – 2047/48		✓	✓

Issue	What are we doing?	What is the benefit?	How much will it cost?	When are we doing it	Growth	LoS	Renew
	Assumptions	The network (including bridges) will perform satisfactorily while a reduced load limit is enforced, until upgraded with some increased maintenance					

7.9 Solid Waste Management

Council's strategic goal for solid waste services activity is:

"to deliver community benefits and reduce waste. Buller District businesses and households will be provided with efficient and effective waste minimisation and management services."

1. Avoid and reduce waste where we can.
2. Manage waste responsibly.
3. Maximise community benefits.

7.9.1 Solid Waste Management Infrastructure Assets

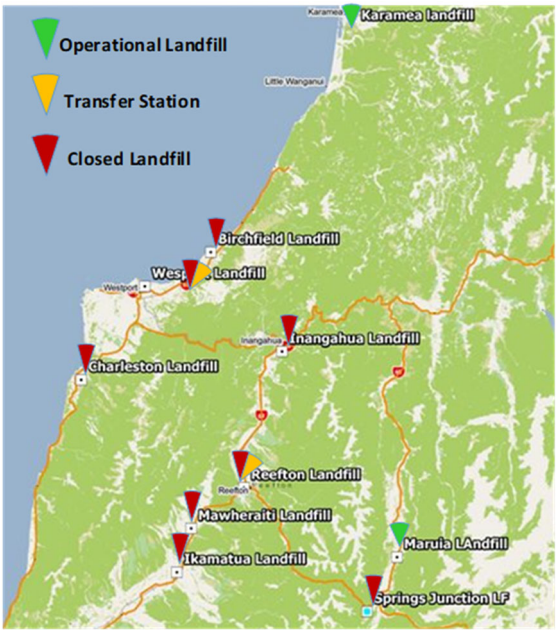


Figure 7-5: Solid Waste Services

Table 7-15: Summary of Solid Waste Services

Zone	Item	Kerbside Collection	Transfer station	Landfill
Zone 1	Covers Westport, the areas from Westport to the Mokihinui Bridge, Westport to Punakaiki, Westport to Reefton including Blacks Point, and Reefton to Ikamatua.			
Zone 2	Is the Karamea area, from north of the Mokihinui Bridge.			
Zone 3	Is beyond Blacks Point including Springs Junction and Maruia.			
Zone 1	Residual wastes (Refuse)	✓	✓	
	Recyclables (glass)	✓	✓	
	Other recyclables	✓	✓	
	Organics (garden & food)		✓	
	Clean fill			
	Hazardous waste			
Zone 2	Residual wastes			✓
	Recyclables		✓	✓
	Organics (garden)			✓
	Clean fill			
	Hazardous waste			
Zone 3	Residual wastes			✓
	Recyclables		✓	✓
	Organics (garden & food)			✓
	Clean fill			
	Hazardous waste			

Council provides the aftercare of Council's eight closed landfill sites (Birchfield, Westport, Charleston, Inangahua, Reefton, Mawheraiti, Springs Junction and Ikamatua).

The purpose of this Strategy is to offer strategic considerations for solid waste management in context of level of service, asset preservation and upgrades, compliance and affordability.

These principles were carried forward into the development of this Strategy and are aligned to the significant strategic issues identified by Council, and supported by the corresponding budget requirements for solid waste operating and capital expenditure.

This Strategy considers the significant issues and potential legislative changes in order to comply with the strategic objectives of waste reduction and transformation to a circular economy across New Zealand.

The Strategy also proposes an action plan to address the identified objectives to achieve a long-term sustainable waste management system.

The Solid Waste activity provides for the collection, transfer and final disposal of waste materials generated by households and businesses within Buller. The district is divided into three zones:

- Zone One covers Westport, the areas from Westport to the Mokihinui Bridge, Westport to Punakaiki, Westport to Reefton including Blacks Point, and Reefton to Ikamatua.
- Zone Two is the Karamea area, from north of the Mokihinui Bridge.
- Zone Three is beyond Blacks Point including Springs Junction and Maruia.

Zone One is a contracted approach through Smart Environmental Limited (until 1 February 2024), which operates as follows:

- Refuse collected weekly in official Council bags.
- 60 litre crate for glass recycling collected fortnightly
- 240 litre wheelie bin for certain types of recycling collected fortnightly

There is no kerbside collection in Zone Two. Karamea has an active landfill operated by Council's contractor. The landfill is open during normal hours of Wednesday, Friday and Sunday between 9am and 1pm unless otherwise notified. For payments, Council offers Eftpos terminal or cash only. Charge accounts are only allowed for certain government institutions.

There is also no kerbside collection in Zone Three. Maruia has an active landfill. The landfill is open during normal hours on Thursday between 1pm and 2.30pm unless otherwise notified.

Council also provides the aftercare of closed landfill sites (Birchfield, Westport, Charleston, Inangahua, Reefton, Mawheraiti, Springs Junction and Ikamatua) and monitors groundwater quality at these sites as required under resource consent conditions.

Council also has a role in facilitating waste minimisation within communities. This is put into effect by providing resources for education programmes into schools about sustainability and waste minimisation. Support can also be provided to businesses to develop more sustainable practices.

Waste generation has not yet reached sufficient tonnage levels in Buller to justify a new in-district landfill. Council owns land at Carolyn Terrace with a District Plan designation for a landfill, but there are no consents or development plans in place.

The strategic direction for solid waste management must be informed by government priorities, policies and legislation. New Zealand is transitioning to a circular economy that aims to reduce reliance on placing waste to landfill. Central Government legislation change is coming that will require a more robust approach by manufacturers and importers on product stewardship.

Central government has initiated a waste levy system that provides a financial penalty or dis-incentive to rely on landfills only.

The strategic direction is to increase product stewardship schemes, standardising kerb-side collection and recycling systems and investing in New Zealand-based recycling re-processors.

It is in this national context that the strategic analysis for solid waste management priorities and investment is addressed in this Strategy.

7.9.1.1 Waste Management and Minimisation Plan

Council's current Waste Management & Minimisation Action Plan (WMMP) was adopted in 2018. The plan includes the following elements:

- Vision – By 2040 Buller will be a district where its population transformed their
  - behaviours and waste practices and all discarded materials are reused,
  - recovered and diverted from landfills.
- Mission – Council offers ethical, economical and efficient waste management
  - services by addressing the goals to have all our waste diverted from landfills
  - and where the concepts of sustainability and responsibility social are equally
  - valued alongside with the costs.
- Action Plan – The WMMP contains various strategies to achieve the long-term
  - vision of the Waste Management Action Plan.

The largely rural nature of our district and the long transport distances means that the service costs are high when compared with similar places around New Zealand In Buller, the higher costs are due to the charges to provide kerbside collection, the disposal fees in York Valley Landfill (Nelson), as well the costs to send our recyclable material to other regions and overseas for reprocessing.

Currently, there are no local services for e-waste, green waste, construction waste and rural waste generated from farming. This is a clear opportunity to explore which may divert significant quantities of material from landfill and reduce waste management cost.

The high cost of waste management, in addition to the increases in landfill waste levies promotes a move towards a circular economy. This would create further benefits for our district including:

- Active reduction in waste quantity generated
- Environmental improvements
- Identifying new opportunities for recycling
- Supporting initiatives of community groups
- Implementing projects to manage special waste
- Developing more local solutions to avoid the high costs of transportation

Central government waste management programs will also bring more opportunities in the long term. In moving towards a circular economy, Council can prioritise resources to engage in these national strategies and seek financial support where available. This would result in a more sustainable waste management approach for Buller.

7.9.2 Strategies

7.9.2.1 Strategy 1: Reduction in the quantity of waste generated and improving recycling material via education and regulation

This strategy is to reduce the quantity of waste sent to landfill. The best way to achieve this is to avoid waste in the first place by saying no to unnecessary single use items as part of better purchase decisions for consumers. Another important way to reduce waste is to reuse common items like water bottles, takeaway containers and reusable bags or promote the implementation of local

solutions for food waste such as compost at home. Waste reduction is key to minimise the costs impact from the increasing waste levy.

The basis of this strategy is to develop an education campaign that focuses on behaviour change and better practices for waste management and minimisation in Buller District Community.

This strategy sets out to reduce recycling contamination by eliminating items that cannot be recycled, reducing recycling material contamination and following the local recycling rules. Achieving this will mean that our recycling material can better meet the need of the end re-processors and avoid that a large proportion of the recycling material simply goes to landfill.

This strategy will involve the creation of a bylaw to promote the compulsory implementation of Waste Management and Minimisation Plans for certain sized businesses located in the District.

7.9.2.2 Strategy 2: Management of special waste

This strategy proposes that the Council promotes and implements the stewardship programmes set from Central Government in order to reduce the quantities of certain waste that is difficult to handle. Examples include agricultural waste, e-waste, batteries, hazardous waste, tyres etc.

The proper management of special waste brings multiple possibilities to divert more waste from landfill and minimizing the environmental impact due to the inadequate disposal of this kind of waste.

7.9.2.3 Strategy 3: Providing waste services and local facilities for solid waste

Council will continue to invest and provide an effective waste services and local facilities that enable effective solid waste management from its inception to its final disposal. It will fund and develop local solution that make the waste management system more financially sustainable by reducing the reliance on high costs paid for transporting waste to another region or overseas.

This strategy will promote opportunities to create value from resources, such as the implementation of recycling infrastructure facilities or the implementation of composting system for managing organic and food waste at a small scale.

Some of these initiatives may be enabled via direct central government financial support funds. The Buller District Council will work collaboratively with other West Coast based Councils to maximise any significant project funds available via the Ministry for the Environment from the increased Waste Levy Contestable Fund.

7.9.2.4 Strategy 4: Landfill management

This strategy addresses the continued monitoring and meeting of all the conditions set in the Resource Consents for our landfills. It also covers the needed actions to improve the services offered at these sites. It includes the development of a long-term solution for the erosion of the Hector Legacy Landfill, as well, a risk assessment across the eight closed landfills existing in the District. These closed landfill sites may be at risk of flood and erosion damage. Council will undertake a study in this LTP period to ensure that measures are put into place to alleviate any potential failures to meet consent conditions at these closed landfill sites to ensure that leachate and pollutants do not enter the surrounding environments.

In-District landfill will not be considered until the District Waste generation approaches and exceeds the financial breakeven point. The indicated breakeven point is still someway off on the current

waste tonnages generated. Council will continue to actually work on waste reduction strategies that sees this waste material further reduce. Therefore, it is seen that collaborative approaches with other West Coast based Councils that explore options on regional cross District approaches to one central landfill is the best approach.

7.9.3 Investment Proposal

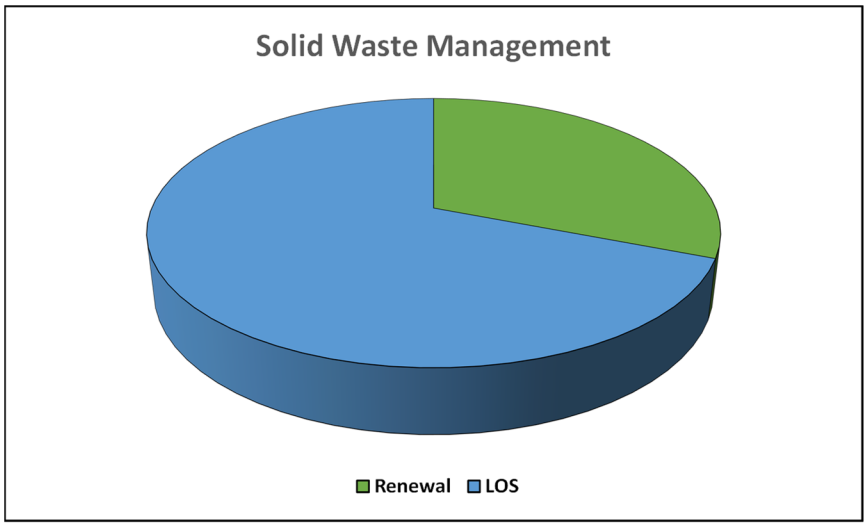


Table 7-16: Solid Waste Management Proposals

Issue	What are we doing?	What is the benefit?	How much will it cost?	When are we doing it	Growth	LoS	Renew
Education and regulation	The programme includes an education campaign, events and networking to promote the Waste Management Minimisation programme, as well, the recruitment of staff to support these activities.	Promoting good practices to encourage Community to undertake effective management of waste	$95,000			✓	
	Assumptions	Develop actions and activities that encourage the residents to reduce the quantity of waste generated, improve the quality of recyclable material and reduce the incidence of fly tipping and illegal dumping. Implementation of Waste Minimisation Management Plan across Council Offices and buildings would be part of this strategy.					
	Creating and implementation a waste management bylaw for residents and commercial operators which would regulate the waste management in the district.	Creating and implementing a waste management bylaw for residents and commercial operators	$5,000			✓	

Issue	What are we doing?	What is the benefit?	How much will it cost?	When are we doing it	Growth	LoS	Renew
	Assumptions	The bylaw would allow obligate certain commercial operators to implement a Waste Minimisation Plans in their businesses.					
	Waste Minimisation Act set the obligation to the territorial authorities to elaborate and implement a WMMP, which must be reviewed and updated every 6 years.	Consultant fees – WMMP Update and revision	$30,000			✓	
	Assumptions	The current plan for Buller District Council has been in place from 2018 and needs to be updated in 2024.					
	Council wants to continue supporting the initiative and involve other schools or early childhood education centres.	Continue developing Enviroschool Programme	$69,000			✓	
	Assumptions	Enviroschools is an environmental action based programme where young people are empowered to design and lead sustainability projects in their schools, neighbourhoods and country. Currently, there are 5 educative institutions involved in Enviroschool programme.					
Management Special Waste	Promote and support stewardship programmes being deployed via Central Government policy	Promote and support stewardship programmes being deployed via Central Government policy	$15,000			✓	
	Assumptions	Territorial Authorities must support and promote the introduction of mandatory products stewardship across items like plastic packaging, tyres, electrical and electronic products (e-waste), agrichemicals and containers, refrigerants and other greenhouse gases as well as farm plastics					
Providing waste services and facilities	Kerbside collection services Contract	Continue providing to the residents with kerbside collection services, litter bins collection and transfer stations facilities	$1,935,000			✓	
	Assumptions						

Issue	What are we doing?	What is the benefit?	How much will it cost?	When are we doing it	Growth	LoS	Renew
	Consultant fees – Procurement kerbside collection services	The current contract with Smart Environmental expires in 2024, therefore, Councils need to prepare the terms of reference for the procurement that would be commence in the year 2022. (contingent on current contractor achieving it final three years' contract extensions)	$50,000			✓	
	Assumptions	This shall include all central Government initiatives on standardized recycling scheme.					

7.9.4 Community Outcomes associated with Solid Waste Activity

Table 7-17: Community Outcomes associated with Solid Waste Activity

Community Outcomes	How the activity contributes
Well-being	By facilitating the collection and disposal of refuse.
Environment	By facilitating collecting and disposing of refuse in a safe, efficient and sustainable manner that maintains district natural and aesthetic values.
	The solid waste disposal minimises risk of waste being inappropriately or dangerously disposed of.
	By providing safe collection and disposal of refuse and by encouraging waste minimisation
Learning	Provide programmes to schools and the community on waste care and reduction
Prosperity	By meeting commercial needs for dealing with waste.

8. FINANCIAL ESTIMATES

The Local Government Act 2002 Section 101B – Infrastructure Strategy states:

(4) The infrastructure strategy must outline the most likely scenario for the management of the local authority's infrastructure assets over the period of the strategy and, in that context, must—

"(a) show indicative estimates of the projected capital and operating expenditure associated with the management of those assets—

"(i) in each of the first 10 years covered by the strategy; and

"(ii) in each subsequent period of 5 years covered by the strategy

The key message for this LTP is that for the next three years, infrastructure expenditure is not driving significant rates increases. There never has been a better time to be undertaking the essential work in the land transport sector than now as only 17% ratepayer contribution is required for the work programmed in the Land Transport Programme Business Case. A keynote to stem out of this round of LTP is that due to the affordability constraints Three Waters carries a high risk profile until deferred LOS has been completed. Infrastructure Services has made aspirational provisions to enable the WMMP objectives to be met.

8.1 Financial Expenditure Estimates Overview

The total capital and operational expenditure for Water Supply, Wastewater, Stormwater, Land Transport and Solid Waste Management is expected to be about **$972m** as shown in **Figure 8-1** below models the 30-year total infrastructure expenditure for the District.

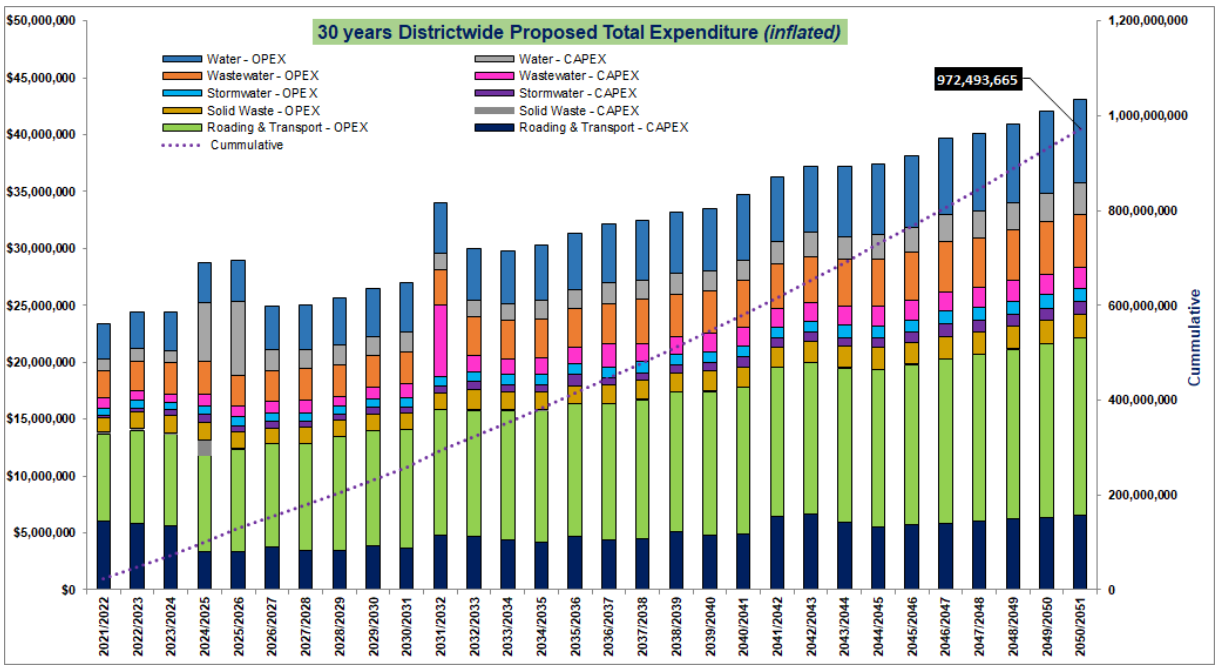


Figure 8-1: Districtwide Activity Proposed Total Expenditure

8.2 Water Supply

8.2.1 Water Supply Operating Expenditure Estimates

The forecast of operating expenditure by scheme is presented in **Figure 8-2**. It includes direct costs relating to the physical operating and maintenance of the networks, and indirect costs such as interest on loans and depreciation. The costs have been adjusted to reflect anticipated increases or decreases in maintenance activities resulting from asset additions or renewals.

The operating expense in the 30 years is approximately **$152.78 million.**

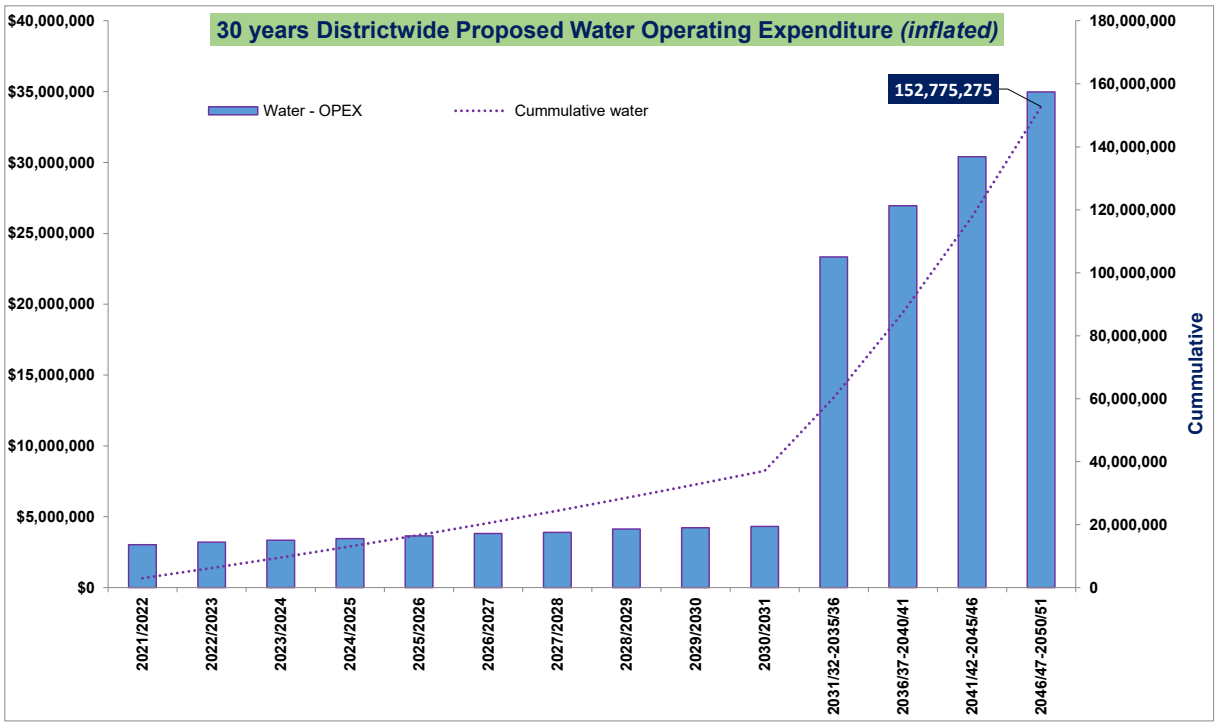


Figure 8-2: Projected Water Operating Expenditure

8.2.2 Water Supply Capital Expenditure Estimates

The renewals are for reticulation, source extraction and treatment. Renewals, Level of Service and growth forecasts are presented in **Figure 8-3**.

The major expenditure in the planning period is largely renewals and level of service.

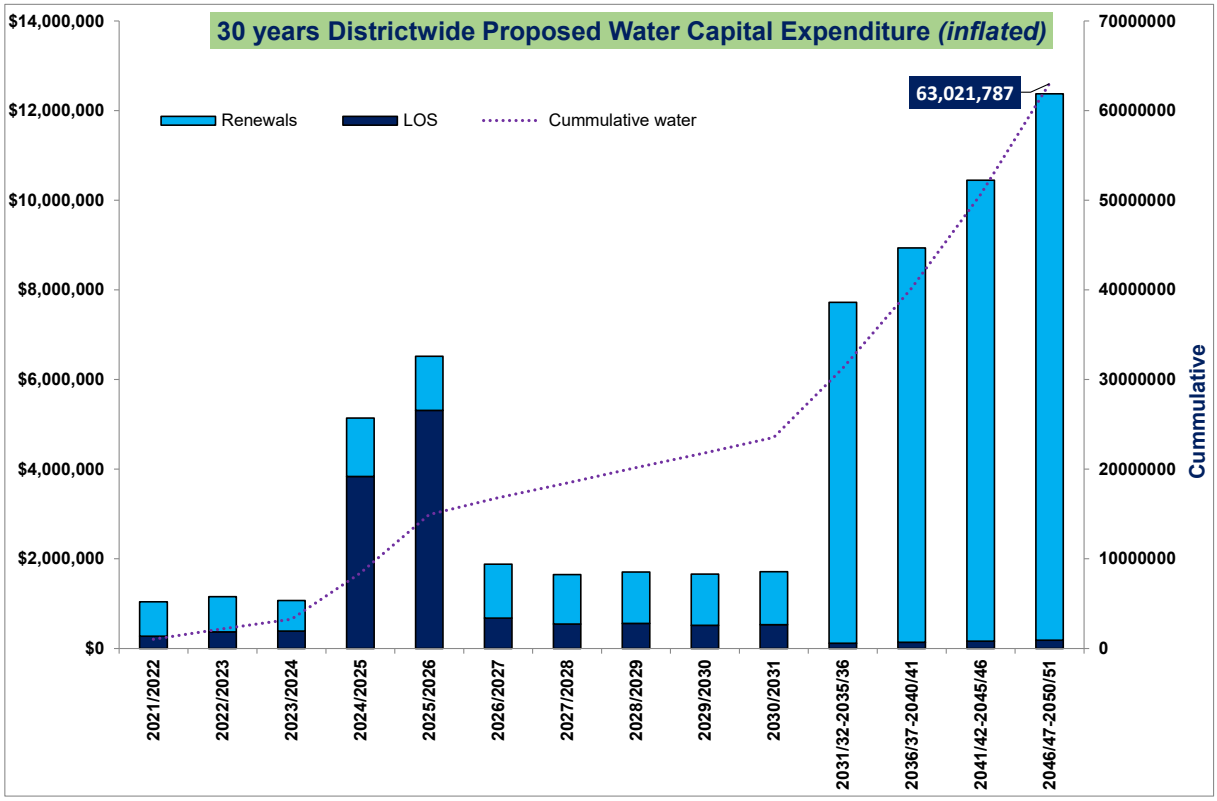


Figure 8-3: Projected Water Capital Expenditure

8.3 Wastewater

8.3.1 Wastewater Operating Expenditure Estimates

Figure 8-4 shows the projected operating expenditure for all the District's wastewater schemes. It includes direct costs relating to the physical operating and maintenance of the networks, and indirect costs such as interest on loans and depreciation. Costs have been adjusted to reflect anticipated increases or decreases in maintenance activities resulting from asset additions or renewals.

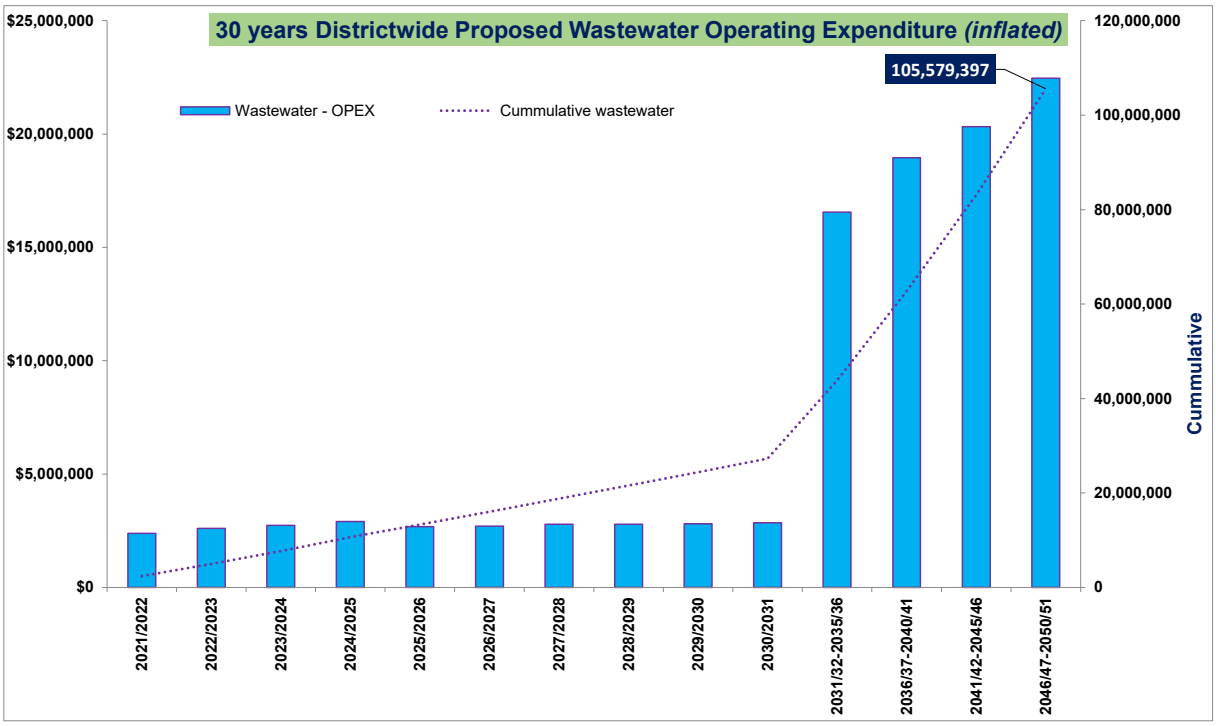


Figure 8-4: Projected Wastewater Operating Expenditure

8.3.2 Wastewater Capital Expenditure Estimates

Figure 8-5 shows projected capital expenditure for all the District's wastewater schemes. The proposed capital expenditure is about $48 million.

Each year also includes programmed pipeline and pump station renewals. Pipeline renewals are based firstly on CCTV inspection and secondly on the expired lives of the pipelines. The existing backlog of renewals is proposed to be adjusted in the current planning period. It is expected that as the renewals progress over this period, levels of infiltration will progressively reduce and result in lower volumes of peak flow effluent needing treatment.

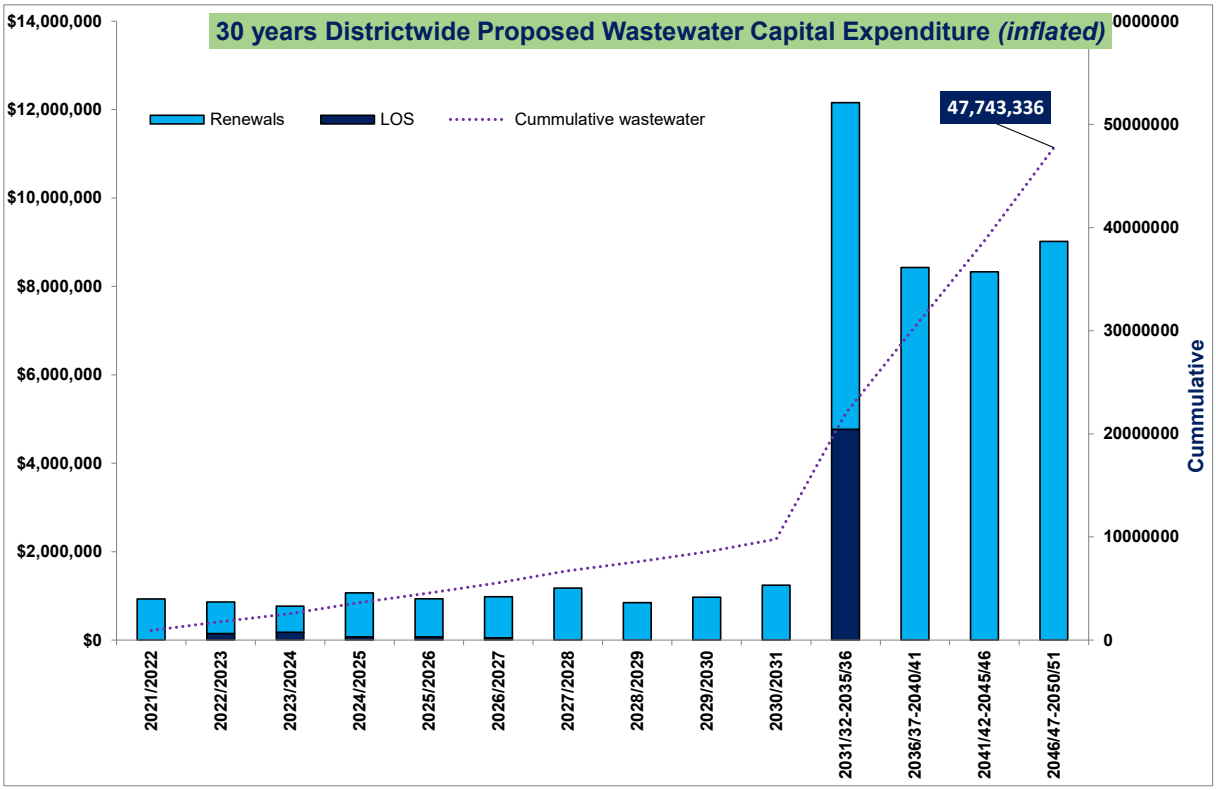


Figure 8-5: Projected Wastewater Capital Expenditure

8.4 Stormwater

8.4.1 Stormwater Operating Expenditure Estimates

Figure 8-6 shows the projected operating expenditure for all the District's Stormwater systems.

It includes direct costs relating to the physical operating and maintenance of the networks, and indirect costs such as interest on loans and depreciation. Costs have been adjusted to reflect anticipated increases or decreases in maintenance activities resulting from asset additions or renewals.

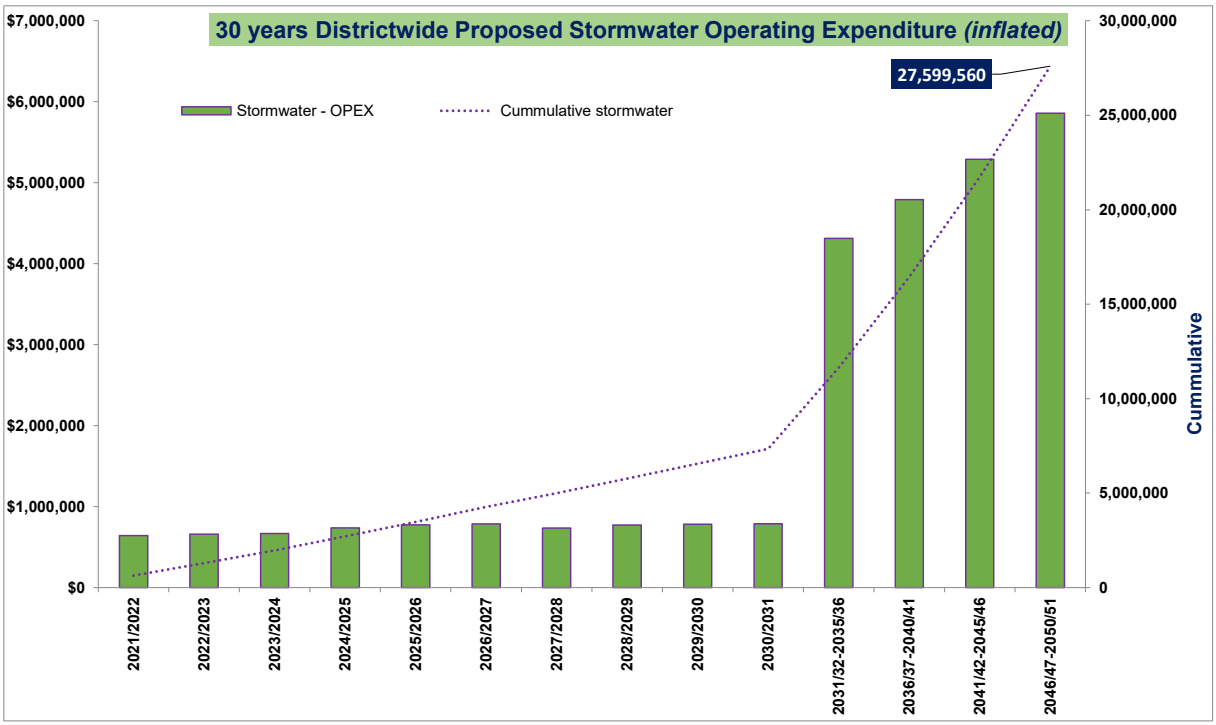


Figure 8-6: Projected Stormwater Operating Expenditure

8.4.2 Stormwater Capital Expenditure Estimates

Figure 8-7 shows the projected capital expenditure for the District's stormwater systems. The expenditure is largely related to renewal work across the District.

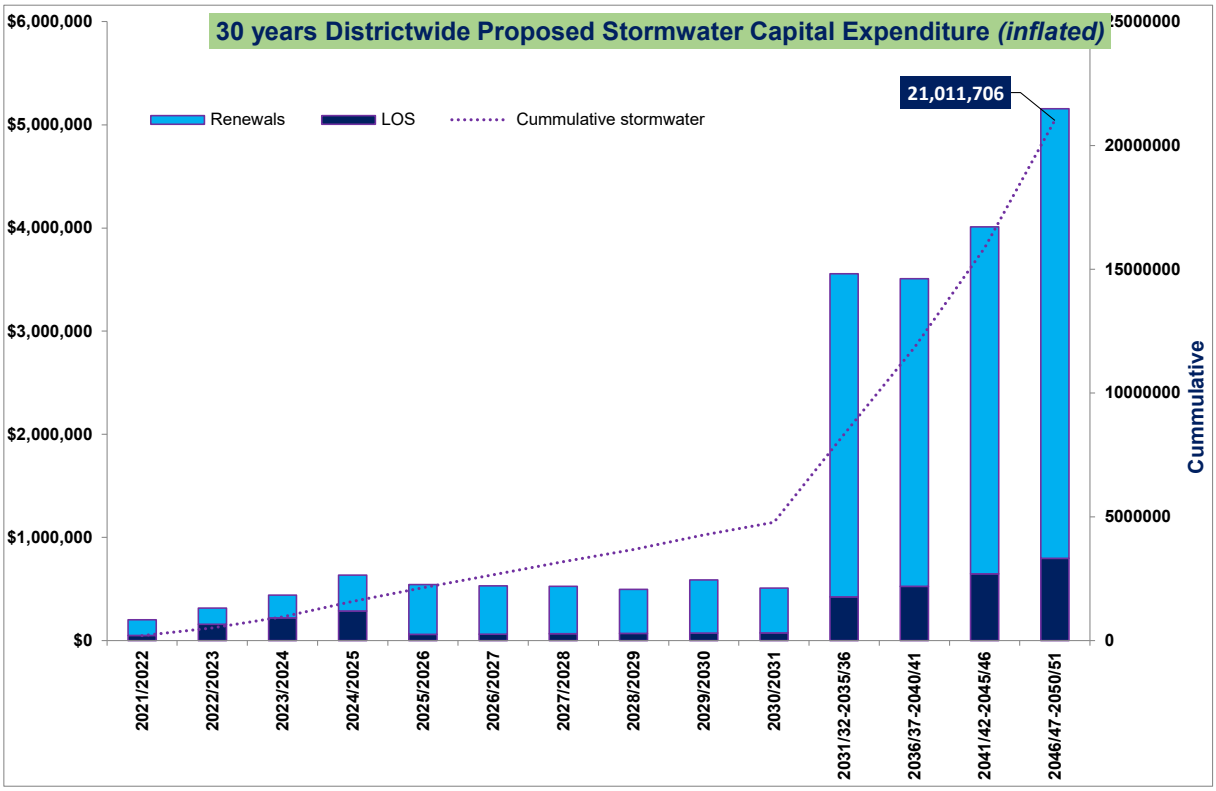


Figure 8-7: Projected Stormwater Capital Expenditure

8.5 Land Transport

8.5.1 Land Transport Operating Expenditure Estimates

The largest portion of operating costs for land transport relates to traffic services such as street light maintenance and electricity, and road corridor maintenance like vegetation control, minor slip repairs and roadside mowing.

Street electricity costs should reduce with the installation of LED lights. However, the long term cost impact of this has not yet been assessed. Forecast expenditure over the 30-year planning period is shown in **Figure 8-8**.

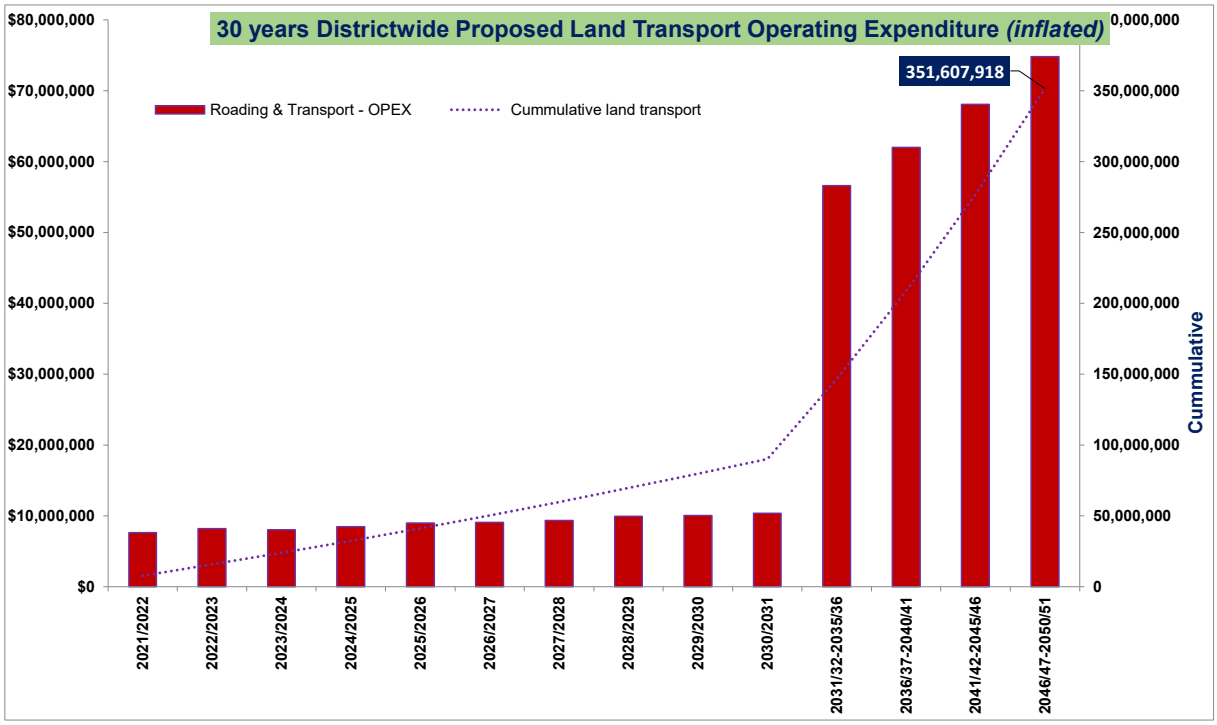


Figure 8-8: Projected Land Transport Operating Expenditure

8.5.2 Land Transport Capital Expenditure Estimates

Most capital expenditure in land transport for this District is spent on resealing road surfaces and rehabilitation of existing roads.

The extent of the work needed on the network's bridges is not fully understood yet but will be improved with ongoing inspection work. There is an allowance for inspections and repair of bridges in Years 2021 to 2024.

The estimates in this forecast, presented in **Figure 8-9**, are inflation-adjusted.

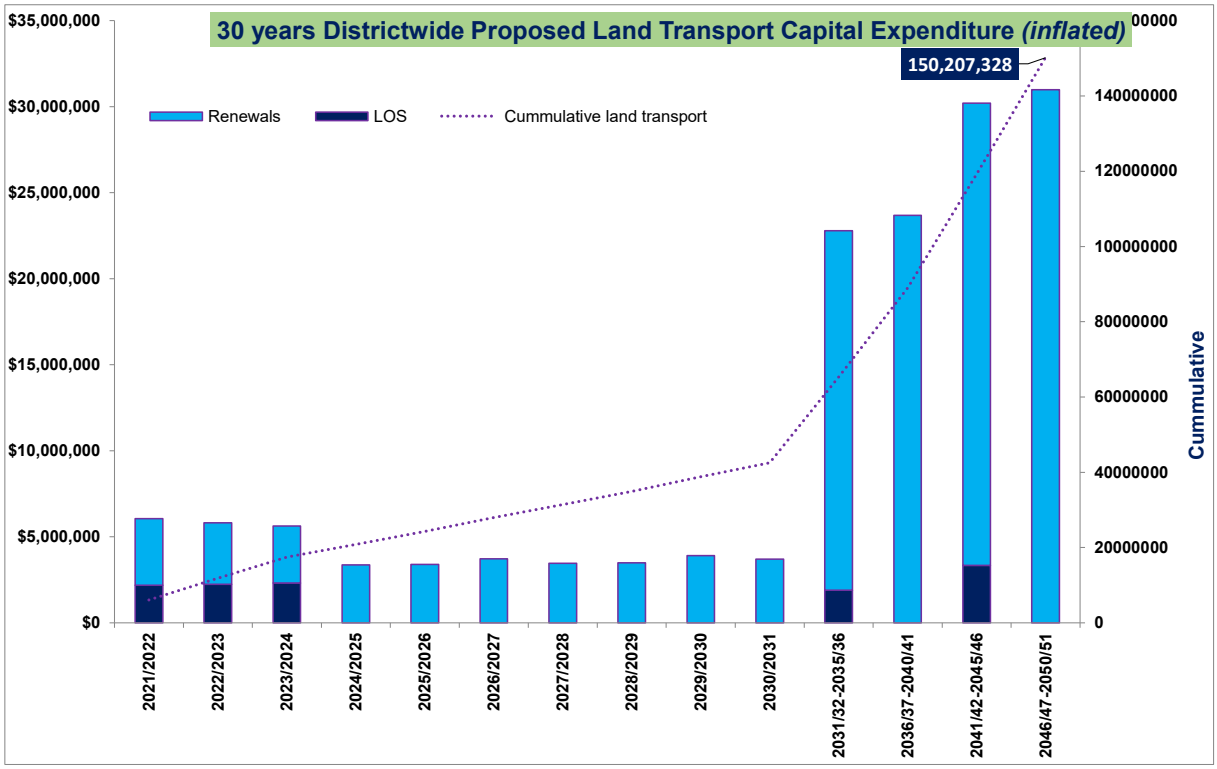


Figure 8-9: Projected Land Transport Capital Expenditure

8.6 Solid Waste Management

8.6.1 Solid Waste Management Operating Expenditure Estimates

Figure 8-10 shows the projected operating expenditure for Solid Waste Management Portfolio.

It includes direct costs relating to the physical operating and maintenance, and indirect costs such as interest on loans and depreciation.

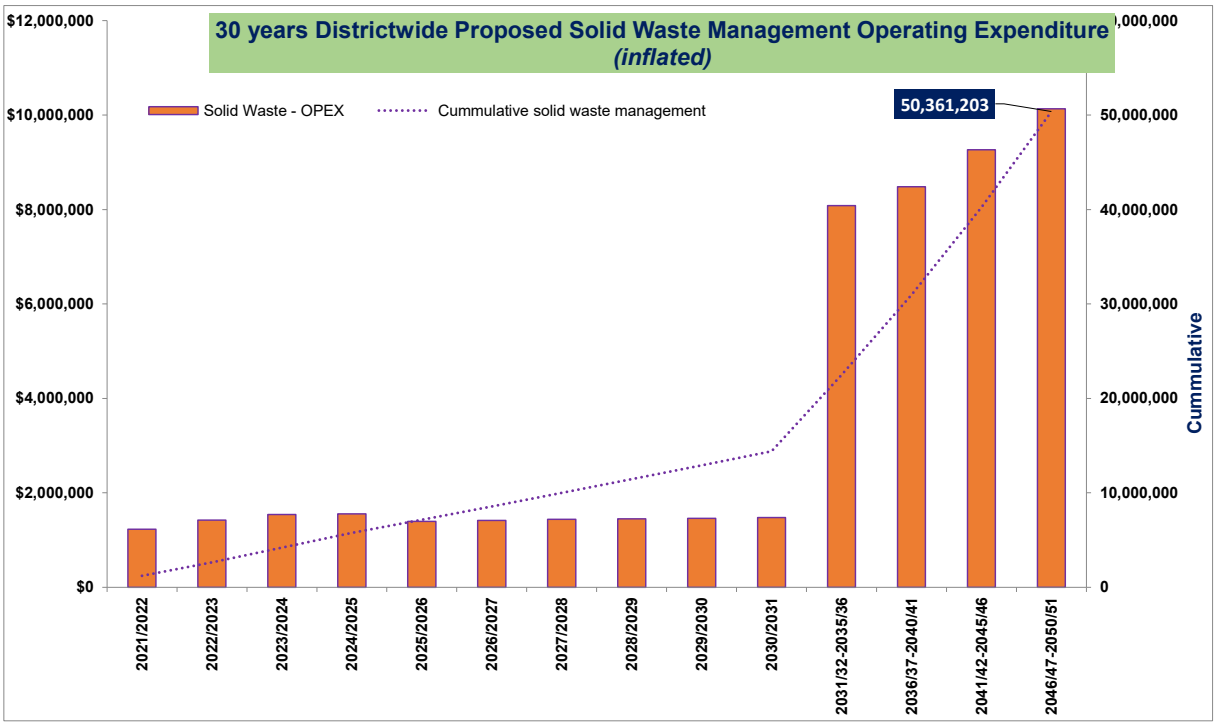


Figure 8-10: Projected Solid Waste Management Operating Expenditure

8.6.2 Solid Waste Management Capital Expenditure Estimates

Figure 8-11 shows the projected capital expenditure for the District's Solid Waste Management. The expenditure is largely related to the Levels of Service improvements across the District.

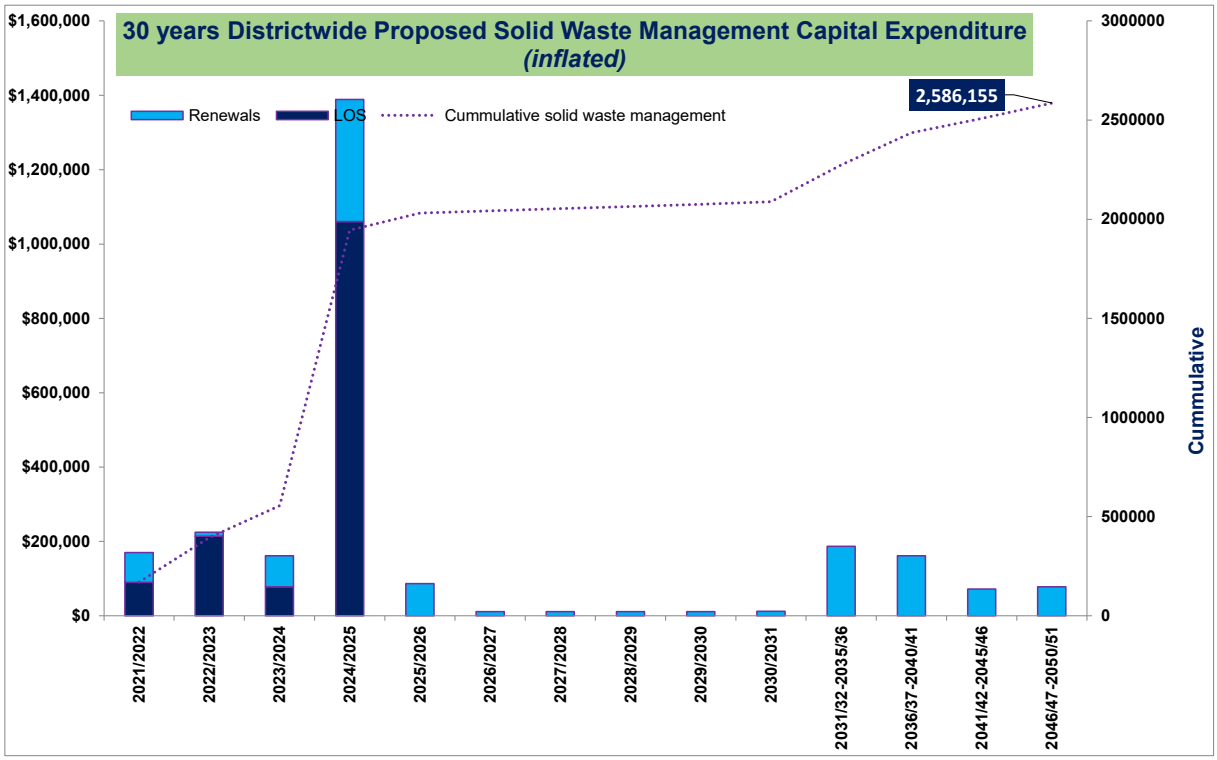


Figure 8-11: Projected Solid Waste Management Capital Expenditure

8.7 Most Likely Scenarios

The basis of this strategy is built on a series of assumptions and forecasts that translate into major drivers of demand for expenditure. Section 3 outlines the demographic context under which the council forecasts it will be operating.

Council has developed a detailed forecast of assumptions that impact across all Council activities. These detailed assumptions are included in the Draft Long Term Plan 2021-2024 and are summarised in the Long Term Plan Significant Forecasting Assumptions and risks. More detailed forecasts of issues that impact directly on the infrastructure activities have been developed through the asset management plan process. Where relevant, these assumptions are summarised in Section 4 of this strategy.

Infrastructure costs for the next 30 years are shown in the graph below. These estimates are based on the preferred options outlined in this strategy and the work programmes included in the 2021-2031 asset management plans.

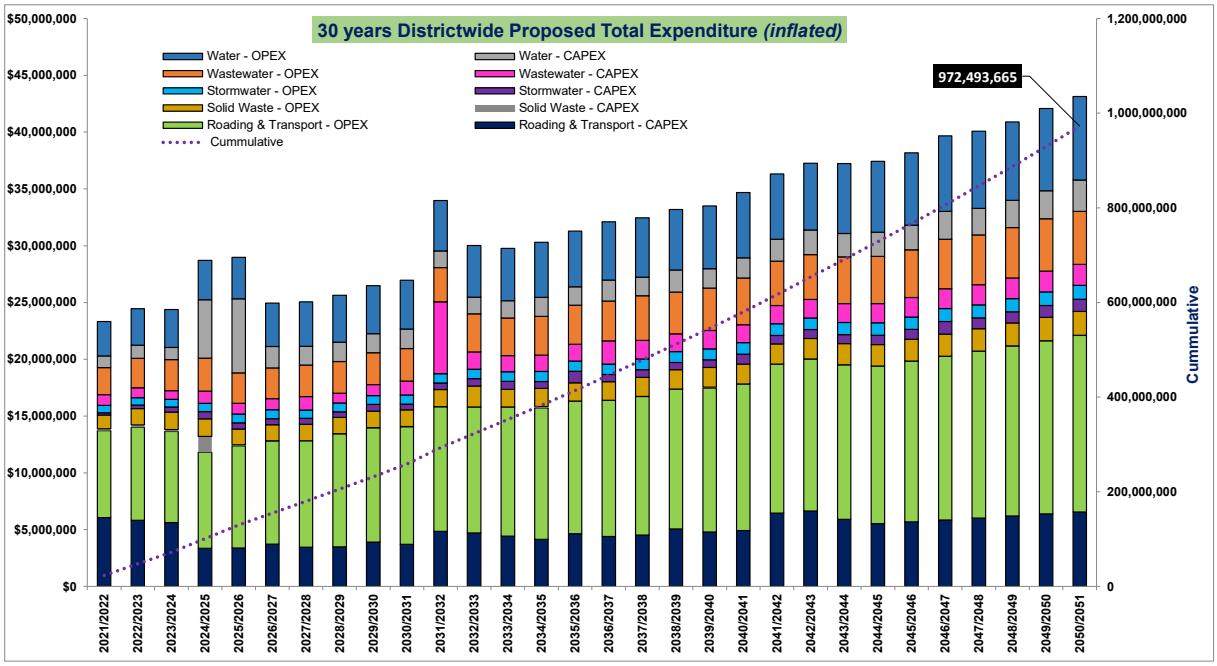


Figure 8-12 shows the most likely total operating expenditure for all core infrastructure activities. The proposed expenditure is about **$687.92 million** for the planning period.

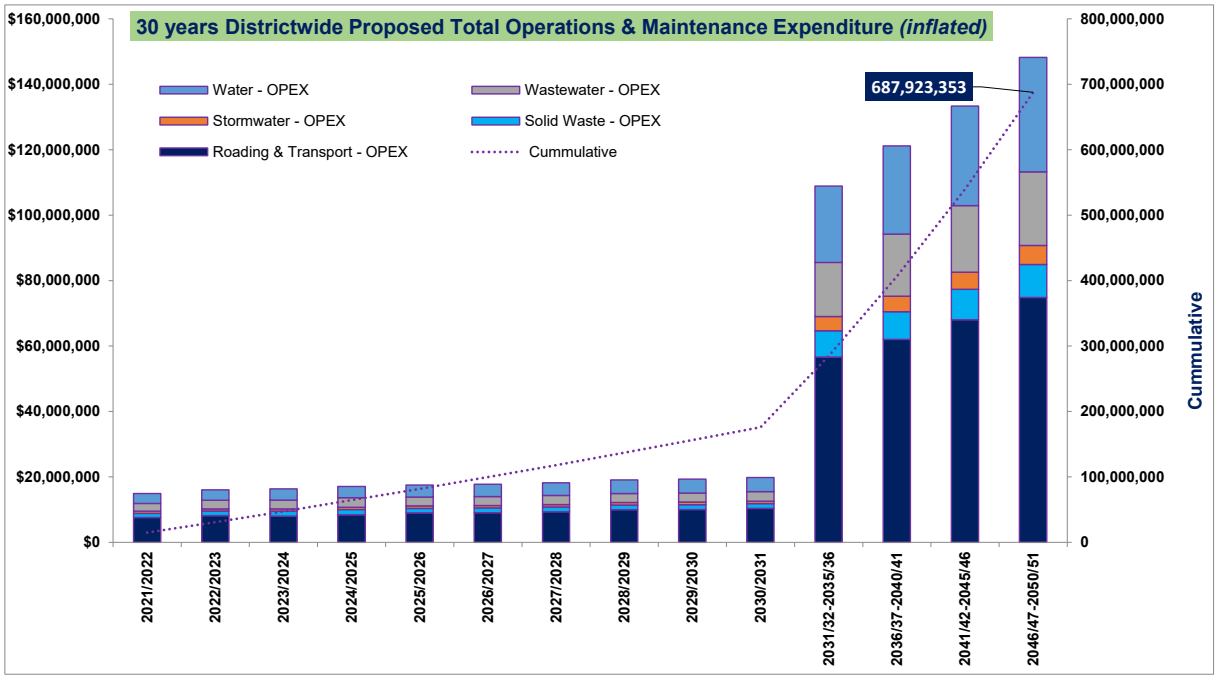


Figure 8-12: Projected Operating Expenditure - All Core Activities

Figure 8-13 shows the most likely total capital expenditure for all core infrastructure activities. The total capital expenditure for all the core infrastructure activities for the planning period is about **$284.57 million**.

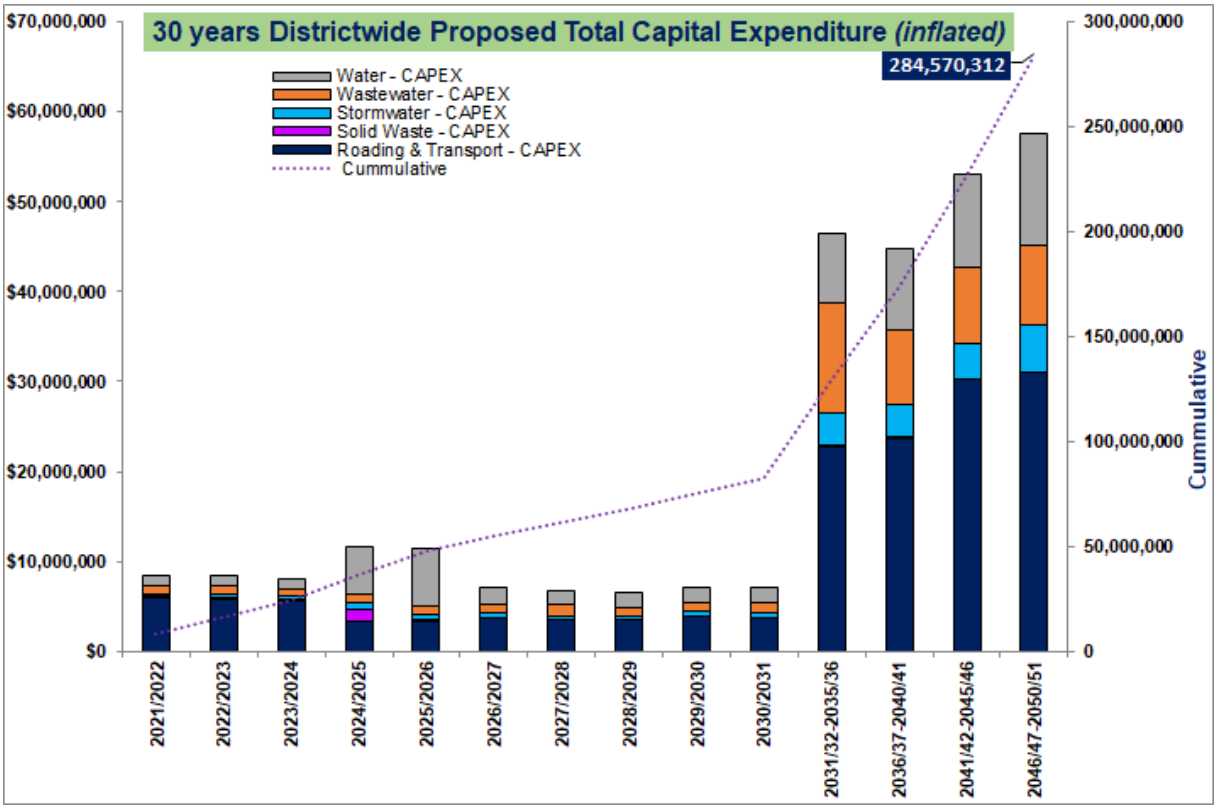
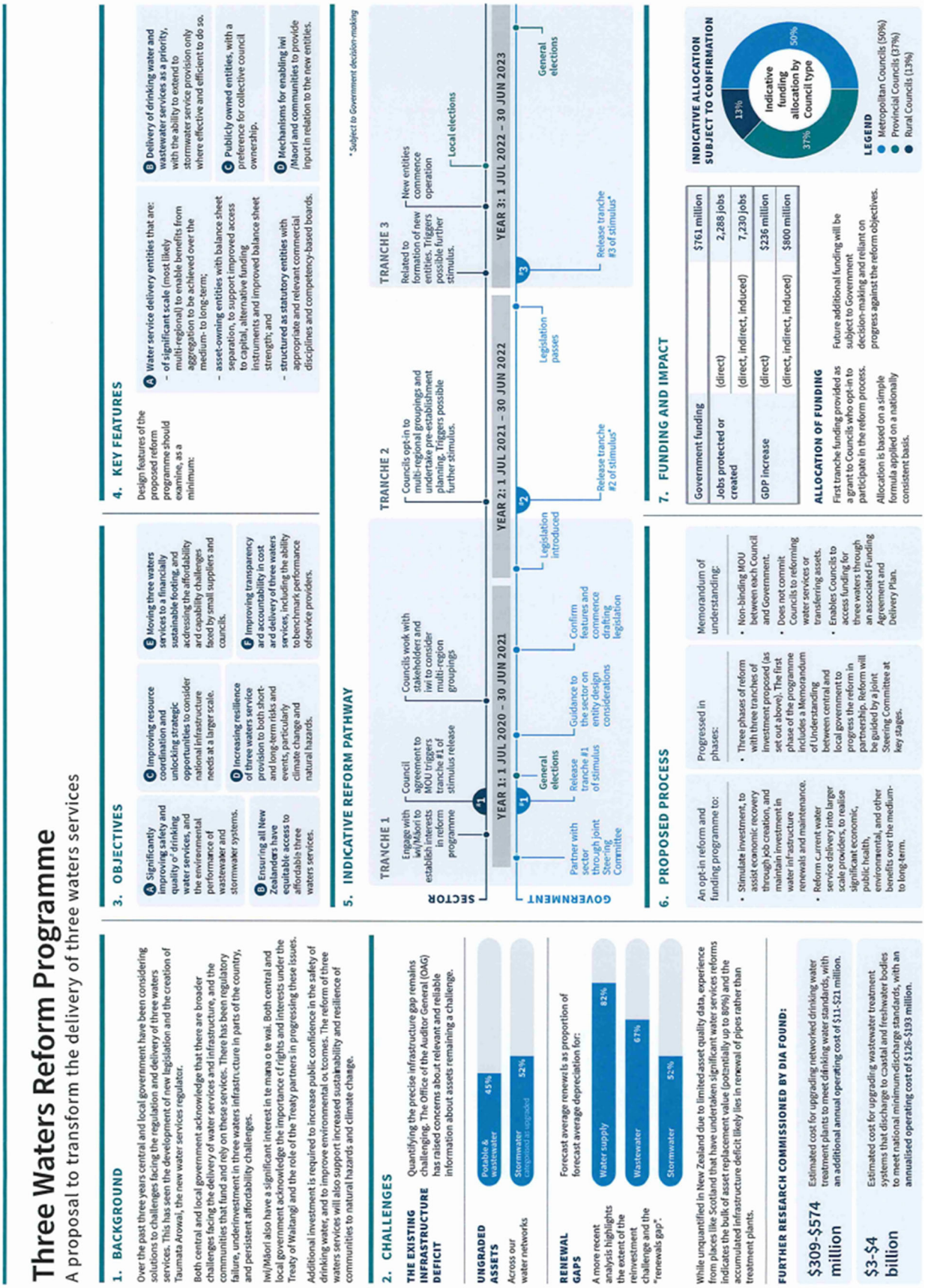
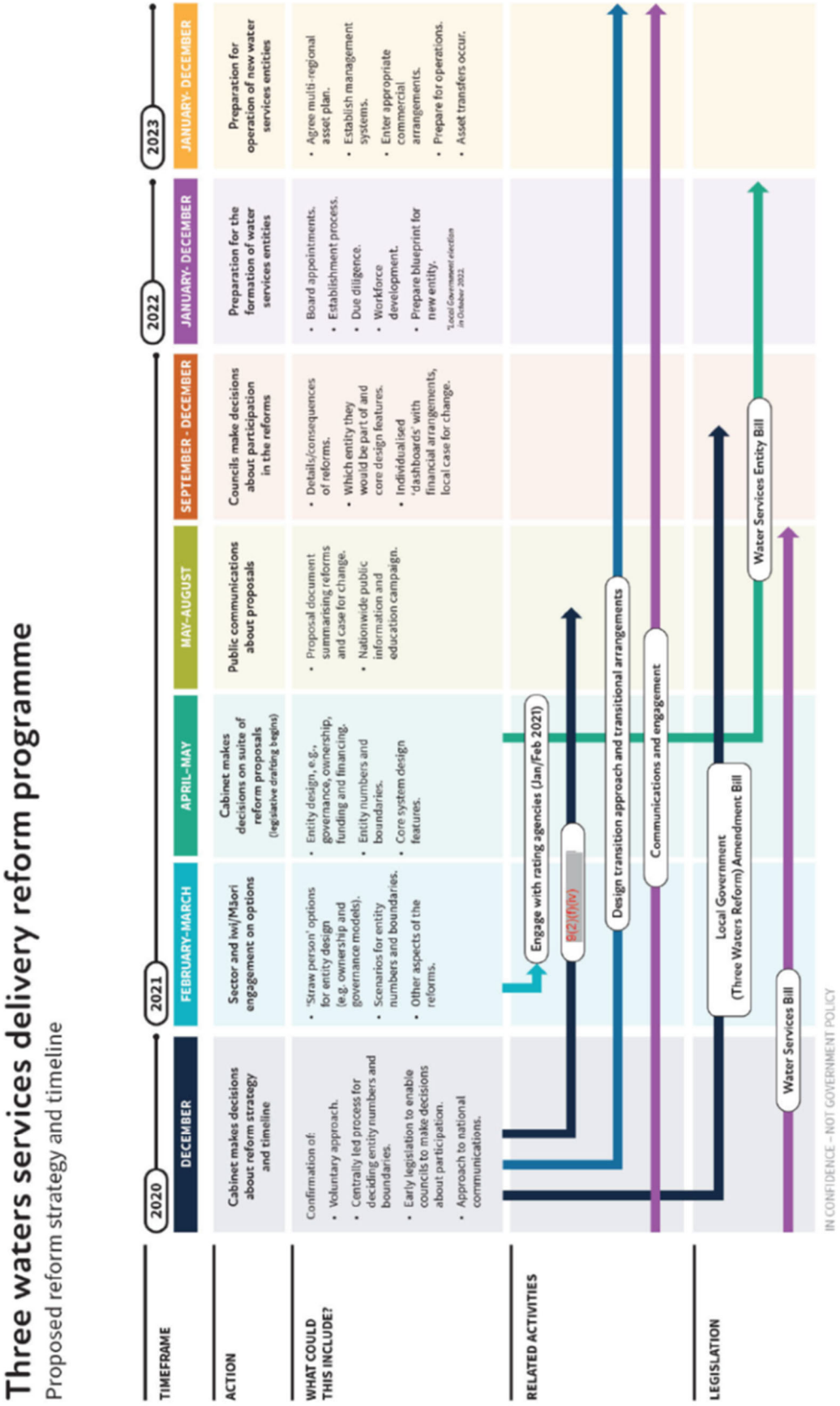


Figure 8-13: Projected Capital Expenditure- All Core Activities

APPENDIX A: THREE WATERS REFORM PROGRAMME

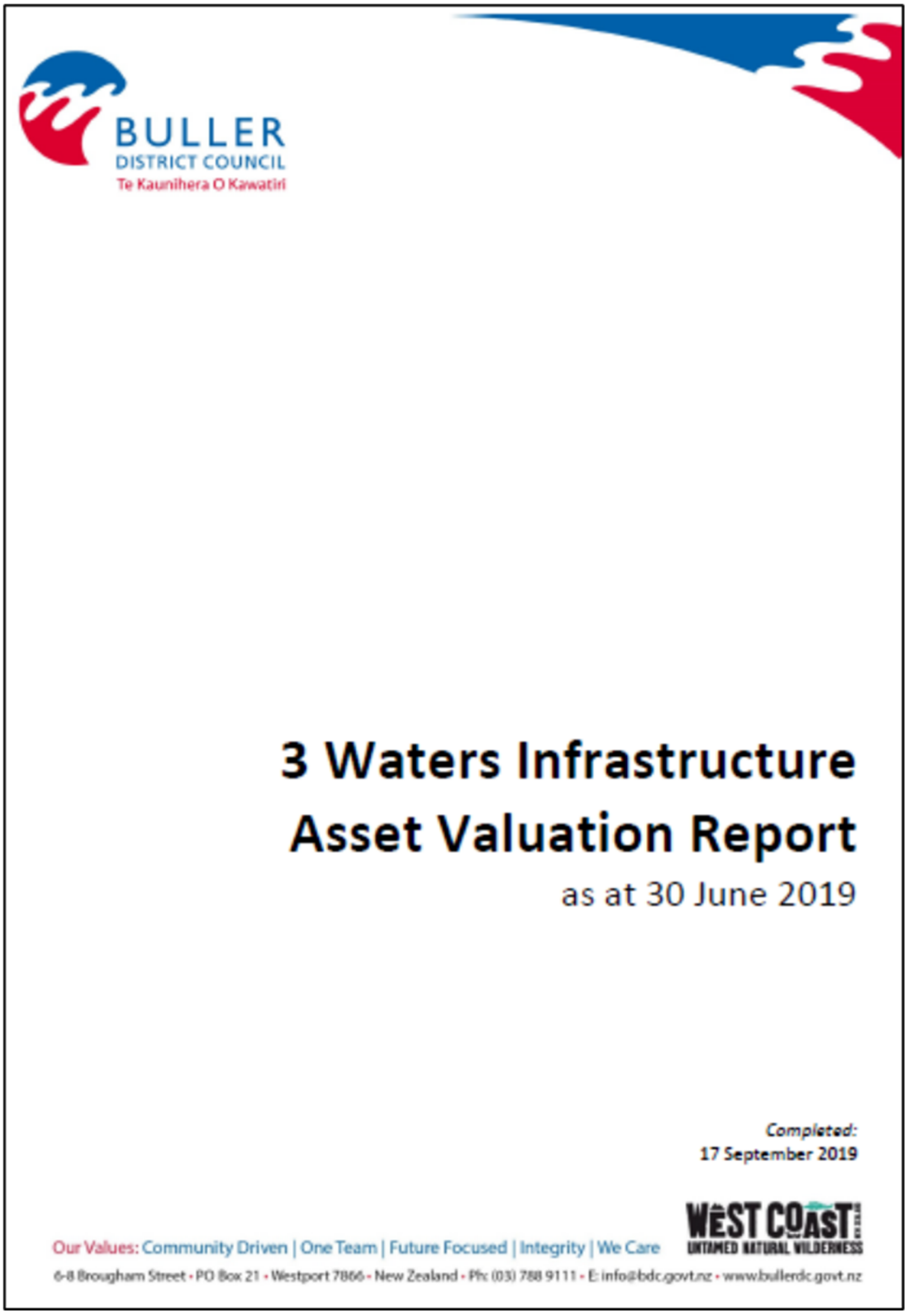


APPENDIX B: THREE WATERS SERVICES DELIVERY REFORM PROGRAMME



APPENDIX C: THREE WATERS INFRASTRUCTURE ASSET VALUATION

EXTRACTS FROM 30 JUNE 2019 VALUATION REPORTS



BULLER DISTRICT COUNCIL
Te Kaunihera O Kawatiri

3 Waters Infrastructure Asset Valuation Report

as at 30 June 2019

Completed:
17 September 2019

Our Values: Community Driven | One Team | Future Focused | Integrity | We Care

WEST COAST UNTAMED NATURAL WILDERNESS

6-8 Brougham Street • PO Box 21 • Westport 7866 • New Zealand • Ph: (03) 788 9111 • E: info@bdc.govt.nz • www.bullerdc.govt.nz

2.3 Data Confidence

Data is given a confidence grading to establish if the valuation has a reasonable basis.

The data has been sourced from various methods including plans, a special survey to capture data by an independent surveyor, prior digitized records, as well as more recent data in the past ten years which has been capturing asset data as described above.

The data is in a state of constant improvement because of the method of data capture used. For example "found" assets are accounted for as discovered and placeholder for unmapped items located in the plant data are reduced as the items are added when BDC is certain of them. The unmapped items are checked each year at balance day revaluation and reconciled to ensure that when found items have been added, that the corresponding deletions are made in the unmapped corresponding category of assets

An assessment of the Council's data was undertaken according to the IIMM rating systems outlined as follows:

Highly reliable	*Reliable*	*Almost reliable*	*Uncertain*
Accuracy +- 5%	Accuracy +-20%	Accuracy +-30%	Accuracy +-40%

The data confidence table for the 2019 valuation is:

2019 Data Confidence Table						
Asset type	Data confidence				Data completeness	Portion of Overall Value
	Quantity	Size	Age	Condition/ performance		
Water:						
Lines						33.02%
Points						3.13%
Plant						9.54%
Wastewater:						
Lines						18.97%
Points						2.67%
Plant						15.76%
Stormwater						
Lines						14.13%
Points						2.49%
Plant						0.29%

Buller DC 2019 Valuation of Roading Infrastructure Assets

Prepared for Buller District Council
Prepared by Beca Projects NZ Limited

18 September 2019

Creative people together transforming our world

4.2 Asset Data

4.2.1 Asset Information Source

All assets located on roads maintained by BDC have been included in this valuation.

Road infrastructure data for the assets was provided by BDC from their database. An evaluation of the level of confidence in the data for each asset type is provided in Section 6. Where data is incomplete Beca have made assumptions, which are detailed in Appendix A dealing with each asset class and component.

4.2.2 Data Confidence

Asset inventory data was sourced from provided spreadsheets, which were compiled by BDC for the purposes of this valuation. Some additional data, for example, asset condition, has been sourced directly from RAMM.

The quality of the data used for each asset class in the valuation has been assessed in accordance with the data confidence grading system in the NZ Infrastructure Asset Valuation and Depreciation Guidelines.

For this valuation, no field audit was completed to confirm asset details.

4.3 Data Confidence Assessment

The grading system and the confidence assessment are provided in the Tables 4.1 and 4.2.

Table 4.1 Data Confidence Grading System

Confidence Grade	General Meaning
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, procedure, investigations and analysis which is properly documented but has minor short comings; for example, the data is old, some documentation is missing, and reliance is placed on unconfirmed reports of some extrapolation.
C	**Uncertain** Data based on sound records, procedure, 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.

Table 4.2 Data Confidence Assessment

Asset / Component	Confidence	Reason and Notes
Bridge and Major Culverts	A	Good data for bridge records, with only a few records missing data
Drainage	B+	Data generally complete for drainage assets, with some minor short comings including missing sizes/diameters etc
Footpaths	B+	Data generally complete for footpaths assets, with some minor short comings including missing length/width etc
Pavement Base	C	Pavement layer material and depths unknown across the network. Estimated traffic loading not provided in the data.
Pavement Formation	B	Data generally complete for formation records, but some short-comings identified with missing start/end, lengths and widths etc
Pavement Surface	A	Good data for pavement surface records, with only a few records missing data
Street Lights	B-	Data generally populated, however many records have an assumed install date and light fitting
Surface Water Channels	B+	Data generally complete for surface water channel assets, with some minor short comings including missing start/end displacements
Traffic Facilities	C	Data has some short comings. Expected duplication and omissions in the data. No recorded installation dates.

APPENDIX D: BRIDGE INSPECTION REPORT AND PROGRAMME OF WORKS 2018

Principal Bridge Inspection Report 2018

Buller District Council, West Coast NZ

Contact Details

Name: Emma Wardle

23 High Street
PO Box 365, Greymouth 7840
New Zealand

Telephone: +64 3 769 9330
Mobile: +64 27 609 0287

Document Details:

Date: 31 October 2018
Reference: 6-WBUL0.39 / 005GG
Status: Draft 1

Prepared By

Emma Wardle
Graduate Engineer Structures

Reviewed By

Campbell Apthorp
Bridge/Structural Engineer

Approved for Release By

Mark Smith
Work Group Manager - Civil/Structural

Contents

1 Introduction 1

1.1 General 1

1.2 Previous Inspections 1

1.3 Bridge Inspection Process 1

1.4 Inspection Personnel 2

2 Schedule of Bridges 2

2.1 Bridges Inspected 2

2.2 Bridges not Inspected 2

2.3 Structures Added to OBIS 3

3 Principal Inspections 3

3.1 Principal Inspections 3

3.2 Special Access Unit Inspections 3

4 Recommended Maintenance 4

4.1 Work Schedules 4

4.2 Priority 4

4.3 Identified Routine Maintenance (114A) 4

4.4 Identified Structural Maintenance (114B) 5

4.5 Identified Guardrail Maintenance (114D) 5

4.6 Further Investigation Required 5

4.7 Minor Safety Projects 7

5 Bridge Valuations 7

5.1 Key Issues and Explanations 7

6 Bridge Replacements 8

7 Posting Weight Limits 10

7.1 Existing Posting Weight Limits 10

7.2 Recommended Posting Weight Limit Assessments 11

8 General Comments 11

9 BDC Structure Inventory Summary 11

Appendices

Appendix A: BDC Structure Inventory Summary 12

Appendix B: Work Schedules 22

Appendix Bi: Routine Maintenance 23

Appendix Bii: Structural Maintenance 41

Appendix Biii: Guardrail Maintenance 54

Appendix Biv: Further Investigation Required 59

Appendix C: Bridge Valuations 63

1 Introduction

1.1 General

This report documents the outcomes of WSP Opus's Principal Inspections of the Buller District Council (BDC) bridging stock. The purpose of these inspections was to determine the current condition of BDC's bridges, major culverts, and stock underpasses and to identify maintenance and repair items. Inspection notes were entered into WSP Opus' Online Bridge Inspection System (OBIS). 142 bridges and culverts were inspected throughout August and September 2018. OBIS provides an in-built tool to give valuations for bridging stock. Bridge valuations are also provided in this report.

Figure 1: BDC Bridges, Major Culverts & Stock Underpasses

1.2 Previous Inspections

During the previous 2014 bridge inspections by Opus International Consultants[1], BDC's bridges were entered into OBIS for the first time. BDC's bridging stock was previously inspected as noted below:

- The 2014/15 bridge inspections included general inspections of 155 bridges
- The 2017 bridge inspections included principal inspections of 12 bridges, and timber drilling of 6 bridges.

1.3 Bridge Inspection Process

During the 2018 bridge inspections, the following tasks were carried out for each bridge:

1 Visual inspection
2 Capture of bridge descriptive photographs, i.e. views of approaches, waterways, and structure.
3 Capture of condition photographs of each structure including detailed photographs of maintenance items and defects.
4 Condition rating of the structure
5 Preparation of maintenance schedules
6 Input data and populate OBIS with inspection findings

Figure 2: Bridge Descriptive Photographs

[1] *Buller District Council Bridge Inspection Report*, Opus International Consultants Ltd., October 2014.

1.4 Inspection Personnel

The following WSP Opus personnel were used in the delivery of this project:

Table 1: Bridge Inspection Personnel

PERSONNEL	TITLE	ROLE
Rem Markland	Senior Engineering Technician	Senior Bridge Inspector
Emma Wardle	Graduate Engineer Structures	Bridge Inspector, Reporting & Valuations
Kathie Ragg	Projects Technician	Bridge Inspector
Nureen Mohammed	Graduate Planner	Safety Person
Campbell Apthorp	Bridge/Structural Engineer	Technical Reviewer
Mark Smith	Work Group Manager – Civil/Structural	Project Manager

2 Schedule of Bridges

2.1 Bridges Inspected

There are a total of 157 bridges on the OBIS system. The 2018 BDC Bridge Inspections included 142 bridges and major culverts. An inventory of all Buller District Council bridging stock on the OBIS system is included in Appendix A.

2.2 Bridges not Inspected

A number of BDC bridges were inspected in 2017 and were excluded from the inspection schedule. Bridges NOT inspected in 2018 are shown in Table 2 below.

Table 2: Bridges Not Inspected

BRIDGE NO.	BRIDGE NAME	ROAD NAME	LAST INSPECTED
29	Chasm Creek Bridge No.3	Charming Creek Road	07/05/2017
30	Charming Creek Bridge	Charming Creek Road	07/05/2017
38	McMillans Bridge	Nansen Street	07/05/2017
107	Mairs Bridge	Westbank Road	07/09/2017
117	Brown Grey Bridge	Palmers Road	06/05/2017
119	Upper Grey River Bridge	Palmers Road	06/05/2017
169	Hamptons Rock	Beach Road (Fairdown)	07/05/2017
170	Fox River Bridge	SH6	23/01/2017
174	Cleine Stock Underpass	Utopia Road (Westport)	07/05/2017
175	Landcorp Stock Underpass	Somerville Road	12/09/2017
176	O'Connor Train Wagon Chassis	O'Connor Road	07/05/2017
177	Mokihinui Pedestrian Bridge	Mokihinui Road	07/05/2017
178	Crushington Farms	Crushington Farms Access Road	06/05/2017
1000	Reefton Suspension Bridge	State Highway 6	12/09/2017
1001	Blacks Point Suspension Bridge	Auld Street	12/09/2017

2.3 Structures Added to OBIS

Table 3 below lists the new structures added to OBIS since the 2014 inspections.

Table 3: Structures Added to OBIS

BRIDGE NO.	BRIDGE NAME	ROAD NAME	COMMENTS
183	O'Connor Home Stock Underpass	Nine Mile Road	New structure
184	Burke's Creek Ford	Mokihinui Road	New structure
185	Corbyvale Stock Underpass	Karamea Highway	Recently identified

Figure 3: New Structures Added to OBIS

3 Principal Inspections

3.1 Principal Inspections

A principal inspection[2] was carried out for each bridge and bridge inspection notes entered into OBIS onsite. Copies of bridge inspection reports can be reproduced in hard copy if required directly from the OBIS database.

In addition to the bridge inspection reports, additional 'Engineer's Comments' have been added to describe any specific issues or comments at each site where applicable.

The bridge inspection reports, site photographs and notes were reviewed for each bridge to identify required maintenance, repairs or strengthening work, or where further investigation is required.

3.2 Special Access Unit Inspections

A number of principal inspections required the use of a special access unit truck. This type of inspection is recommended for principal inspections where the bridge soffit is not easily accessible from the riverbed. The bridges in Table 4 below were inspected from the access unit.

Table 4: Access Unit Inspections

BRIDGE NO.	BRIDGE NAME	ROAD NAME	PREVIOUSLY INSPECTED
27	Chasm Creek Bridge No.1	Mokihinui Road	4/09/2014
47	Scotts Bridge	Stephen Road	10/09/2014
65	Mirfins Bridge	Atarau Road	12/09/2014
70	Alexander Bridge	Snowy Road	12/09/2014
98	Coal Creek Bridge	Brown Creek Road	10/09/2014
123	Surveyors Creek Bridge	Karamea Highway	4/09/2014
125	Glasseye Creek	Karamea Highway	4/09/2014
134	Karamea Bridge	Karamea Highway	4/09/2014
168	Perseverance Bridge	Perseverance Road	10/09/2014

[2] New Zealand Transport Agency: Bridges and Other Significant Highway Structures, Inspection Policy; NZTA S6:2011; Section 5.

4 Recommended Maintenance

4.1 Work Schedules

Items identified in the 2018 inspections, as well as items from the 2014 and 2017 inspections are included in the Work Schedules in Appendix B.

Works schedules are output from the inspection process and discussed in the following sections. The schedule definitions are shown in Table 5 below.

Table 5: Work Schedules

WORK ELEMENT		DESCRIPTION
114A	Routine Maintenance	Repairs and maintenance requiring no design input. These items may be undertaken by the maintenance Contractor.
114B	Structural Maintenance	Repairs and maintenance requiring design input or where specialist contractors would be required to undertake the work.
114D	Guardrail Maintenance	Repairs and maintenance for guardrail and handrail on the bridge.
I	Further Investigation Required	Further investigation is required to determine the cause or extent of repair.
MS	Minor Safety Project	Opportunities identified where upgrades to guardrail, alignment, etc. would greatly improve the safety of the structure.

Figure 4: Routine, Structural & Guardrail Maintenance

4.2 Priority

The works have been prioritized based on the recommended timeframe for completion.

Table 6: Works Prioritization

PRIORITY		TIMEFRAME
U	Urgent	Prompt action required (within 3 months)
H	High	Complete within 1 year
M	Medium	Complete within 2 years
L	Low	Complete within 5 years or as resources allow
Z	Monitor	As recommended
N	Not Required	As recommended

4.3 Identified Routine Maintenance (114A)

A Rough Order Cost (ROC) for Routine Maintenance items (Appendix B i) is shown below, separated by priority.

Table 7: Routine Maintenance Items

PRIORITY	IDENTIFIED ITEMS	ROC TO COMPLETE WORKS
Urgent	5	$3,100
High	99	$87,700
Medium	104	$159,850
Low	37	$35,450
Monitor	44	$430,550
Not Required	5	$9,000
TOTAL	**294**	**$725,650**

4.4 Identified Structural Maintenance (114B)

A Rough Order Cost (ROC) for Structural Maintenance items (Appendix B ii) is shown below, separated by priority.

Table 8: Structural Maintenance Items

PRIORITY	IDENTIFIED ITEMS	ROC TO COMPLETE WORKS
Urgent	10	$373,000
High	39	$414,500
Medium	46	$616,400
Low	21	$215,800
Monitor	62	$969,950
Not Required	-	-
TOTAL	**178**	**$2,589,650**

4.5 Identified Guardrail Maintenance (114D)

A Rough Order Cost (ROC) for Guardrail Maintenance items (Appendix B iii) is shown below, separated by priority.

Table 9: Guardrail Maintenance Items

PRIORITY	IDENTIFIED ITEMS	ROC TO COMPLETE WORKS
Urgent	-	-
High	26	$87,870
Medium	18	$35,550
Low	12	$35,400
Monitor	6	$109,300
Not Required	-	-
TOTAL	**62**	**$268,120**

4.6 Further Investigation Required

A Rough Order Cost (ROC) for Further Investigation items (Appendix B iv) is shown below, separated by priority.

Table 10: Further Investigation Required

PRIORITY	IDENTIFIED ITEMS	ROC TO COMPLETE WORKS
Urgent	6	$30,250
High	5	$48,500
Medium	11	$47,450
Low	4	$22,000
Monitor	7	$97,000
Not Required	-	-
TOTAL	**33**	**$245,200**

4.6.1 Timber Bridges Recommended for Drilling

The following bridges were drilled pre-2014. Timber bridges are recommended to be drilled on a 6-year cycle and are therefore due for drilling inspection in 2019.

Table 11: Timber Bridges Recommended for Drilling in 2019

BRIDGE NO.	BRIDGE NAME	ROAD NAME	TIMBER ELEMENTS FOR DRILLING	LAST DRILLED
13A	Kelly Creek	Arapito Road	Deck, caps and piles.	Pre-2014
45	Christmas Bridge	Powerhouse Road (Fairdown)	Deck, beams, caps.	Pre-2014
61	Bullock Creek Bridge	Bullock Creek Road	Corbels, caps, piles.	Pre-2014
104	Buller Camp Bridge	Buller Railway Road (South)	Deck, beams, caps, piles.	Pre-2014
120	Blue Grey River	Palmers Road	Deck, beams (Span AB only), caps.	Pre-2014
176	O'Connor Train Wagon Chassis	O'Connor Road	Caps, piles.	Pre-2014

The following bridges were drilled in 2017 and do not require drilling until 2023.

Table 12: Timber Bridges Recommended for Drilling in 2023

BRIDGE NO.	BRIDGE NAME	ROAD NAME	LAST DRILLED
29	Chasm Creek Bridge No.3	Charming Creek Road	07/05/2017
30	Charming Creek Bridge	Charming Creek Road	07/05/2017
107	Mairs Bridge	Westbank Road	07/09/2017
117	Brown Grey Bridge	Palmers Road	06/05/2017
119	Upper Grey River Bridge	Palmers Road	06/05/2017
169	Hamptons Rock	Beach Road (Fairdown)	07/05/2017
170	Fox River Bridge	SH6	23/01/2017
177	Mokihinui Pedestrian Bridge	Mokihinui Road	07/05/2017

4.6.1 Fish Passage

The *New Zealand Fish Passage Guidelines*[3] were introduced in April 2018. This document outlines requirements for fish passage to protect New Zealand's native fish species. Culverts with a spillway which may impede fish passage were flagged during the inspections. Table 13 below shows a list of these structures.

Table 13: Structures Impeding Fish Passage

BRIDGE NO.	BRIDGE NAME	ROAD NAME
36	Miller Stream Arch	Calliope Street
77	Burtons Culvert No 1	Burtons Road
78	Burtons Culvert No 2	Burtons Road
124	Falls Creek Culvert	Karamea Highway
131a	Blackwater Creek Culvert No.2	Karamea Highway
133	Mussons Creek Culvert	Karamea Highway
159	Break Creek No 2	McCallums Mill Road
160	Break Creek No 3	McCallums Mill Road
161	Break Creek No 4	McCallums Mill Road
162	Break Creek No 5	McCallums Mill Road
164	Break Creek No 7	McCallums Mill Road
181	Millterton Culverts	Millerton Track

[3] *New Zealand Fish Passage Guidelines*, NIWA, April 2018

Figure 5: Culverts Impeding Fish Passage

4.7 Minor Safety Projects

The following minor safety projects were identified during the BDC bridge inspections.

Table 14: Minor Safety Projects

BRIDGE NO.	BRIDGE NAME	ROAD NAME	RECOMMENDATION
114	Rahu Creek Bridge	Westbank Road	Consider installing approach guardrail. Bridge comes off sharp turn with steep embankments.
118	Palmer Bridge	Palmers Road	Consider installing approach guardrail. Steep embankment on downstream side.
130	Little Wanganui Bridge	Karamea Highway	Consider upgrading guardrail.

5 Bridge Valuations

The OBIS system has a module for undertaking Bridge Valuations in accordance with NZ Infrastructure Asset Valuation & Depreciation Guidelines (Edition 2.0, 2006). Appendix C contains the bridge valuation report from the database. The bridge valuations undertaken for BDC are consistent with that undertaken by WSP Opus for other Local Authorities.

Based on existing bridge information held in the database and user applied 'weighting' factors to represent the current condition of the bridge, the module provides the following key outputs for each structure:

- Remaining Useful Life (RUL)
- Replacement Cost
- Optimised Depreciation Replacement Cost (ODRC)
- Annual Straight-Line Depreciation

Table 15 below summarises the results of the valuation assessment:

Table 15: Valuation Summary

VALUATION SUMMARY	
Total Bridge Replacement Cost	$39,431,000
Optimised Depreciated Replacement Cost	$16,985,283
Annual Straight-Line Depreciation	$462,126

5.1 Key Issues and Explanations

There are a number of key issues relating the valuation of these bridges with explanations below.

- Bridges have not been broken down to component level when undertaking the valuations. Valuating bridges at a component level would make the valuation exercise much more

onerous and would likely result in no significant change in outcome. The approach taken is considered appropriate at this point in time.

- The replacement costs have been optimised based on the structure replacement type and the level of service required. In many instances we have identified that existing bridges would be more cost effectively replaced with a culvert type structure providing the same level of service.
- Bridge replacement costs are based on square metre rates for the various types of bridges, being applied to the deck area of the bridge. The rates used are tabulated at the back of the valuation report in Appendix C. The deck area is taken as the overall width (the greater of the width between kerbs or handrails) multiplied by the length of the bridge. For the length of the bridge we have used an assessed 'Equivalent Length' which assumes spill through batters being used in place of retaining wall abutments. This is in order to more effectively represent the basis of the unit cost rates.
- Culvert replacement costs are based on lineal metre rates for the various types of culverts. The rates used are tabulated at the back of the valuation report in Appendix C.
- To account for the varying life expectancies of the main bridge components (deck, beams and foundations) which typically affect the overall life of the structure, a 'Base Life' is adopted based on the type of materials used in the main components of the bridge. The selection table for assigning the base life is outlined at the back of the valuation report in Appendix C.
- As we had no information on a large number of bridges we have had to estimate the age of a large number of bridges based on the type of construction and the age of other bridges within the area.
- The Remaining Useful Life (RUL) is the 'Useful Life' less the age of the structure. Where structures are nearing the end of life or are older than their typical 'Useful Lives', the calculation of the RUL can give inappropriate answers (i.e. negative values or significantly lower than expected/assessed values for the RUL). We have taken account of this by using our assessment of the Remaining Life (based on inspection) for the RUL where considered appropriate. The Useful Life is adjusted accordingly. This provides a more meaningful assessment of the Optimised Depreciated Replacement Cost for BDC's bridging assets.
- As we do not have a good picture of the rates of deterioration of these bridges through previous inspections we have not typically altered the RUL calculated by OBIS.
- Technical Factors (Table 4.6.3 of the *Valuation Guidelines*) are used to account for variances in design standards, construction and material quality, operational and environmental stresses and other factors. These factors have an effect on the life of a structure and are used to adjust the 'Base Life' to provide the 'Useful Life'.
- 'Straight Line' Depreciation has been adopted for this valuation exercise.

A full bridge valuation is contained within Appendix C of the report. Individual valuations can be obtained straight from OBIS.

6 Bridge Replacements

Table 16 below summarises all bridges with an estimated remaining life of 10 years or less and forms the basis of a bridge replacement programme. This list is preliminary only and can be refined with further investigation.

The Remaining Useful Life (RUL) of some of these bridges could be extended through component replacement and this is summarised in Table 16 below.

It is recommended that a bridge replacement budget of 40-90% of the annual depreciation be allowed to maintain a council's bridging stock. For BDC this equates to an annual replacement budget of $184,850 to $415,913. Lower replacement budgets typically result in an overall reduction in the value and a general deterioration of the bridging stock.

Table 16: Preliminary 10-year Bridge Replacement Programme

BRIDGE NO.	BRIDGE NAME	ROAD NAME	RUL (YRS)	REPLACEMENT COST	COMMENTS
104	Buller Camp Bridge	Buller Railway Road	0	$73,080	Life could be extended through drilling and repair works although unlikely to exceed 5-10yrs.
146	Culvert 2472	Conns Creek Road	0	$41,760	Recommend replacement with a concrete culvert
162	Break Creek No 5	McCallums Mill Road	0	$43,200	Recommend replacement with a concrete culvert
167a	Palmer Road Culvert	Palmers Road	0	$51,840	Recommend replacement with a concrete culvert
170	Fox River Bridge	State Highway 6	0	Not recommended for replacement	Recommend significant repair works or demolition.
174	Cleine Stock Underpass	Utopia Road	0	$156,816	Appears to be in reasonable condition.
178	Crushington Farms	Crushington Farms Access Road	0	$466,671	Life could be extended through repairs and maintenance.
159	Break Creek No 2	McCallums Mill Road	1	$28,800	Recommend replacement with a concrete culvert
117	Brown Grey Bridge	Palmers Road	3	$271,656	Bridge piers and abutments drilled in 2017. Likely okay until next drilling in 2023.
124	Falls Creek Culvert	Karamea Highway	3	$54,000	Life could be extended through repairs including new invert and retaining works. Appropriate remedial works likely to achieve another 15-20+ years.
13a	Kelly Creek Bridge	Arapito Road	4	$83,520	Bridge is nearing the end of its life – recommend replacing within 4yrs.
29	Chasm Creek Bridge No. 3	Charming Creek Road	5	$42,804	Bridge drilled in 2017. Likely okay until next drilling in 2023.
30	Charming Creek Bridge	Charming Creek Road	5	$42,804	Bridge drilled in 2017. Repairs and maintenance are required to extend life of bridge.
106	Boundary Bridge	Boundary Road	6	$913,066	Large concrete bridge currently in reasonable condition. This RUL likely conservative and RUL could exceed 20-30yrs. Monitor closely in future inspections.
119	Upper Grey River Bridge	Palmers Road	6	$269,730	Bridge drilled in 2017. Likely okay until next drilling in 2023.
120	Blue Grey River Bridge	Palmers Road	6	$272,832	Life could be extended through replacement of deck and underpinning of piers. This could achieve 20+ yrs. RUL.
121	Tobin Creek Culvert	Karamea Highway	6	$237,600	Culvert has a large bulge through centre and should be replaced within 10yrs.
19	Blackwater Creek Culvert No. 1	Back Road (Kongahu)	10	$105,600	Currently in reasonable condition. This RUL likely conservative and could exceed 20 years. Monitor closely in future inspections.
			TOTAL REPLACEMENT COST:	$3,155,779	

Note that these replacement costs are based on the average replacement cost over all bridging assets and should not be treated as a cost estimate for the replacement of the structure.

Figure 6: Bridges for Replacement

7 Posting Weight Limits

7.1 Existing Posting Weight Limits

The following bridges should be posted with weight and/or speed restrictions for heavy vehicles. Note that this may not be a comprehensive list as there may have been PWL assessments conducted by others.

Table 17: Bridges with Posting Weight Limits

BRIDGE NO.	BRIDGE NAME	ROAD NAME	POSTING	POSTED?
13a	Kelly Creek	Arapito Road	Axles 1000kg, 10% of Class 1, Speed 30km/h	Yes
30	Charming Creek Bridge	Charming Creek Road	Light Vehicles Only	No
56	Virgin Flat No 1	Virgin Flat Road	30km/h for Heavy Vehicles	Yes
62	New Creek Bridge	Pensini Road	60% Class 1	Unknown
70	Alexander Bridge	Snowy Road	10km/h for Heavy Vehicles	No
104	Buller Camp Bridge	Buller Railway Road	2000KG Max gross weight	Yes
165	McCallums Bridge	McCallums Mill Road	No Oscillating Axles	Yes
169	Hamptons Rock	Beach Road	1 person	No
178	Crushington Farms	Crushington Farms Access Road	8200KG Axle	Yes
1001	Blacks Point Suspension Bridge	Auld Street	10 people	Yes

It is recommended that bridges 30, 62, 70 and 169 have Posting Weight Limit signs installed as soon as possible to ensure the existing postings are followed.

Figure 7: Heavy Vehicle Bridge Limits

7.2 Recommended Posting Weight Limit Assessments

The bridges in

Table 18 below show bridges that are recommended for Posting Weight Limit assessments. If these have already been conducted, please let us know and we will update them in the OBIS Database.

Table 18: Recommended PWL Assessments

BRIDGE NO.	BRIDGE NAME	ROAD NAME	JUSTIFICATION
20	Blue Duck Creek Bridge No 1	Blue Duck Creek Road	Continuous over piers. Horizontal braces between piles appears to have corroded through.
117	Brown Grey Bridge	Palmers Road	Bridge has been widened and blocking between beams has been removed.
120	Blue Grey River Bridge	Palmers Road	Deck condition and potential decay in timber span.
176	O'Connor Train Wagon Chassis	O'Connor Road	Span length and steel condition.

8 General Comments

The following items were found to be common or widespread issues throughout Buller District Council's bridging stock:

- Scour around abutments, piers and revetments.
- River degradation leading to exposed piles.
- Corrosion on handrail pipes.
- Corrosion of steel under Gold Seal. This is a widespread issue due to poor application of product. Engineering design is recommended for the removal of Gold Seal and application of an approved coating system.
- Logs/debris build-up on piers.
- Concrete kerb impact damage.

Figure 8: Common Defects

9 BDC Structure Inventory Summary

The Buller District Council bridging stock is recommended for General inspection on a 4-yearly cycle. The next round of General Inspections for these bridges is due in August 2022.

Bridges not inspected (listed in Table 2) are due for inspection in 2021.

Appendix A

BDC Structure Inventory Summary

Buller District Council
STRUCTURE INVENTORY SUMMARY OUTPUT

Structure No	Structure Name	Road Name	Displ	Waterway Name	Structure Type	Superstructure	Deck	Length(m)	Width(m)	No. of Spans	Date Built	Remain Life	Last Inspected
52	LAGOON CREEK BRIDGE	ALMA RD	0.36	Lagoon Creek	Bridge	Hollow core units	Concrete Precast, Reinforced	10	4.3	1	1988	69	28/08/2018
12	GILBANK CREEK BRIDGE	ARAPITO RD	1.45	Gilbank Creek	Culvert			6		0	1991	64	28/08/2018
13	JORDANS CREEK BRIDGE	ARAPITO RD	4.3	Jordan Creek	Bridge	I beams	Concrete Precast, Reinforced	28.4	3.7	3	1972	41	28/08/2018
14	ELFORDS CREEK BRIDGE NO.1	ARAPITO RD	5.67	Elfords creek	Bridge	I beams	Timber, Transverse Planks	24	3.2	2	1980	26	28/08/2018
15	OFFICE CREEK BRIDGE	ARAPITO RD	5.99	Office Creek	Culvert			3.6	3.7	1	1950	16	28/08/2018
13A	KELLY CREEK	ARAPITO RD	8.72	Kelly Creek	Bridge	I beams	Timber, Transverse Planks	8.9	3	1	1960	0	28/08/2018
65	MIRFINS BRIDGE	ATARAU RD	1.13	Mawheraiti River	Bridge	I beams	Concrete Cast Insitu, Reinforced	126	4.3	6	1985	66	20/06/2018
1001	BLACKS POINT SUSPENSION BRIDGE	Auld Street		inangahua river	Footbridge	Rectangular beams	Timber, Transverse Planks	50		1			12/09/2017
18	DEANS CREEK ARMCO CULVERT	BACK RD (KONGAHU)	0.98	Deans Creek	Culvert			12	6	0	1982	9	28/08/2018
19	BLACKWATER CREEK CULVERT NO.1	BACK RD (KONGAHU)	4.29	Blackwater Creek	Culvert			28	6	1	1984	6	28/08/2018
8	BAKERS CREEK BRIDGE NO.2	BAKER CREEK RD	0.45	Bakers Creek	Bridge	I beams	Concrete, Unknown	12.5	3.6	1	1962	8	27/08/2018
11	BAKERS CREEK NO 3	BAKER CREEK RD	1.11	Bakers creek	Bridge	I beams	Timber, Transverse Planks	12.4	3	1	1980	28	27/08/2018
43	VEALES STOCK UNDERPASS	BEACH RD (FAIRDOWN)	0.25		Culvert			7	7.5	1	1995	76	30/08/2018
44	WET LEAD CULVERT	BEACH RD (FAIRDOWN)	0.9	Tributary Whareatea River	Culvert			6.1	6.1	2	1983	64	30/08/2018
169	HAMPTONS ROCK	BEACH RD (FAIRDOWN)			Footbridge	Unknown	Concrete, Unknown			0		5	07/05/2017
93	BOATMANS CREEK BRIDGE	BLAIRS RD	0.4	Boatmans Creek	Bridge	I beams	Concrete Precast, Reinforced	29	3.75	6	1962	36	21/08/2018

Structure No	Structure Name	Road Name	Displ	Waterway Name	Structure Type	Superstructure	Deck	Length(m)	Width(m)	No. of Spans	Date Built	Remain Life	Last Inspected
94	ITALIAN CREEK BRIDGE	BLAIRS RD	2.42	Italian Creek	Bridge	Hollow core units	Concrete Precast, Pretensioned	9.4	3.8	1	1964	36	21/08/2018
95	RAGLANS CREEK BRIDGE	BLAIRS RD	3.09	Raglan Creek	Bridge	Other	Concrete Precast, Reinforced	10.8	3.7	1	1964	56	21/08/2018
20	BLUE DUCK CREEK BRIDGE NO.1	BLUE DUCK CREEK RD	1.07	Blue Duck	Bridge	I beams	Timber, Transverse Planks	33.68	3.1	1	1988	36	28/08/2018
92	REDMONDS CREEK BRIDGE	BOATMANS RD	2.01	Redman Creek	Bridge	I beams	Concrete, Unknown	7	4	1	1970	36	21/08/2018
106	BOUNDARY BRIDGE	BOUNDARY RD	1.92	Maruia River	Bridge	Rectangular beams	Concrete, Unknown	96	3.08	7	1938	16	21/09/2018
55	BRADSHAWS CREEK BRIDGE NO.2	BRADSHAWS RD	0.73	Bradshaws Creek	Culvert		Concrete Precast, Pretensioned	8.8	4.5	2	2004	38	28/08/2018
182	BEACHSIDE ESTATE MARINE PARADE RD	BRADSHAWS RD			Culvert	Unknown		8	6.5	1	2010	75	28/08/2018
98	COAL CREEK BRIDGE	BROWN CREEK RD	1.5	Coal creek	Bridge	Plate girder	Concrete, Unknown	71	3.8	2	1967	39	17/09/2018
99	BROWN CREEK BRIDGE	BROWN CREEK RD	2.6	Brown Creek	Bridge	I beams	Concrete Precast, Reinforced	33.6	3.75	6	1965	36	22/08/2018
100	CAMP CREEK BRIDGE	BROWN CREEK RD	4.5	Camp Creek	Bridge	Hollow core units	Concrete Precast, Pretensioned	11	4	1	1985	64	22/08/2018
101	ROUGH CREEK BRIDGE	BROWN CREEK RD	6.87	Rough Creek	Bridge	I beams	Concrete Precast, Reinforced	38	3.8	3	1970	41	22/08/2018
54	BRUNINGS BRIDGE	BRUNINGS RD	1.05	Bradshaws Creek	Bridge	Hollow core units	Concrete Precast, Pretensioned	17	4.1	1	1984	56	28/08/2018
104	BULLER CAMP BRIDGE	BULLER RAILWAY RD (SOUTH)	0.03	Inangahua River Tributary	Bridge	Rectangular beams	Timber, Transverse Planks	6.7	3.5	1	1940	0	14/08/2018
61	BULLOCK CREEK BRIDGE	BULLOCK CREEK RD	5.89	Bullock Creek	Bridge	I beams	Timber, Transverse Planks	25	3.05	3	1968	15	29/08/2018
89	BURKES CREEK NO.2	BURKES CREEK RD	0.94	Stoney Batter Creek	Culvert			6	4.4	1	2003	46	22/08/2018
76	ROUGH & TUMBLE BRIDGE	BURTONS RD	0.58	Rough & tumble Creek	Bridge	I beams	Concrete Precast, Reinforced	25.3	3.7	3	1963	36	13/08/2018
77	BURTONS CULVERT NO.1	BURTONS RD	2.51	Mawheraiti River Tributary	Culvert			10		0	2000	46	13/08/2018

Structure No	Structure Name	Road Name	Displ	Waterway Name	Structure Type	Superstructure	Deck	Length(m)	Width(m)	No. of Spans	Date Built	Remain Life	Last Inspected
78	BURTONS CULVERT NO.2	BURTONS RD	2.82	Mawheraiti River Tributary	Culvert			10	6	1	1992	76	13/08/2018
41	MANNS BRIDGE	CAINS RD	1.2	Jones Creek	Bridge	I beams	Concrete Cast Insitu, Reinforced	28	3.8	3	1966	21	30/08/2018
36	MILLER STREAM ARCH	CALLIOPE STREET	1.25	Miller Stream	Culvert	Unknown	Concrete, Unknown	8	6	1	1968	52	30/08/2018
34	GRANITY ARCH	CALLIOPE STREET	1.316	Granity Creek	Culvert	Other	Concrete, Unknown	7	6	0	1952	20	30/08/2018
28	CHASM CREEK BRIDGE NO.2	CHARMING CREEK RD	4.18	Chasm Creek	Bridge	I beams	Timber, Transverse Planks	23	3.95	3	1965	22	29/08/2018
29	CHASM CREEK BRIDGE NO.3	CHARMING CREEK RD	4.57	Tributary Chasm creek	Bridge	Rectangular beams	Timber, Transverse Planks	3	4.1	1	1960	9	07/05/2017
30	CHARMING CREEK BRIDGE	CHARMING CREEK RD	8.75	Charming Creek	Bridge	Rectangular beams	Timber, Transverse Planks	3	4.1	1	1960	1	07/05/2017
42	SYRONS CULVERT	COLLINS RD	1.72	Tributary Waimangaroa River	Culvert			6	7.6	5	1984	18	29/08/2018
146	CULVERT 2472	CONNS CREEK RD	1.27		Bridge	Other	Other	2.2	4	1	1940	0	30/08/2018
178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD		Inangahua River	Bridge	I beams	Concrete Precast, Pretensioned	48.8	3.32	10	2000	25	06/05/2017
25	STILLWATER CREEK BRIDGE	DE MALMANCHES RD	0.1	Stillwater Creek	Bridge	Double core units	Concrete Precast, Pretensioned	37	4.05	6	1982	56	29/08/2018
26	SAWYERS CREEK BRIDGE	DE MALMANCHES RD	0.52	Sawyers Creek	Bridge	Double core units	Concrete Precast, Pretensioned	6.8	4.9	1	1990	59	29/08/2018
32	WATSON CREEK	DOMAIN RD (GRANITY)	0.31	Watson creek	Culvert	Other	Concrete Precast, Reinforced	7.4	6	1	1980	14	30/08/2018
91	FERNDALE BRIDGE NO.1	FERNDALE RD	0.11	Burkes creek	Bridge	Double core units	Concrete Precast, Reinforced	13.2	4.3	1	1992	66	22/08/2018
90	FERNDALE BRIDGE NO.2	FERNDALE RD	0.73	Burkes creek	Bridge	I beams	Concrete Precast, Reinforced	7.6	3.74	1	1975	36	22/08/2018
87	BURKES CREEK BRIDGE NO.1	GANNONS RD	0.845	Burkes creek	Bridge	Rectangular beams	Concrete, Unknown	10	3.05	1	1950	16	22/08/2018
88	GANNONS BRIDGE	GANNONS RD	4.8	Waitahu River	Bridge	I beams	Concrete Precast, Reinforced	44	3.8	2	1960	36	22/08/2018

Structure No	Structure Name	Road Name	Displ	Waterway Name	Structure Type	Superstructure	Deck	Length(m)	Width(m)	No. of Spans	Date Built	Remain Life	Last Inspected
24	TIDAL CREEK BRIDGE	GLASSEYE RD	0.38	Tidal Creek	Bridge	I beams	Concrete Precast, Reinforced	27.03	3.6	6	1985	44	28/08/2018
16	BLACKWATER DRAIN	GRANITE CREEK RD	0.9	Blackwater drain	Bridge	Hollow core units	Concrete Precast, Pretensioned	12.19	4.15	1	1976	46	28/08/2018
17	GRANITE CREEK BRIDGE NO.1	GRANITE CREEK RD	1.6	Granite Creek	Bridge	Hollow core units	Concrete Precast, Pretensioned	36.58	4.27	6	1974	44	28/08/2018
17B	GRANITE CREEK BRIDGE NO 2	GRANITE CREEK RD	4.317	granite creek	Bridge	Hollow core units	Concrete Precast, Pretensioned	36.58	4.16	6	1971	38	28/08/2018
59	LITTLE TOTARA BRIDGE	HANDS RD	4.12	Little Totara River	Bridge	Double core units	Concrete Precast, Pretensioned	47	4.27	10	1980	51	28/08/2018
105	INWOODS BRIDGE	INWOOD RD	0.405	Inangahua River Tributary	Bridge	I beams	Concrete Precast, Reinforced	5.3	4	1	1985	59	14/08/2018
121	TOBIN CREEK CULVERT	KARAMEA HIGHWAY	1.94	Tobins Creek	Culvert			18.6		0	1956	6	29/08/2018
122	SANDEL CREEK CULVERT	KARAMEA HIGHWAY	8.495	Sandel creek	Culvert			10		1	1969	33	29/08/2018
123	SURVEYORS CREEK BRIDGE	KARAMEA HIGHWAY	9.71	Surveyors Creek	Bridge	I beams	Concrete, Unknown	37	8.6	3	1982	63	06/11/2018
135	WHISKEY CREEK CULVERT	KARAMEA HIGHWAY	12.885	Whiskey Creek	Culvert			11.2	7.2	0	1966	30	29/08/2018
124	FALLS CREEK CULVERT	KARAMEA HIGHWAY	14.52	Falls Creek	Culvert			8.5	6	1	1934	3	29/08/2018
185	Corbyvale Stock Underpass	KARAMEA HIGHWAY	16.461	underpass	Other	Other	Concrete Cast Insitu, Reinforced			0			
125	GLASSEYE CREEK	KARAMEA HIGHWAY	18.875	Glasseye Creek	Bridge	T beams	Concrete, Unknown	9.75	4.98	1	1953	26	18/09/2018
126	LAKE CREEK CULVERT	KARAMEA HIGHWAY	25.23	Lake Creek	Culvert			18.3		1	1962	26	29/08/2018
127	TIDAL CREEK NO.1	KARAMEA HIGHWAY	29	Tidal creek	Bridge	T beams	Concrete, Unknown	12.6	7.45	1	1950	18	29/08/2018
128	TIDAL CREEK NO.2	KARAMEA HIGHWAY	29.1	Tidal creek	Bridge	I beams	Timber, Transverse Planks	35	3.7	1	1932	11	29/08/2018
129	TIDAL CREEK NO.3	KARAMEA HIGHWAY	30.47	Tidal creek	Bridge	T beams	Concrete Cast Insitu, Reinforced	12.6	8.08	1	1951	24	29/08/2018
130	LITTLE WANGANUI BRIDGE	KARAMEA HIGHWAY	32.44	Little Wanganui River	Bridge	I beams	Timber, Transverse Planks	75	3.35	6	1931	11	28/08/2018
131	CALLARIS CREEK CULVERT	KARAMEA HIGHWAY	33.8	Caliaris Creek	Culvert			15		0	1969	28	28/08/2018

Structure No	Structure Name	Road Name	Displ	Waterway Name	Structure Type	Superstructure	Deck	Length(m)	Width(m)	No. of Spans	Date Built	Remain Life	Last Inspected
131a	BLACKWATER CREEK CULVERT NO.2	KARAMEA HIGHWAY	43.21	kongahu swamp	Culvert			12.5	9.85	2	1978	41	28/08/2018
132	GRANITE CREEK BRIDGE	KARAMEA HIGHWAY	43.66	Granite Creek	Bridge	Other	Concrete, Unknown	42.7	7.32	5	1949	12	28/08/2018
133	MUSSONS CREEK CULVERT	KARAMEA HIGHWAY	47.02	Mussons Creek	Culvert			12.5		1	1965	28	28/08/2018
134	KARAMEA BRIDGE	KARAMEA HIGHWAY	49.15	Karamea River	Bridge	I beams	Concrete Cast Insitu, Reinforced	163	4.3	9	1981	44	17/09/2018
172	JONES STOCK UNDERPASS	KARAMEA HIGHWAY			Bridge		Concrete, Unknown		11.63	1	1950	46	28/08/2018
173	BJERRING STOCK UNDERPASS	KARAMEA HIGHWAY			Bridge	Rectangular beams	Concrete, Unknown			1	1980	46	28/08/2018
6	QUINLANS BRIDGE	KOHAIHAI	0	Bakers Creek	Bridge	Hollow core units	Concrete Precast, Pretensioned	54	4.19	10	1988	80	28/08/2018
5	OPARARA BRIDGE	KOHAIHAI	3.33	Oparara River	Bridge	I beams	Concrete Precast, Reinforced	93	4.08	13	1961	17	28/08/2018
4	BREAK CREEK BRIDGE	KOHAIHAI	8.85	Break Creek	Bridge	Hollow core units	Other	49.3	4.2	10	1992	70	27/08/2018
3	CANDLE CREEK BRIDGE	KOHAIHAI	10.55	Candle Creek	Culvert			9	6	1	1992	56	27/08/2018
2	STONEY CREEK BRIDGE	KOHAIHAI	11.76	Stoney Creek	Culvert			6	6	2	1992	52	27/08/2018
1	MOSSEYBURN	KOHAIHAI	13.95	Mossyburn Creek	Bridge	I beams	Concrete Precast, Reinforced	12.7	3.7	1	1962	26	27/08/2018
96	LITTLE LANDING CREEK BRIDGE	LANDING CREEK RD	1.29	Little Landing Creek	Bridge	Double core units	Concrete Precast, Pretensioned	6.7	4	1	1980	56	14/08/2018
31	BREWERY CREEK BRIDGE	LEWIS STREET	0.3	Brewery Creek	Bridge	Double core units	Concrete Precast, Pretensioned	9	5.4	1	1988	26	30/08/2018
82	MAI MAI BRIDGE	MAI MAI RD	1.945	Maimai Creek	Bridge	Double core units	Concrete Precast, Pretensioned	43	3.7	3	1982	63	22/08/2018
83	FAIRBRASS BRIDGE	MAI MAI RD	3.365	Maimai Creek Tributary	Bridge	I beams	Concrete, Unknown	4.9	3.59	1	1975	48	22/08/2018
84	DIRTY MARY BRIDGE NO.1	MAI MAI RD	5.59	Dirty Mary Creek	Bridge	I beams	Concrete Precast, Reinforced	8.5	3.86	1	1975	36	22/08/2018
85	DIRTY MARY BRIDGE NO.2	MAI MAI RD	5.99	Little Grey River Tributary	Bridge	I beams	Concrete Precast, Reinforced	8	3.65	1	1976	36	22/08/2018

Structure No	Structure Name	Road Name	Displ	Waterway Name	Structure Type	Superstructure	Deck	Length(m)	Width(m)	No. of Spans	Date Built	Remain Life	Last Inspected
86	JACKS CREEK BRIDGE	MAI MAI RD	7.6	Jacks Creek	Bridge	Hollow core units	Concrete Precast, Pretensioned	16	3.9	2	1980	66	22/08/2018
53	MARTINS CREEK BRIDGE NO.2	MARTINS CREEK RD	0.07	Martins Creek	Bridge	Hollow core units	Concrete Precast, Pretensioned	23	4.1	3	1985	57	28/08/2018
159	BREAK CREEK No 2	McCALLUMS MILL ROAD	0.85	Tributary to Break Creek	Culvert			1.2	6	0	1970	0	28/08/2018
160	BREAK CREEK No 3	McCALLUMS MILL ROAD	1.41	Tributary to Break Creek	Culvert			4	6	0	1975	35	28/08/2018
161	BREAK CREEK NO 4	McCALLUMS MILL ROAD	4.6	Tributary to Break Creek	Culvert			3	7.2	0	1975	35	28/08/2018
162	BREAK CREEK NO 5	McCALLUMS MILL ROAD	5.45	Break Creek	Culvert			4	5	0	1975	0	27/08/2018
163	BREAK CREEK NO 6	McCALLUMS MILL ROAD	5.87	Break Creek	Bridge	I beams	Timber, Nail Laminated Baulks	12.3	4.1	1	1970	25	27/08/2018
164	BREAK CREEK NO 7	McCALLUMS MILL ROAD	14	Narya Creek	Culvert			10.5	7	0	2004	37	27/08/2018
165	McCALLUMS BRIDGE	McCALLUMS MILL ROAD	14.18	Operara River	Bridge	I beams	Timber, Transverse Planks	34	2.8	4	1970	26	27/08/2018
103	MCDONALDS BRIDGE	MCDONALDS RD	0.08	Brown Creek	Bridge	Hollow core units	Concrete Precast, Pretensioned	18	4.2	1	1988	69	22/08/2018
39	Mine Creek No 1	MILLERTON TK (STOCKTON RD)	3.4	Mine Creek	Bridge	Hollow core units	Concrete Precast, Pretensioned	7.55	4.2	1	1980	53	30/08/2018
40	MINE CREEK BRIDGE NO.2	MILLERTON TK (STOCKTON RD)	4.05	Mine Creek	Culvert	Unknown	Steel	13	6	1	1989	15	30/08/2018
181	Millerton Culverts	MILLERTON TK (STOCKTON RD)			Culvert			8	7	0	1970	38	30/08/2018
158	CULVERT 2250	MILL ST (EAST)			Culvert			24		2	1950	16	28/08/2018
27	CHASM CREEK BRIDGE NO.1	MOKIHINUI ROAD	2.03	Chasm Creek	Bridge	Rectangular beams	Concrete, Unknown	10.5	3.6	1	1948	20	18/09/2018
180	Coal Creek	MOKIHINUI ROAD	4.2	Coal creek	Bridge	T beams	Concrete Precast, Reinforced	11.7	4.2	1	1990	63	29/08/2018
184	Burkes Creek Ford	MOKIHINUI ROAD		burkes creek	Other					0		96	29/08/2018
177	MOKIHINUI PEDESTRIAN BRIDGE	MOKIHINUI ROAD		Burkes creek	Footbridge	Rectangular beams	Timber, Transverse Planks			1		15	07/05/2017

Structure No	Structure Name	Road Name	Displ	Waterway Name	Structure Type	Superstructure	Deck	Length(m)	Width(m)	No. of Spans	Date Built	Remain Life	Last Inspected
67	MOSSEY CREEK BRIDGE NO.2	MOSSEY RD	0.69	Mossy Creek	Bridge	Double core units	Concrete Precast, Pretensioned	10	3.7	1	1980	53	13/08/2018
38	McMillans Bridge	NANSEN STREET		Miller Stream	Bridge	I beams	Timber, Nail Laminated Baulks		3.36	1	1950	35	07/05/2017
37	NAPIER STREET BRIDGE	NAPIER ST	1.46	Granity Creek	Bridge	Rectangular beams	Concrete, Unknown	12.1	3.05	0	1948	21	30/08/2018
62A	New Creek Road Half Bridge	NEW CREEK ROAD		buller river	Other	Unknown	Concrete, Unknown	14.5		1		41	14/08/2018
50	ARCHERS BRIDGE	NINE MILE RD	3.92	Buller River Overflow	Bridge	I beams	Concrete, Unknown	30.6	3.8	6	1963	44	28/08/2018
51	WILLIAMS BRIDGE	NINE MILE RD	6.02	Coal creek	Bridge	U beams	Concrete, Unknown	18.3	3.67	2	1977	58	28/08/2018
183	O'Connor Home Stock Underpass	NINE MILE RD		underpass	Other					0	2018	96	28/08/2018
176	O'CONNOR TRAIN WAGON CHASSIS	O'CONNER ROAD		STONEY STREAM	Bridge	Other	Steel	12.78	2.38	1		2	07/05/2017
7	BAKERS CREEK BRIDGE NO.1	OPARARA RD	0.5	Bakers Creek	Bridge	I beams	Concrete, Unknown	19	3.66	3	1963	20	27/08/2018
171	RHINDS STOCK UNDERPASS	OPARARA RD	3.36		Bridge	Unknown	Concrete, Unknown	3.6		1	1980	42	28/08/2018
167A	Palmer Rd Culvert	PALMERS RD	2.8	brown grey river tributary	Culvert			9	4.4	1	1960	21	22/08/2018
117	BROWN GREY BRIDGE	PALMERS RD	4.37	Brown Grey River	Bridge	I beams	Timber, Transverse Planks	31	3.08	2	1950	7	06/05/2017
118	PALMER BRIDGE	PALMERS RD	5.35	Upper Grey River	Bridge	Hollow core units	Concrete Precast, Reinforced	6.1	3.7	1	1993	76	21/08/2018
119	UPPER GREY RIVER BRIDGE	PALMERS RD	6.54	Upper Grey River	Bridge	I beams	Timber, Transverse Planks	31.7	2.95	6	1940		06/05/2017
120	BLUE GREY RIVER	PALMERS RD	8.65	Blue Grey River	Bridge	I beams	Timber, Transverse Planks	28	3.2	3	1950	6	21/08/2018
62	NEW CREEK BRIDGE	PENSINI RD	1.25	new creek	Bridge	I beams	Timber, Transverse Planks	27	3.5	3	1970	21	14/08/2018
63	PENSINI BRIDGE	PENSINI RD	2.55	pensini creek	Bridge	I beams	Concrete Precast, Reinforced	19	4	2	1970	36	14/08/2018
168	Perseverance Bridge	PERSERVERENCE ROAD	0.45	Inangahua River	Bridge	U beams	Concrete, Unknown	131	4	7	1985	61	20/09/2018

Structure No	Structure Name	Road Name	Displ	Waterway Name	Structure Type	Superstructure	Deck	Length(m)	Width(m)	No. of Spans	Date Built	Remain Life	Last Inspected
168A	FLETCHERS BRIDGE	PERSERVERENCE ROAD	4.23	fletcher creek	Bridge	Hollow core units	Concrete, Unknown	12.5	3.88	1	1975	48	14/08/2018
45	CHRISTMAS BRIDGE	POWERHOUSE RD (FAIRDOWN)	1.88	Christmas Creek	Bridge	Rectangular beams	Timber, Transverse Planks	8.2	4	1	1970	51	30/08/2018
1000	REEFTON SUSPENSION BRIDGE	SH6		inangahua river	Footbridge	Rectangular beams	Timber, Transverse Planks	46		1			12/09/2017
170	Fox River Bridge	SH6		Fox River	Footbridge	Rectangular beams	Timber, Transverse Planks			0	1929	0	23/01/2017
66	MOSSEY CREEK BRIDGE NO.1	SNOWY RD	1.45	Mossy Creek	Bridge	Hollow core units	Concrete Precast, Pre/Post-tensioned	14	4.2	1	1989	76	13/08/2018
68	BROWNS CREEK BRIDGE	SNOWY RD	13.3	Brown Creek	Bridge	I beams	Concrete, Unknown	12	3.7	1	1975	51	13/08/2018
70	ALEXANDER BRIDGE	SNOWY RD	18.3	Absolum Creek	Bridge	I beams	Timber, Nail Laminated Baulks	13.5	3.6	0	1975	35	19/09/2018
69	STAIRCASE BRIDGE	SNOWY RD	20.715	Staircase Creek	Bridge	I beams	Concrete, Unknown	11	3.75	1	1975	51	13/08/2018
71	MCVICARS BRIDGE	SNOWY RD	28.215		Bridge	Hollow core units	Concrete Precast, Pretensioned	11	3.2	1	1985	66	13/08/2018
49	SOAPWORKS BRIDGE	SOAPWORKS RD (EXCELSIOR RD)	0.96	Orowaiti River	Bridge	Hollow core units	Concrete Precast, Pretensioned	44.9	4.1	10	1982	63	28/08/2018
97	PROGRESS JUNCTION BRIDGE	SOLDIERS RD	5.25	Devils Creek	Bridge	Hollow core units	Concrete Precast, Pretensioned	14	3.6	1	1982	63	22/08/2018
81	THOMPSON ARMCO CULVERT	SOMERVILLE RD	0.23	Rough & Tumble Creek Tributary	Culvert			14	6.5	1	1985	36	13/08/2018
79	SOMERVILLE BRIDGE No 1	SOMERVILLE RD	2.53	Rough & Tumble Creek	Bridge	Hollow core units	Concrete Precast, Pretensioned	22.6	4.5	2	1982	63	13/08/2018
80	SOMERVILLE BRIDGE NO.2	SOMERVILLE RD	3.2	Burtons Creek	Bridge	Double core units	Concrete Precast, Pretensioned	33	4.25	2	1983	36	13/08/2018
175	LANDCORP STOCK UNDERPASS	SOMERVILLE RD			Culvert			12.4	12.06	1	1960		12/09/2017
47	SCOTTS BRIDGE	STEPHEN RD	1.1	Orowaiti River	Bridge	Hollow core units	Concrete Precast, Pretensioned	82	4.3	5	1987	68	19/11/2018
102	SWAMP CREEK BRIDGE	SWAMP CREEK RD	0.35	Little Landing Creek	Bridge	Plate girder	Concrete, Unknown	32	3.65	2	1969	43	14/08/2018
58	WALLS CREEK CULVERT	TAURANGA BAY RD	3.87	Walls Creek	Culvert			19.2	6	0	1987	21	28/08/2018

Structure No	Structure Name	Road Name	Displ	Waterway Name	Structure Type	Superstructure	Deck	Length(m)	Width(m)	No. of Spans	Date Built	Remain Life	Last Inspected
46	DEADMANS CREEK BRIDGE	UTOPIA RD (WESTPORT)	4.14	Deadmans Creek	Bridge	Double core units	Concrete Precast, Reinforced	25	4	3	1986	59	10/09/2014
174	CLEINE STOCK UNDERPASS	UTOPIA RD (WESTPORT)			Culvert			12		0	2008		07/05/2017
56	VIRGIN FLAT BRIDGE	VIRGIN FLAT RD	2.59	Tributary Okari river	Bridge	I beams	Timber, Transverse Planks	11	3.6	1	1970	21	28/08/2018
57	VIRGIN FLAT N0.2	VIRGIN FLAT RD	3.4	Tributary Okari river	Culvert	Other	Concrete Precast, Reinforced	6	4.2	1	2003	41	28/08/2018
72	RED JACK CREEK CULVERT	WAIUTA RD	3.6	Red Jack Creek	Culvert			9	4	1	1960	11	13/08/2018
73	BLACKWATER BRIDGE NO.1	WAIUTA RD	5.73	Blackwater Creek	Bridge	Rectangular beams	Concrete Cast Insitu, Reinforced	13.7	3.7	1	1950	38	13/08/2018
75	BLACKWATER CREEK NO.2	WAIUTA RD	7.8	Blackwater Creek	Bridge	I beams	Concrete Precast, Reinforced	10	3.7	1	1970	43	13/08/2018
48	LOWES BRIDGE	WATERWORKS RD	1.11	Giles Creek	Bridge	Hollow core units	Concrete Precast, Pretensioned	22	4	3	1980	61	28/08/2018
107	MAIRS BRIDGE	WESTBANK RD	0.03	Maruia River	Bridge	I beams	Timber, Transverse Planks	136.8	3.57	10	1948		07/09/2017
110	PADDY GOURLEYS BRIDGE	WESTBANK RD	4.26	Maruia River Tributary	Bridge	Hollow core units	Concrete Precast, Reinforced	15	3.7	1	1988	69	21/08/2018
111	BLACKADDER BRIDGE NO.1	WESTBANK RD	4.5	Maruia River Tributary	Bridge	Double core units	Concrete Precast, Pretensioned	14	4.3	1	1987	56	21/08/2018
112	PAKIHI CREEK CULVERT	WESTBANK RD	7.47	Pakihi Creek	Culvert			10		0	1988	56	21/08/2018
114	RAHU CREEK BRIDGE	WESTBANK RD	9.2	Rahu Creek	Bridge	Plate girder	Concrete Precast, Reinforced	27.3	4.15	2	1970	26	21/08/2018
115	SCHOOL CREEK BRIDGE	WESTBANK RD	10.73	SCHOOL CREEK	Bridge	I beams	Concrete, Unknown	4.9	3.7	1	1970	36	21/08/2018
144	WILSON LEAD CULVERT 565	WILSONS LEAD RD	1.3	O'Malley's Creek	Culvert			24		0	1990	71	28/08/2018
116	WOOLLEY CREEK BRIDGE	WOOLLEY CREEK RD	1.15	Woolley River	Bridge	Rectangular beams	Concrete Cast Insitu, Reinforced	60	3.25	5	1938	16	21/08/2018

Appendix B

Works Schedules

Buller District Council
STRUCTURE REPAIR SCHEDULES

Priority Definitions

Priority	Timing
Urgent	Complete within 3 months
High	Complete within 1 year
Medium	Complete within 2 years
Low	Complete within 5 years or as resources allow
Monitor	N/A

114A - Routine Maintenance

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
Urgent								
OBIS_48940	65	MIRFINS BRIDGE	ATARAU RD	20/09/2018	G3 - Special approach signs	re-instate give way priority sign on ground west end	Urgent	$150.00
OBIS_44180	169	HAMPTONS ROCK	BEACH RD (FAIRDOWN)	12/09/2017	G3 - Special approach signs	Recommend posting for maximum 1 person.	Urgent	$300.00
OBIS_41317	176	O'CONNOR TRAIN WAGON CHASSIS	O'CONNER ROAD	07/05/2017	G11 - Deck drainage	Wash deck regularly. Remove or raise kick boards for self drainage	Urgent	$150.00
OBIS_40844	170	Fox River Bridge	SH6	23/01/2017	S4 - Trees and tree roots	Remove flood debris from around piers.	Urgent	$500.00
OBIS_47993	114	RAHU CREEK BRIDGE	WESTBANK RD	21/08/2018	W2 - Erosion of abutments	Large scour hole 2m diameter at abut a down stream. Looks fresh and unstable. Place rock work asap	Urgent	$2,000.00
Sub Total								$3,100.00
High								
OBIS_48126	13A	KELLY CREEK	ARAPITO RD	27/08/2018	- Deck	Clear vegetation from structure sides and under timber deck baulks	High	$150.00
OBIS_9215	14	ELFORDS CREEK BRIDGE NO.1	ARAPITO RD	03/09/2014	S1 - River aggrading	(S1 and W1) - Build up of material under bridge and upstream, continue stream training and remove 1m deep across bed to 40-50m upstream/ remove logs and debris.2018 looks better, ongoing	High	$1,800.00
OBIS_44092	1001	BLACKS POINT SUSPENSION BRIDGE	Auld Street	12/09/2017	ST3 - Deck wear	Loose mesh on stairs at TL side of bridge, re-staple to treads.	High	$150.00
OBIS_44093	1001	BLACKS POINT SUSPENSION BRIDGE	Auld Street	12/09/2017	ST4 - Bolts and spikes	Top nut on eye bolt to U/S #1 transom loose. Retighten back down onto transom.	High	$50.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_50620	11	BAKERS CREEK NO 3	BAKER CREEK RD	30/08/2018	10 - Head wall	Remove debris from abutment shelf.	High	$300.00
OBIS_48069	11	BAKERS CREEK NO 3	BAKER CREEK RD	27/08/2018	G4 - Bridge reflector signs	Install BEM s	High	$300.00
OBIS_9209	8	BAKERS CREEK BRIDGE NO.2	BAKER CREEK RD	03/09/2014	G6 - Bearings	Heavily corroded.consider blast and coating 2018 pack rusing and HD nuts over 20% section loss	High	$2,000.00
OBIS_48022	95	RAGLANS CREEK BRIDGE	BLAIRS RD	21/08/2018	G3 - Special approach signs	Missing one lane priority signs.	High	$500.00
OBIS_48023	95	RAGLANS CREEK BRIDGE	BLAIRS RD	21/08/2018	S4 - Trees and tree roots	Clear vegetation around structure and consider removing island built up in stream	High	$3,000.00
OBIS_9346	92	REDMONDS CREEK BRIDGE	BOATMANS RD	10/09/2014	W2 - Erosion of abutments	Abutment A previously underpinned has scoured again - Rip rap toe of abutment	High	$3,000.00
OBIS_49961	106	BOUNDARY BRIDGE	BOUNDARY RD	21/09/2018	G3 - Special approach signs	missing BEM RHS north end	High	$150.00
OBIS_9370	106	BOUNDARY BRIDGE	BOUNDARY RD	11/09/2014	S4 - Trees and tree roots	4 piers heavily loaded with logs - remove. excavator required. 2018 less now	High	$2,000.00
OBIS_9290	55	BRADSHAWS CREEK BRIDGE NO.2	BRADSHAWS RD	09/09/2014	G3 - Special approach signs	No name sign.install. 2018 same	High	$300.00
OBIS_9353	99	BROWN CREEK BRIDGE	BROWN CREEK RD	10/09/2014	W2 - Erosion of abutments	D/S north end wingwall material scouring. retain with rock if it deteriorates. 2018 same	High	$8,000.00
OBIS_47941	76	ROUGH & TUMBLE BRIDGE	BURTONS RD	13/08/2018	S4 - Trees and tree roots	Logs built up on piers	High	$800.00
OBIS_9246	30	CHARMING CREEK BRIDGE	CHARMING CREEK RD	05/09/2014	G3 - Special approach signs	No name sign	High	$300.00
OBIS_9267	42	SYRONS CULVERT	COLLINS RD	05/09/2014	G3 - Special approach signs	West U/S BEM needs re-instating. 2018 both missing	High	$300.00
OBIS_41291	178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD	06/05/2017	G4 - Bridge reflector signs	No bridge end markers. Stand axel weight sign south end.	High	$300.00
OBIS_41293	178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD	06/05/2017	G11 - Deck drainage	Remove soil rows down bridge deck sides retaining water and cow manure. Currently ponding water.	High	$550.00
OBIS_48194	26	SAWYERS CREEK BRIDGE	DE MALMANCHES RD	29/08/2018	G3 - Special approach signs	Replace name sign post Westend	High	$300.00
OBIS_48193	25	STILLWATER CREEK BRIDGE	DE MALMANCHES RD	12/12/2018	G11 - Deck drainage	Deck ponding water keep joints clear	High	$500.00
OBIS_51433	32	WATSON CREEK	DOMAIN RD (GRANITY)	17/12/2018	G3 - Special approach signs	Install bridge name signs	High	$300.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_9256	32	WATSON CREEK	DOMAIN RD (GRANITY)	05/09/2014	W4 - Other defects	D/S true right slump in road behind abutment - retain and fill. 2018 has become small scour hole. Retain and fill still recommended	High	$1,200.00
OBIS_48036	90	FERNDALE BRIDGE NO.2	FERNDALE RD	22/08/2018	W2 - Erosion of abutments	Abutment b upstream large void under abutment toe. Place rock work.	High	$3,000.00
OBIS_48037	90	FERNDALE BRIDGE NO.2	FERNDALE RD	22/08/2018	S4 - Trees and tree roots	Heavy timber Deer fence hanging from bridge causing debris build up. Liaise with farmer to remove and clear debris from under bridge	High	$500.00
OBIS_9340	88	GANNONS BRIDGE	GANNONS RD	10/09/2014	G3 - Special approach signs	No name sign	High	$300.00
OBIS_9298	59	LITTLE TOTARA BRIDGE	HANDS RD	05/09/2014	S4 - Trees and tree roots	Logs on piers - minor chainsaw work. 2018 same, large logs on piers and vegetation around structure needs clearing	High	$500.00
OBIS_9367	105	INWOODS BRIDGE	INWOOD RD	26/09/2014	G3 - Special approach signs	No name sign	High	$300.00
OBIS_48200	122	SANDEL CREEK CULVERT	KARAMEA HIGHWAY	29/08/2018	W4 - Other defects	Abrasion in floor between iron rails. Most concerning is the ones in the outlet apron floor. Risk of penitrating and undercutting structure.	High	$1,200.00
OBIS_9417	131	CALLARIS CREEK CULVERT	KARAMEA HIGHWAY	03/09/2014	W1 - Waterway adequate	Clear vegetation from inlet and outlet. Clear and inspect flood flap condition	High	$300.00
OBIS_51192	185	Corbyvale Stock Underpass	KARAMEA HIGHWAY	11/12/2018	G3 - Special approach signs	Bridge Name signs missing. Install.	High	$300.00
OBIS_49366	125	GLASSEYE CREEK	KARAMEA HIGHWAY	18/09/2018	G3 - Special approach signs	Missing name sign at karamea end	High	$150.00
OBIS_48478	134	KARAMEA BRIDGE	KARAMEA HIGHWAY	17/09/2018	F5 - Corrosion of steel	Gabion under abutment north end corroded reinstate baskets. 3 metres long x1 metre wide x 600 high	High	$450.00
OBIS_48159	130	LITTLE WANGANUI BRIDGE	KARAMEA HIGHWAY	28/08/2018	G3 - Special approach signs	No northern name sign	High	$150.00
OBIS_48201	124	FALLS CREEK CULVERT	KARAMEA HIGHWAY	29/08/2018	G3 - Special approach signs	No BEMs install narrow road steep drop offs	High	$300.00
OBIS_48198	122	SANDEL CREEK CULVERT	KARAMEA HIGHWAY	29/08/2018	G3 - Special approach signs	Replace damaged name sign	High	$150.00
OBIS_9415	130	LITTLE WANGANUI BRIDGE	KARAMEA HIGHWAY	03/09/2014	S4 - Trees and tree roots	Clear logs and debris off piers	High	$300.00
OBIS_48205	127	TIDAL CREEK NO.1	KARAMEA HIGHWAY	29/08/2018	G4 - Bridge reflector signs	Replace BEM at Westport ds end black yellow	High	$200.00
OBIS_9412	129	TIDAL CREEK NO.3	KARAMEA HIGHWAY	03/09/2014	S4 - Trees and tree roots	Clear vegetation underneath structure	High	$300.00
OBIS_48202	124	FALLS CREEK CULVERT	KARAMEA HIGHWAY	29/08/2018	S4 - Trees and tree roots	Clear trees out of waterway both ends	High	$150.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_48197	121	TOBIN CREEK CULVERT	KARAMEA HIGHWAY	29/08/2018	G3 - Special approach signs	Consider chevrons here tight corner. Name sighn should be back to back	High	$1,500.00
OBIS_48136	131a	BLACKWATER CREEK CULVERT NO.2	KARAMEA HIGHWAY	28/08/2018	W4 - Other defects	Flood flap open with log jam. Consider options for fish passage	High	$400.00
OBIS_48135	131a	BLACKWATER CREEK CULVERT NO.2	KARAMEA HIGHWAY	28/08/2018	G10 - Handrail or guardrail	Edge marker replacement add more.	High	$150.00
OBIS_48114	5	OPARARA BRIDGE	KOHAIHAI	27/08/2018	F5 - Corrosion of steel	Clear vegetation from both Abutment ends. 3m clearence from structure.	High	$150.00
OBIS_48075	1	MOSSEYBURN	KOHAIHAI	27/08/2018	G2 - Approach adequacy	Potholing at north approach over joint repair	High	$300.00
OBIS_9192	1	MOSSEYBURN	KOHAIHAI	02/09/2014	G10 - Handrail or guardrail	D/S west facing pipe on hand rails moderate section loss due to corrosion-nuts on post bases also have section loss. Recommend replacing	High	$3,000.00
OBIS_48055	82	MAI MAI BRIDGE	MAI MAI RD	22/08/2018	S4 - Trees and tree roots	Clear logs and debris from piers and waterway	High	$800.00
OBIS_48053	82	MAI MAI BRIDGE	MAI MAI RD	22/08/2018	G3 - Special approach signs	Name sign missing at abut a approach and name sign at abut d approach has letters missing	High	$300.00
OBIS_9289	53	MARTINS CREEK BRIDGE NO.2	MARTINS CREEK RD	09/09/2014	F8 - Other defects	Clear scrub away from abutments. Clear dead vegetation around abutment a to allow access for inspection.	High	$100.00
OBIS_48105	165	McCALLUMS BRIDGE	McCALLUMS MILL ROAD	27/08/2018	W3 - Erosion of piers	Logs on pier C and D remove. Chainsaw work	High	$350.00
OBIS_9456	165	McCALLUMS BRIDGE	McCALLUMS MILL ROAD	04/09/2014	S4 - Trees and tree roots	Remove buildup of trees and debris around piers	High	$500.00
OBIS_48088	162	BREAK CREEK NO 5	McCALLUMS MILL ROAD	27/08/2018	S4 - Trees and tree roots	Logs building up at inlets	High	$100.00
OBIS_48128	159	BREAK CREEK No 2	McCALLUMS MILL ROAD	26/08/2018	G3 - Special approach signs	Consider installing BEM signs or sight rail downstream edge	High	$300.00
OBIS_48131	161	BREAK CREEK NO 4	McCALLUMS MILL ROAD	27/08/2018	G3 - Special approach signs	Clean BEM signage	High	$100.00
OBIS_50623	163	BREAK CREEK NO 6	McCALLUMS MILL ROAD	30/08/2018	G1 - Appearance	Potholing at approaches	High	$400.00
OBIS_48098	162	BREAK CREEK NO 5	McCALLUMS MILL ROAD	27/08/2018	S4 - Trees and tree roots	Logs building up at inlets	High	$100.00
OBIS_48097	162	BREAK CREEK NO 5	McCALLUMS MILL ROAD	27/08/2018	W1 - Waterway adequate	Poor fish passage install spillway rock this will also protect structure from cut back erosion.	High	$2,500.00
OBIS_48089	163	BREAK CREEK NO 6	McCALLUMS MILL ROAD	27/08/2018	G3 - Special approach signs	Wash bems	High	$100.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_48051	103	MCDONALDS BRIDGE	MCDONALDS RD	17/12/2018	G8 - Expansion joints	Joints leaking at abutments due to potholing and water above. See approach adequecy. Recommend strippibg seal and sealing joint in conjuction with approach remake.	High	$3,000.00
OBIS_49994	27	CHASM CREEK BRIDGE NO.1	MOKIHINUI ROAD	18/09/2014	S4 - Trees and tree roots	Clear vegetation from structures, safe access required. 2018 same.	High	$500.00
OBIS_41306	177	MOKIHINUI PEDESTRIAN BRIDGE	MOKIHINUI ROAD	07/05/2017	G9 - Footways	Fit anti slip netting to walkway.	High	$1,200.00
OBIS_49993	27	CHASM CREEK BRIDGE NO.1	MOKIHINUI ROAD	17/09/2014	W3 - Erosion of piers	As previously noted (has been removed from OBIS??) drain discharging across abutment A. Divert with shovel work. watch cliff edge when working there. fall arrest! 2018 inspected with BIU. Same issue.	High	$450.00
OBIS_48186	184	Burkes Creek Ford	MOKIHINUI ROAD	29/08/2018	G3 - Special approach signs	Name signs missing	High	$300.00
OBIS_9483	67	MOSSEY CREEK BRIDGE NO.2	MOSSEY RD	25/09/2014	G10 - Handrail or guardrail	terminal end ropes tighten. 2018 same	High	$100.00
OBIS_41311	38	McMillans Bridge	NANSEN STREET	07/05/2017	G1 - Appearance	Cut back scrub 3 metres from structure to allow airflow and drying.	High	$150.00
OBIS_48146	183	O'Connor Home Stock Underpass	NINE MILE RD	28/08/2018	G3 - Special approach signs	Name signs missing - new structure	High	$300.00
OBIS_41315	176	O'CONNOR TRAIN WAGON CHASSIS	O'CONNER ROAD	07/05/2017	G4 - Bridge reflector signs	Fit BEM to approaches.	High	$300.00
OBIS_48063	7	BAKERS CREEK BRIDGE NO.1	OPARARA RD	27/08/2018	G2 - Approach adequacy	North approach pavement scabbing and rutting rip and remake	High	$3,000.00
OBIS_41338	117	BROWN GREY BRIDGE	PALMERS RD	06/05/2017	S4 - Trees and tree roots	Remove trees around Pier B.	High	$300.00
OBIS_9391	118	PALMER BRIDGE	PALMERS RD	24/09/2014	G3 - Special approach signs	Replace missing bridge end marker - north approach.	High	$150.00
OBIS_9392	119	UPPER GREY RIVER BRIDGE	PALMERS RD	11/09/2014	S4 - Trees and tree roots	Logs / debris on piers. Remove logs and debris around piers. (2017 Same).	High	$800.00
OBIS_48004	118	PALMER BRIDGE	PALMERS RD	21/08/2018	G4 - Bridge reflector signs	Bridge name sign missing and Bem Impact damage downstream side. Replace	High	$300.00
OBIS_47961	62	NEW CREEK BRIDGE	PENSINI RD	14/08/2018	G4 - Bridge reflector signs	Missing BEM upstream true right others loose in ground	High	$150.00
OBIS_47966	63	PENSINI BRIDGE	PENSINI RD	14/08/2018	W3 - Erosion of piers	Logs on pier hand work chainsaw	High	$150.00
OBIS_9511	63	PENSINI BRIDGE	PENSINI RD	01/10/2014	W4 - Other defects	Repair damage to Gabion Baskets on true left abutment toe. 2018 rock loss	High	$550.00
OBIS_9303	62	NEW CREEK BRIDGE	PENSINI RD	10/09/2014	S4 - Trees and tree roots	Vegetation growing under transverse planks on the D/S side.remove and water blast. 2018 same	High	$350.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_9459	168A	FLETCHERS BRIDGE	PERSERVERENCE ROAD	10/09/2014	W2 - Erosion of abutments	Scour under abutment A. Consider rock rip rap around toe of abutment to protect against scour. 2018 can see piles 5-600 deep undermining. New rock placed upstream needed to extend down face of abutment to prevent further scour	High	$4,000.00
OBIS_9445	168	Perseverance Bridge	PERSERVERENCE ROAD	10/09/2014	S4 - Trees and tree roots	Remove build-up of logs and debris from piers. Boat or excavator may be required to access piers.	High	$2,500.00
OBIS_40842	170	Fox River Bridge	SH6	23/01/2017	W3 - Erosion of piers	Lowering of bed level has exposed piles below sheathing in waterway. Recommend sheathing lower section of piles (to bed level) to provide protection against abrasion and to prevent debris catching piles.	High	$5,000.00
OBIS_44081	1000	REEFTON SUSPENSION BRIDGE	SH6	12/09/2017	ST3 - Deck wear	Mesh wearing through and starting to lift in some places. Recommend patching where required.	High	$300.00
OBIS_44083	1000	REEFTON SUSPENSION BRIDGE	SH6	12/09/2017	ST4 - Bolts and spikes	Bolts through ends of transoms to prevent vertical splitting due to hanger rod connections missing in some locations. Others are missing nuts and washers or loose. Recommend checking all bolts and where they are missing, installing new bolts to prevent splitting.	High	$500.00
OBIS_51497	68	BROWNS CREEK BRIDGE	SNOWY RD	19/12/2018	G2 - Approach adequacy	Smooth approaches.	High	$300.00
OBIS_9329	80	SOMERVILLE BRIDGE NO.2	SOMERVILLE RD	12/09/2014	G2 - Approach adequacy	Potholing at approaches. fill compact grade. 2018 same	High	$500.00
OBIS_47955	79	SOMERVILLE BRIDGE No 1	SOMERVILLE RD	13/08/2018	S4 - Trees and tree roots	Clear vegetation around structure 3m, logs on piers	High	$800.00
OBIS_47947	79	SOMERVILLE BRIDGE No 1	SOMERVILLE RD	13/08/2018	G2 - Approach adequacy	Name sign missing at abut c approach	High	$150.00
OBIS_51498	79	SOMERVILLE BRIDGE No 1	SOMERVILLE RD	19/12/2018	G2 - Approach adequacy	Smooth approaches and clear vegetation on road edges within guardrail.	High	$500.00
OBIS_9325	80	SOMERVILLE BRIDGE NO.2	SOMERVILLE RD	12/09/2014	G3 - Special approach signs	No name sign. 2018 same at abut a approach	High	$150.00
OBIS_44179	175	LANDCORP STOCK UNDERPASS	SOMERVILLE RD	12/09/2017	G3 - Special approach signs	No name sign	High	$300.00
OBIS_9486	80	SOMERVILLE BRIDGE NO.2	SOMERVILLE RD	25/09/2014	W3 - Erosion of piers	remove vegetation build up from piers.labour manual and chainsaw. 2018 same	High	$500.00
OBIS_9361	102	SWAMP CREEK BRIDGE	SWAMP CREEK RD	10/09/2014	F8 - Other defects	Cut scrub under bridge abutments. BUILD UP OF VEGETATION AT PIER.large tree fallen and jammed under structure remove.	High	$1,200.00
OBIS_41313	174	CLEINE STOCK UNDERPASS	UTOPIA RD (WESTPORT)	07/05/2017	G3 - Special approach signs	Hazard markers should not be used both sides of an approach. Also should not substiute BEMS. Replace. Add name sign or ID to structure.	High	$500.00
OBIS_9373	107	MAIRS BRIDGE	WESTBANK RD	11/09/2014	S4 - Trees and tree roots	Logs on piers - Remove carefully with excavator. 2017 Same.	High	$1,100.00
OBIS_47988	111	BLACKADDER BRIDGE NO.1	WESTBANK RD	21/08/2018	G3 - Special approach signs	Bridge name sign missing	High	$300.00
OBIS_51434	115	SCHOOL CREEK BRIDGE	WESTBANK RD	17/12/2018	40 - Appearance	Access to underside of structure difficult, between steel beams not inspected. Clear waterway to allow access for inspection.	High	$400.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_44297	107	MAIRS BRIDGE	WESTBANK RD	07/09/2017	G5 - Vibration	Loose holding down bolts to baulks at various locations across the bridge. Baulks are moving under load and cracking the sealed surface. Recommend tightening baulks to steel superstructure.	High	$3,000.00
OBIS_9381	114	RAHU CREEK BRIDGE	WESTBANK RD	26/09/2014	W2 - Erosion of abutments	Scour behind Abut. C (South) wingwall -place rock batter and re-instate	High	$6,000.00
OBIS_48167	144	WILSON LEAD CULVERT 565	WILSONS LEAD RD	28/08/2018	S4 - Trees and tree roots	Walk through not completed due to access. Clear vegetation for inspection and to allow flow	High	$600.00
OBIS_47997	116	WOOLLEY CREEK BRIDGE	WOOLLEY CREEK RD	21/08/2018	G4 - Bridge reflector signs	Reinstate broken bems at abut a approach	High	$300.00
OBIS_9383	116	WOOLLEY CREEK BRIDGE	WOOLLEY CREEK RD	11/09/2014	W3 - Erosion of piers	Logs on pier 2 manual labour and chainsaw, clear moss from deck.	High	$800.00
Sub Total								$87,700.00
Medium								
OBIS_48115	12	GILBANK CREEK BRIDGE	ARAPITO RD	28/08/2018	W4 - Other defects	Centre flood flap damaged log jammed hand work and chainsaw	Medium	$550.00
OBIS_9213	13	JORDANS CREEK BRIDGE	ARAPITO RD	03/09/2014	SC4 - Other defects	Vegetaion growing in joints under soffit- remove	Medium	$300.00
OBIS_48120	13	JORDANS CREEK BRIDGE	ARAPITO RD	28/08/2018	SS1 - Condition of paint	Flood debris stuck in coating flanges covered in river silt. This will grow vegetation need to wash without removing gold seal	Medium	$1,500.00
OBIS_48125	13A	KELLY CREEK	ARAPITO RD	27/08/2018	G2 - Approach adequacy	Drop out on upstream true right corner. Consider moving BEM sign to avoid cavity at approach or build up with rock.	Medium	$1,800.00
OBIS_48127	13A	KELLY CREEK	ARAPITO RD	27/08/2018	- Beams	Isolated pitting corrosion on bottom flanges remove and replace goldseal coating	Medium	$2,500.00
OBIS_9466	19	BLACKWATER CREEK CULVERT NO.1	BACK RD (KONGAHU)	24/09/2014	S4 - Trees and tree roots	build up of vegetation at inlet. clear	Medium	$150.00
OBIS_48152	18	DEANS CREEK ARMCO CULVERT	BACK RD (KONGAHU)	28/08/2018	F5 - Corrosion of steel	Cut and spray around inlet outlet	Medium	$150.00
OBIS_48067	8	BAKERS CREEK BRIDGE NO.2	BAKER CREEK RD	27/08/2018	F5 - Corrosion of steel	Vegetation growing under structure remove	Medium	$150.00
OBIS_48070	11	BAKERS CREEK NO 3	BAKER CREEK RD	27/08/2018	- Deck	Detritus on deck slippery. Apply biocide treatment and wash	Medium	$300.00
OBIS_9270	43	VEALES STOCK UNDERPASS	BEACH RD (FAIRDOWN)	05/09/2014	G10 - Handrail or guardrail	Broken site rails.Reinstate. 2018 done	Medium	$550.00
OBIS_9269	43	VEALES STOCK UNDERPASS	BEACH RD (FAIRDOWN)	05/09/2014	W2 - Erosion of abutments	North facing material caving in on west side. Retain with concrete. 2018 same, no change	Medium	$3,000.00
OBIS_48019	93	BOATMANS CREEK BRIDGE	BLAIRS RD	21/08/2018	S4 - Trees and tree roots	Debris on piers	Medium	$500.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_9230	20	BLUE DUCK CREEK BRIDGE NO.1	BLUE DUCK CREEK RD	04/09/2014	S4 - Trees and tree roots	Clear logs off piers	Medium	$750.00
OBIS_9507	20	BLUE DUCK CREEK BRIDGE NO.1	BLUE DUCK CREEK RD	04/09/2014	SS5 - Other defects	Build up of material on beams and cross bracing. Recommend cleaning debris from steelwork.	Medium	$1,500.00
OBIS_9345	92	REDMONDS CREEK BRIDGE	BOATMANS RD	10/09/2014	G10 - Handrail or guardrail	Build up of gravel under kerbs.remove	Medium	$100.00
OBIS_49962	106	BOUNDARY BRIDGE	BOUNDARY RD	21/09/2014	G11 - Deck drainage	various kerb drains blocked some cleaned at time of inspection	Medium	$100.00
OBIS_9291	55	BRADSHAWS CREEK BRIDGE NO.2	BRADSHAWS RD	09/09/2014	G1 - Appearance	Spray vegetation at abutments. 2018 same	Medium	$150.00
OBIS_9358	101	ROUGH CREEK BRIDGE	BROWN CREEK RD	10/09/2014	S4 - Trees and tree roots	Minor build up of sticks/logs at piers. CHAINSAW AND MANUAL LABOUR. 2018 same	Medium	$150.00
OBIS_48048	101	ROUGH CREEK BRIDGE	BROWN CREEK RD	22/08/2018	W2 - Erosion of abutments	South abutment scour of approach fill potential monitor. Currently ok steep rock batter in main channel couls drop out in flood event easily. Place better grade on toe rock batter	Medium	$8,500.00
OBIS_48045	100	CAMP CREEK BRIDGE	BROWN CREEK RD	22/08/2018	S4 - Trees and tree roots	Vegetation growing under structure remove	Medium	$150.00
OBIS_48169	54	BRUNINGS BRIDGE	BRUNINGS RD	28/08/2018	S4 - Trees and tree roots	Vegetation is growing back. Clear for 3m around bridge	Medium	$250.00
OBIS_9301	61	BULLOCK CREEK BRIDGE	BULLOCK CREEK RD	09/09/2014	S4 - Trees and tree roots	Vegetaion on pier. 2018 same	Medium	$800.00
OBIS_48034	89	BURKES CREEK NO.2	BURKES CREEK RD	22/08/2018	G2 - Approach adequacy	Smooth approaches and bridge surface	Medium	$2,500.00
OBIS_9248	30	CHARMING CREEK BRIDGE	CHARMING CREEK RD	05/09/2014	S4 - Trees and tree roots	Waterway blocked U/S and D/S from windblown trees. chain saw removal in sections. (2017) debris directly under structure cleared but this will be an on-going issue due to extent of windfall upstream and around bridge. MONITOR.	Medium	$850.00
OBIS_9244	29	CHASM CREEK BRIDGE NO.3	CHARMING CREEK RD	05/09/2014	W2 - Erosion of abutments	U/S true left abutment- corner slumped off road edge. Reinstate with rock. (2017) Same.	Medium	$1,500.00
OBIS_9245	29	CHASM CREEK BRIDGE NO.3	CHARMING CREEK RD	05/09/2014	S4 - Trees and tree roots	Fallen tree un waterway U/S	Medium	$650.00
OBIS_41296	178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD	06/05/2017	W2 - Erosion of abutments	Upstream true right rock rip rap protecting approach fill has slumped down. Top up 15 cubic metres.	Medium	$4,500.00
OBIS_41297	178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD	06/05/2017	W2 - Erosion of abutments	True left abutment rock protection very steep and at risk of undermining/slumping. Provide rock support to toe. 20 cubic metres.	Medium	$5,500.00
OBIS_41298	178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD	06/05/2017	S4 - Trees and tree roots	Logs on piers. Remove.	Medium	$100.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_9234	25	STILLWATER CREEK BRIDGE	DE MALMANCHES RD	04/09/2014	SC4 - Other defects	Light vegetation removal joints at piers, Cut scrub under structure.	Medium	$150.00
OBIS_9341	88	GANNONS BRIDGE	GANNONS RD	10/09/2014	S4 - Trees and tree roots	Large Logs on centre pier.remove with excavator.	Medium	$1,100.00
OBIS_9233	24	TIDAL CREEK BRIDGE	GLASSEYE RD	04/09/2014	S4 - Trees and tree roots	Large log U/S pier - remove. trim back all scrub 3m	Medium	$1,200.00
OBIS_48150	17	GRANITE CREEK BRIDGE NO.1	GRANITE CREEK RD	28/08/2018	G11 - Deck drainage	Deck drains blocked small holes has been cleaned but holes need flushing	Medium	$300.00
OBIS_9221	17B	GRANITE CREEK BRIDGE NO 2	GRANITE CREEK RD	03/09/2014	G2 - Approach adequacy	Vegetation - Clear from D/S side 3m clearance	Medium	$100.00
OBIS_9297	59	LITTLE TOTARA BRIDGE	HANDS RD	09/09/2014	S4 - Trees and tree roots	Vegetation growing from joints over piers. remove 2018 same.	Medium	$150.00
OBIS_9398	123	SURVEYORS CREEK BRIDGE	KARAMEA HIGHWAY	04/09/2014	S4 - Trees and tree roots	Clear vegetation under structure. 2018 same.	Medium	$500.00
OBIS_48134	132	GRANITE CREEK BRIDGE	KARAMEA HIGHWAY	28/08/2018	G11 - Deck drainage	Fretting of seal on deck. Reseal	Medium	$3,500.00
OBIS_9232	131a	BLACKWATER CREEK CULVERT NO.2	KARAMEA HIGHWAY	04/09/2014	G2 - Approach adequacy	General vegetaion control from guardrails	Medium	$600.00
OBIS_41302	172	JONES STOCK UNDERPASS	KARAMEA HIGHWAY	07/05/2017	G1 - Appearance	Mow verges and spray around site rails.	Medium	$150.00
OBIS_48204	127	TIDAL CREEK NO.1	KARAMEA HIGHWAY	29/08/2018	G1 - Appearance	Turf and detritus on upper concrete elements waterblast	Medium	$250.00
OBIS_48207	129	TIDAL CREEK NO.3	KARAMEA HIGHWAY	29/08/2018	G1 - Appearance	Waterblast structure covered in mosses, includes drains	Medium	$250.00
OBIS_51189	127	TIDAL CREEK NO.1	KARAMEA HIGHWAY	11/12/2018	F1 - Settlement	Noted cavity under kerb end up to 1metre x1 metre could extend out under pavement consider filling void.	Medium	$2,000.00
OBIS_48166	131	CALLARIS CREEK CULVERT	KARAMEA HIGHWAY	28/08/2018	S1 - River aggrading	Silt vegetation in inlet clear	Medium	$300.00
OBIS_48162	130	LITTLE WANGANUI BRIDGE	KARAMEA HIGHWAY	28/08/2018	G1 - Appearance	Spray turf on deck edges	Medium	$200.00
OBIS_48164	130	LITTLE WANGANUI BRIDGE	KARAMEA HIGHWAY	28/08/2018	G2 - Approach adequacy	Seal scabbing at northern span	Medium	$2,000.00
OBIS_48479	134	KARAMEA BRIDGE	KARAMEA HIGHWAY	17/09/2018	S4 - Trees and tree roots	Vegetation growing under structure clear laterally 3 metres minimum	Medium	$150.00
OBIS_50019	123	SURVEYORS CREEK BRIDGE	KARAMEA HIGHWAY	18/09/2018	1 - Primary load carrying element	clear debris carefully away from upstream Karamea end beams	Medium	$800.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_48076	1	MOSSEYBURN	KOHAIHAI	27/08/2018	- Deck	Mosses on east deck edge waterblast	Medium	$150.00
OBIS_50622	4	BREAK CREEK BRIDGE	KOHAIHAI	30/08/2018	G2 - Approach adequacy	Fretting pavement.	Medium	$500.00
OBIS_48111	5	OPARARA BRIDGE	KOHAIHAI	27/08/2018	G8 - Expansion joints	Expansion joint leakage from deck and outside edges of pre cast deck units. Causing staining on steelwork	Medium	$8,000.00
OBIS_9200	6	QUINLANS BRIDGE	KOHAIHAI	03/09/2014	SC4 - Other defects	Vegetation growing in joints over piers - remove completely do not just spray. U/S and D/S	Medium	$150.00
OBIS_50621	1	MOSSEYBURN	KOHAIHAI	30/08/2018	22 - Guardrail / handrail / safety fences	Significant section loss on kerb bolts through concrete deck. Recommend replacing.	Medium	$2,000.00
OBIS_9332	82	MAI MAI BRIDGE	MAI MAI RD	11/09/2014	W1 - Waterway adequate	Consider stream training to centre river. Agaisnts bank U/S north end. 2018 same	Medium	$1,200.00
OBIS_48058	86	JACKS CREEK BRIDGE	MAI MAI RD	22/08/2018	W2 - Erosion of abutments	Scour at upstream abutment b. Place rock work to retain wing wall.	Medium	$4,000.00
OBIS_51451	86	JACKS CREEK BRIDGE	MAI MAI RD	17/12/2018	G2 - Approach adequacy	Smooth bridge approaches.	Medium	$800.00
OBIS_9331	82	MAI MAI BRIDGE	MAI MAI RD	11/09/2014	SC4 - Other defects	Vegetation growing from pier joints - moss build up on face of beams - waterblast.	Medium	$750.00
OBIS_48094	165	McCALLUMS BRIDGE	McCALLUMS MILL ROAD	27/08/2018	F5 - Corrosion of steel	Vegetation at abutments clear back as far as allowed here. Check with DOC.	Medium	$150.00
OBIS_48091	164	BREAK CREEK NO 7	McCALLUMS MILL ROAD	27/08/2018	W2 - Erosion of abutments	Drop out of intake headwall rock several voids exposing fill. Reinstate rock and secure with blinding concrete.	Medium	$1,200.00
OBIS_48104	165	McCALLUMS BRIDGE	McCALLUMS MILL ROAD	27/08/2018	F5 - Corrosion of steel	Vegetation at abutments clear back as far as allowed here. Check with DOC.	Medium	$150.00
OBIS_48092	164	BREAK CREEK NO 7	McCALLUMS MILL ROAD	27/08/2018	W4 - Other defects	Poor fish passage and scour at outlet. Improve both with spillway in rock	Medium	$850.00
OBIS_48093	165	McCALLUMS BRIDGE	McCALLUMS MILL ROAD	27/08/2018	G2 - Approach adequacy	Minor potholing at north end. Repair	Medium	$100.00
OBIS_48050	103	MCDONALDS BRIDGE	MCDONALDS RD	22/08/2018	G2 - Approach adequacy	Settlement at approaches both ends and potholing. Repair	Medium	$2,000.00
OBIS_9461	158	CULVERT 2250	MILL ST (EAST)	09/09/2014	S1 - River aggrading	Culvert Pipes half full of sediment. Clear waterway downstream (excavating to remove sediment) to promote flow. 2018 same	Medium	$1,000.00
OBIS_9462	158	CULVERT 2250	MILL ST (EAST)	09/09/2014	S4 - Trees and tree roots	clear vegetation from waterway upstream. 2018 same, also clear downstream	Medium	$500.00
OBIS_41308	177	MOKIHINUI PEDESTRIAN BRIDGE	MOKIHINUI ROAD	07/05/2017	- Deck	Blacklichen on structure. normal but keep scrub clear for air circulation and sun	Medium	$350.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_9260	37	NAPIER STREET BRIDGE	NAPIER ST	05/09/2014	G1 - Appearance	Trim back scrub away from structure. 2018 same	Medium	$200.00
OBIS_47968	62A	New Creek Road Half Bridge	NEW CREEK ROAD	14/08/2018	F4 - Abrasion	Seal approaches to prevent abraision of concrete.	Medium	$5,500.00
OBIS_9285	51	WILLIAMS BRIDGE	NINE MILE RD	09/09/2014	S4 - Trees and tree roots	Minor build up of logs on pier- could scour west abutment. monitor. 2018 same, consider removing old timber piles to prevent this. Heritage?	Medium	$500.00
OBIS_48142	51	WILLIAMS BRIDGE	NINE MILE RD	28/08/2018	S2 - River degrading	River appears to be degrading. Piles are exposed up to 800mm at pier and 400mm at abutment a	Medium	$10,000.00
OBIS_41314	176	O'CONNOR TRAIN WAGON CHASSIS	O'CONNER ROAD	07/05/2017	G1 - Appearance	Scrub and weed clearance required to improve air flow around the structure particularly at the abutments.	Medium	$300.00
OBIS_41316	176	O'CONNOR TRAIN WAGON CHASSIS	O'CONNER ROAD	07/05/2017	G10 - Handrail or guardrail	Clean rails and posts	Medium	$300.00
OBIS_48006	120	BLUE GREY RIVER	PALMERS RD	21/08/2018	G1 - Appearance	Clear moss and debris from deck and handrail.	Medium	$800.00
OBIS_48011	120	BLUE GREY RIVER	PALMERS RD	21/08/2018	S4 - Trees and tree roots	Clear logs from piers	Medium	$500.00
OBIS_48007	120	BLUE GREY RIVER	PALMERS RD	21/08/2018	G2 - Approach adequacy	Smooth both approaches	Medium	$2,000.00
OBIS_41333	117	BROWN GREY BRIDGE	PALMERS RD	06/05/2017	G1 - Appearance	Clear vegetation around abutments and clean debris off abutment caps.	Medium	$300.00
OBIS_9302	62	NEW CREEK BRIDGE	PENSINI RD	10/09/2014	S4 - Trees and tree roots	Minor build up of logs at piers. chainsaw and labour. 2018 major build up	Medium	$350.00
OBIS_9510	63	PENSINI BRIDGE	PENSINI RD	01/10/2014	W3 - Erosion of piers	monitor scour around central pier. Same 2018 scour between Pier B & abutment C	Medium	$5,000.00
OBIS_47965	63	PENSINI BRIDGE	PENSINI RD	14/08/2018	W2 - Erosion of abutments	Upstream true right rock settlement slump top up 12 cube rock	Medium	$2,000.00
OBIS_9460	168A	FLETCHERS BRIDGE	PERSERVERENCE ROAD	10/09/2014	G2 - Approach adequacy	Top up gravel on bridge approach	Medium	$150.00
OBIS_9274	45	CHRISTMAS BRIDGE	POWERHOUSE RD (FAIRDOWN)	05/09/2014	G2 - Approach adequacy	Trim scrub for visibility. 2018 done	Medium	$100.00
OBIS_48222	45	CHRISTMAS BRIDGE	POWERHOUSE RD (FAIRDOWN)	29/08/2018	W2 - Erosion of abutments	Place rockwork to protect abutments, undermined at both abuts 100mm	Medium	$8,000.00
OBIS_9484	70	ALEXANDER BRIDGE	SNOWY RD	25/09/2014	G7 - HD bolts and linkages	Clear build up of material off HD bolts	Medium	$150.00
OBIS_47916	71	MCVICARS BRIDGE	SNOWY RD	13/08/2018	W2 - Erosion of abutments	large scour hole now at true left abutment too.	Medium	$2,000.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_47913	66	MOSSEY CREEK BRIDGE NO.1	SNOWY RD	13/08/2018	W2 - Erosion of abutments	Scour behind true right upstream abutment. Consider straightening flow and placing rip-rap.	Medium	$3,000.00
OBIS_48140	49	SOAPWORKS BRIDGE	SOAPWORKS RD (EXCELSIOR RD)	28/08/2018	G11 - Deck drainage	Consider extending deck drains to prevent water running on deck soffit	Medium	$1,000.00
OBIS_9485	79	SOMERVILLE BRIDGE No 1	SOMERVILLE RD	12/09/2014	W3 - Erosion of piers	consider stream training to avoid scour at south abutment	Medium	$1,200.00
OBIS_47958	81	THOMPSON ARMCO CULVERT	SOMERVILLE RD	13/08/2018	S4 - Trees and tree roots	Clear vegetation 3m around structure	Medium	$500.00
OBIS_9277	47	SCOTTS BRIDGE	STEPHEN RD	10/09/2014	F8 - Other defects	Clear low lying scrub/gorse under approaches Vegetation growing from pier cap joints. 2018 same.	Medium	$300.00
OBIS_9278	47	SCOTTS BRIDGE	STEPHEN RD	05/09/2014	G10 - Handrail or guardrail	Terminal end cable loose U/S true left -tension. 2018 same.	Medium	$100.00
OBIS_9294	58	WALLS CREEK CULVERT	TAURANGA BAY RD	09/09/2014	S4 - Trees and tree roots	Large Pohutakawa growing over intake of structure, clear under and check for root system in concrete and waterway. 2018 looks okay, monitor.	Medium	$250.00
OBIS_51278	58	WALLS CREEK CULVERT	TAURANGA BAY RD	12/12/2018	W4 - Other defects	Scour under outlet pipe. Infill with concrete.	Medium	$1,000.00
OBIS_9292	56	VIRGIN FLAT BRIDGE	VIRGIN FLAT RD	09/09/2014	G1 - Appearance	Clear scrub for visibility air/light around structure - Flax, manuka etc. 2018 same	Medium	$150.00
OBIS_47933	73	BLACKWATER BRIDGE NO.1	WAIUTA RD	13/08/2018	S1 - River aggrading	River aggrading, log stuck under bridge due to aggradation. Straighten flow and remove islands	Medium	$4,000.00
OBIS_48172	48	LOWES BRIDGE	WATERWORKS RD	28/08/2018	S4 - Trees and tree roots	Remove debris build up on piers. This may help with exposed piles under pier	Medium	$300.00
OBIS_9280	48	LOWES BRIDGE	WATERWORKS RD	10/09/2014	SC4 - Other defects	Vegetation growing from pier/deck joint.	Medium	$300.00
OBIS_9371	107	MAIRS BRIDGE	WESTBANK RD	11/09/2014	S4 - Trees and tree roots	Willows D/S under bridge south end. cut back 3 metres clear of structure	Medium	$250.00
OBIS_44300	107	MAIRS BRIDGE	WESTBANK RD	07/09/2017	F6 - Decay	Piles are decaying at the top where the end of the pile is exposed to the weather. Recommend consideration be given to treating the decay at the ends of the piles and installing a metal cap over the end of the pile to protect it from moisture.	Medium	$5,000.00
OBIS_47987	111	BLACKADDER BRIDGE NO.1	WESTBANK RD	21/08/2018	G2 - Approach adequacy	Smooth approach at abutment a	Medium	$500.00
OBIS_47991	114	RAHU CREEK BRIDGE	WESTBANK RD	21/08/2018	G2 - Approach adequacy	Smooth both approaches and bridge surface	Medium	$4,000.00
OBIS_47994	114	RAHU CREEK BRIDGE	WESTBANK RD	21/08/2018	S4 - Trees and tree roots	Logs on pier	Medium	$500.00
OBIS_47995	115	SCHOOL CREEK BRIDGE	WESTBANK RD	21/08/2018	W1 - Waterway adequate	Downstream culvert belonging to farmer is blocking flow. Liaise with farmer to clear culvert pipes	Medium	$0.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_47985	110	PADDY GOURLEYS BRIDGE	WESTBANK RD	21/08/2018	G2 - Approach adequacy	Smooth approaches abut a	Medium	$2,000.00
OBIS_9375	110	PADDY GOURLEYS BRIDGE	WESTBANK RD	11/09/2014	SC4 - Other defects	Water blast concrete work	Medium	$300.00
OBIS_48001	116	WOOLLEY CREEK BRIDGE	WOOLLEY CREEK RD	21/08/2018	W2 - Erosion of abutments	Scour under abutment a and all piers. Gabion baskets and rock work are in place to protect these but do not appear to be working. Monitor and consider placing further rock work	Medium	$20,000.00
Sub Total								$159,850.00
Low								
OBIS_48121	14	ELFORDS CREEK BRIDGE NO.1	ARAPITO RD	27/08/2018	G3 - Special approach signs	Consider replacement name signs. Lettering peeling off.	Low	$300.00
OBIS_48153	19	BLACKWATER CREEK CULVERT NO.1	BACK RD (KONGAHU)	28/08/2018	F5 - Corrosion of steel	ringbark corrosion in bottom 3 metres of culvert beginning	Low	$1,200.00
OBIS_9208	8	BAKERS CREEK BRIDGE NO.2	BAKER CREEK RD	03/09/2014	SC4 - Other defects	Remove vegetation from joints on underside of deck	Low	$150.00
OBIS_9448	95	RAGLANS CREEK BRIDGE	BLAIRS RD	10/09/2014	G1 - Appearance	Waterblast concrete to remove moss growth	Low	$400.00
OBIS_48155	20	BLUE DUCK CREEK BRIDGE NO.1	BLUE DUCK CREEK RD	08/10/2014	- Deck	Loose and broken running planks. Consider full running deck and seal to protect steel work below. Use spax screws for fixing not nails	Low	$8,000.00
OBIS_9228	20	BLUE DUCK CREEK BRIDGE NO.1	BLUE DUCK CREEK RD	04/09/2014	G7 - HD bolts and linkages	Clear materail off HD bolts at abutments	Low	$500.00
OBIS_47943	77	BURTONS CULVERT NO.1	BURTONS RD	13/08/2018	F1 - Settlement	Fill missing/washed away above upstream inlet. Consider filling	Low	$800.00
OBIS_9241	29	CHASM CREEK BRIDGE NO.3	CHARMING CREEK RD	05/09/2014	G3 - Special approach signs	South end sign bullet hole damage. Still legible. (2017) Same.	Low	$150.00
OBIS_9240	28	CHASM CREEK BRIDGE NO.2	CHARMING CREEK RD	05/09/2014	G7 - HD bolts and linkages	Build up of gravel over HD bolts south end - clean as required. 2018 same	Low	$150.00
OBIS_9236	26	SAWYERS CREEK BRIDGE	DE MALMANCHES RD	04/09/2014	G1 - Appearance	Clear scrub away from sides	Low	$150.00
OBIS_48196	26	SAWYERS CREEK BRIDGE	DE MALMANCHES RD	29/08/2018	- Deck	Water ponding on deck keep jpints clean. Consider drain holes	Low	$1,200.00
OBIS_9253	32	WATSON CREEK	DOMAIN RD (GRANITY)	05/09/2014	G1 - Appearance	Build up of vegetation- remove. 2018 same	Low	$100.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_9344	91	FERNDALE BRIDGE NO.1	FERNDALE RD	10/09/2014	G1 - Appearance	Need wash/ waterblast - moss growing	Low	$350.00
OBIS_48156	24	TIDAL CREEK BRIDGE	GLASSEYE RD	28/08/2018	G8 - Expansion joints	Turf on deck edges and outer deck unit joint leakage. Wash and seal	Low	$3,500.00
OBIS_9218	17	GRANITE CREEK BRIDGE NO.1	GRANITE CREEK RD	03/09/2014	G2 - Approach adequacy	Light trim of scrub around and under abutment ends	Low	$150.00
OBIS_9220	17	GRANITE CREEK BRIDGE NO.1	GRANITE CREEK RD	03/09/2014	SC4 - Other defects	Vegetation growing from piers/joints - remove	Low	$150.00
OBIS_9222	17B	GRANITE CREEK BRIDGE NO 2	GRANITE CREEK RD	03/09/2014	G3 - Special approach signs	Bullet holes in east end signs	Low	$200.00
OBIS_9404	125	GLASSEYE CREEK	KARAMEA HIGHWAY	04/09/2014	G1 - Appearance	Moss growing on concrete. Recommend water blasting bridge to remove moss.	Low	$3,000.00
OBIS_48137	131a	BLACKWATER CREEK CULVERT NO.2	KARAMEA HIGHWAY	28/08/2018	- Deck	Unable to inspect culvert soffit. Arrange a boat for inspection next round	Low	$1,200.00
OBIS_48133	133	MUSSONS CREEK CULVERT	KARAMEA HIGHWAY	28/08/2018	S4 - Trees and tree roots	Clear trees at outlet	Low	$150.00
OBIS_49369	125	GLASSEYE CREEK	KARAMEA HIGHWAY	18/09/2018	W2 - Erosion of abutments	Scour 250mm under shot crete section upstream true right	Low	$3,500.00
OBIS_41303	172	JONES STOCK UNDERPASS	KARAMEA HIGHWAY	07/05/2017	G10 - Handrail or guardrail	Repaint 2 years	Low	$550.00
OBIS_48211	135	WHISKEY CREEK CULVERT	KARAMEA HIGHWAY	29/08/2018	S1 - River aggrading	Culvert inlet agraded 40% consider digging spooning basin upstream	Low	$850.00
OBIS_9231	131a	BLACKWATER CREEK CULVERT NO.2	KARAMEA HIGHWAY	04/09/2014	W1 - Waterway adequate	Clear gorse and vegetaion from faces	Low	$150.00
OBIS_9414	130	LITTLE WANGANUI BRIDGE	KARAMEA HIGHWAY	03/09/2014	S4 - Trees and tree roots	Clear scrub away from steelwork below bridge.	Low	$100.00
OBIS_9427	134	KARAMEA BRIDGE	KARAMEA HIGHWAY	04/09/2014	G8 - Expansion joints	Grit in expansion joints - clean.	Low	$150.00
OBIS_9418	132	GRANITE CREEK BRIDGE	KARAMEA HIGHWAY	03/09/2014	G1 - Appearance	Clear vegetation under approach guardrails	Low	$100.00
OBIS_9193	2	STONEY CREEK BRIDGE	KOHAIHAI	02/09/2014	SC4 - Other defects	hole in P.C deck unit joints outside road edge seal with premix concrete.	Low	$100.00
OBIS_48130	160	BREAK CREEK No 3	McCALLUMS MILL ROAD	27/08/2018	W1 - Waterway adequate	Poor fish passage. Apron drop off 250mm. Consider fish pasaage	Low	$850.00
OBIS_48189	39	Mine Creek No 1	MILLERTON TK (STOCKTON RD)	29/08/2018	G2 - Approach adequacy	Ground loss at both sides of abutment b approach.	Low	$4,000.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_48190	39	Mine Creek No 1	MILLERTON TK (STOCKTON RD)	29/08/2018	F1 - Settlement	Settlement at abut a approach. Minor.	Low	$500.00
OBIS_9202	7	BAKERS CREEK BRIDGE NO.1	OPARARA RD	03/09/2014	F8 - Other defects	Clear vegetation from abutments & piers touching steelwork.2018 same	Low	$250.00
OBIS_9386	117	BROWN GREY BRIDGE	PALMERS RD	11/09/2014	G3 - Special approach signs	Firearm damage to signs - still legible.	Low	$150.00
OBIS_9328	80	SOMERVILLE BRIDGE NO.2	SOMERVILLE RD	12/09/2014	SC4 - Other defects	Waterblast (clean beams/ abutments	Low	$500.00
OBIS_9378	111	BLACKADDER BRIDGE NO.1	WESTBANK RD	11/09/2014	SC4 - Other defects	Waterblast - build up of moss on beams and abutments	Low	$300.00
OBIS_9376	110	PADDY GOURLEYS BRIDGE	WESTBANK RD	11/09/2014	S4 - Trees and tree roots	Clear vegetation under abutments (minor)	Low	$100.00
OBIS_9384	116	WOOLLEY CREEK BRIDGE	WOOLLEY CREEK RD	11/09/2014	G10 - Handrail or guardrail	Minor patches of rot in timber rails	Low	$1,500.00
Sub Total								$35,450.00
Monitor								
OBIS_9217	13A	KELLY CREEK	ARAPITO RD	03/09/2014	W2 - Erosion of abutments	U/S east abutment monitor scourk rip rap.	Monitor	$2,000.00
OBIS_48119	13	JORDANS CREEK BRIDGE	ARAPITO RD	28/08/2018	W2 - Erosion of abutments	Rock dropout at south west abutment downstream edge. 12 cube rock	Monitor	$2,500.00
OBIS_50627	13	JORDANS CREEK BRIDGE	ARAPITO RD	30/08/2018	W3 - Erosion of piers	Scour under piers.	Monitor	$20,000.00
OBIS_9273	44	WET LEAD CULVERT	BEACH RD (FAIRDOWN)	05/09/2014	S1 - River aggrading	East culvert half full of silt. Monitor. 2018 same	Monitor	$1,200.00
OBIS_48018	93	BOATMANS CREEK BRIDGE	BLAIRS RD	21/08/2018	W2 - Erosion of abutments	Continue monitoring abutment D for scour and top up rock as required	Monitor	$3,500.00
OBIS_9489	106	BOUNDARY BRIDGE	BOUNDARY RD	21/09/2018	W3 - Erosion of piers	large wier down stream. monitor and top up accoringly to avoid further degradation of material below pile caps.Ensure inspections are made after flood events.2018 currently ok	Monitor	$15,000.00
OBIS_9487	98	COAL CREEK BRIDGE	BROWN CREEK RD	25/09/2014	W4 - Other defects	large active slip D/S SOUTH END MONITOR. 2018 monitor.	Monitor	$0.00
OBIS_9299	61	BULLOCK CREEK BRIDGE	BULLOCK CREEK RD	09/09/2014	SS2 - Corrosion	Light section loss bottom flange, mainly at north end. blast and re- apply coat to effected area.	Monitor	$2,500.00
OBIS_47945	78	BURTONS CULVERT NO.2	BURTONS RD	13/08/2018	W2 - Erosion of abutments	Scour under outlet apron. Monitor	Monitor	$10,000.00
OBIS_9259	34	GRANITY ARCH	CALLIOPE STREET	05/09/2014	F3 - Spalling	Honeycombing in original concrete inside arch- some recent epoxy morta repairs. No sign of exposed reinforcing. Unlikely to cause any issues . 2018 same	Monitor	$2,500.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_48187	36	MILLER STREAM ARCH	CALLIOPE STREET	29/08/2018	F8 - Other defects	Crib walls bulge slightly, but appear stable. Monitor.	Monitor	$20,000.00
OBIS_9249	30	CHARMING CREEK BRIDGE	CHARMING CREEK RD	05/09/2014	ST3 - Deck wear	Gravel over deck 70mm deep. Remove weight and allow air flow	Monitor	$150.00
OBIS_9239	28	CHASM CREEK BRIDGE NO.2	CHARMING CREEK RD	05/09/2014	F2 - Cracking	Monitor corrosion bottom flange - minor at this stage.	Monitor	$20,000.00
OBIS_9506	88	GANNONS BRIDGE	GANNONS RD	10/09/2014	W2 - Erosion of abutments	Minor erosion of abutment rock protection and erosion of fill behind concrete wingwall. Recommend placing additional rock to protect. 2018 monitor.	Monitor	$2,000.00
OBIS_9421	132	GRANITE CREEK BRIDGE	KARAMEA HIGHWAY	03/09/2014	F3 - Spalling	Early signs of isolated spalling in souther span underside deck D/S	Monitor	$20,000.00
OBIS_9405	125	GLASSEYE CREEK	KARAMEA HIGHWAY	04/09/2014	G2 - Approach adequacy	North approach left lane slump in road near abutment (50mm approx).2018 longitudinal shearing in seal Repair or monitor.	Monitor	$8,000.00
OBIS_9400	124	FALLS CREEK CULVERT	KARAMEA HIGHWAY	04/09/2014	F8 - Other defects	Road has slumped overtop of downstream end of culvert. Monitor and consider repairing road surface.	Monitor	$15,000.00
OBIS_9422	132	GRANITE CREEK BRIDGE	KARAMEA HIGHWAY	03/09/2014	S1 - River aggrading	Appears to be an ongoing issue with aggradation - has been recently excavated. Currently being monitored by BDC.	Monitor	$80,000.00
OBIS_9426	134	KARAMEA BRIDGE	KARAMEA HIGHWAY	04/09/2014	G1 - Appearance	Span 1 (from south end) D/S small area of machine damage on outer beam bottom corner.	Monitor	$5,000.00
OBIS_41304	172	JONES STOCK UNDERPASS	KARAMEA HIGHWAY	07/05/2017	F8 - Other defects	Note unistrut with cables is corroding heavily. Monitor and advise provider when replacement is required 5 years.	Monitor	$10,000.00
OBIS_9419	132	GRANITE CREEK BRIDGE	KARAMEA HIGHWAY	03/09/2014	G10 - Handrail or guardrail	Widespread spalling in concrete side panels .	Monitor	$20,000.00
OBIS_48210	135	WHISKEY CREEK CULVERT	KARAMEA HIGHWAY	29/08/2018	F8 - Other defects	Poorly aligned culvert units at outlet end monitor for scour of road fill	Monitor	$3,000.00
OBIS_41310	173	BJERRING STOCK UNDERPASS	KARAMEA HIGHWAY	07/05/2017	F5 - Corrosion of steel	Service unistrut heavily corroded. Monitor and advise provider of the need to replace. 4 years	Monitor	$550.00
OBIS_48109	6	QUINLANS BRIDGE	KOHAIHAI	28/08/2018	W2 - Erosion of abutments	Monitor decay in old abutments downstream retaing river banks. Rock when required	Monitor	$8,000.00
OBIS_50625	5	OPARARA BRIDGE	KOHAIHAI	30/08/2018	W3 - Erosion of piers	Scour under piers. Monitor.	Monitor	$20,000.00
OBIS_9251	31	BREWERY CREEK BRIDGE	LEWIS STREET	05/09/2014	S2 - River degrading	Prone to scour up/s banks monitor. 2018 same, some ground loss	Monitor	$2,500.00
OBIS_9440	163	BREAK CREEK NO 6	McCALLUMS MILL ROAD	04/09/2014	F6 - Decay	Some of the GoldSeal coating has rubbed off the underside of the stringers. Monitor and repair as required.	Monitor	$5,000.00
OBIS_50624	159	BREAK CREEK No 2	McCALLUMS MILL ROAD	30/08/2018	29 - Scour	Evidence of cutback under the pipes. Monitor.	Monitor	$800.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_9432	159	BREAK CREEK No 2	McCALLUMS MILL ROAD	04/09/2014	S4 - Trees and tree roots	Monitor vegetation inlet/outlet	Monitor	$800.00
OBIS_9436	162	BREAK CREEK NO 5	McCALLUMS MILL ROAD	04/09/2014	W2 - Erosion of abutments	Monitor steep rock batters	Monitor	$20,000.00
OBIS_9476	163	BREAK CREEK NO 6	McCALLUMS MILL ROAD	04/09/2014	F6 - Decay	Monitor condition of timber headwalls	Monitor	$30,000.00
OBIS_9481	181	Millerton Culverts	MILLERTON TK (STOCKTON RD)	10/09/2014	W2 - Erosion of abutments	Potential for scour at inlet between pipes. Monitor and repair as required.	Monitor	$3,000.00
OBIS_9262	40	MINE CREEK BRIDGE NO.2	MILLERTON TK (STOCKTON RD)	05/09/2014	W2 - Erosion of abutments	Rock used on face batters degrading to soil and will eventually collapse. monitor.	Monitor	$4,000.00
OBIS_48178	180	Coal Creek	MOKIHINUI ROAD	29/08/2018	W2 - Erosion of abutments	Scour under true right abutment toe. Only approx 100mm, monitor	Monitor	$1,200.00
OBIS_41307	177	MOKIHINUI PEDESTRIAN BRIDGE	MOKIHINUI ROAD	07/05/2017	- Deck	1 cracked gluelam board downstream mid span. 2nd board up in beam. Monitor for more.	Monitor	$2,500.00
OBIS_41312	38	McMillans Bridge	NANSEN STREET	07/05/2017	W2 - Erosion of abutments	Monitor small scour under mason work at abutment B. May require haunching with concrete bags or similar.	Monitor	$850.00
OBIS_9286	51	WILLIAMS BRIDGE	NINE MILE RD	09/09/2014	W2 - Erosion of abutments	Scour hole D/S true left- only risk to adjoining land owner at this stage. 2018 same	Monitor	$8,000.00
OBIS_41339	117	BROWN GREY BRIDGE	PALMERS RD	06/05/2017	W3 - Erosion of piers	Consider placing additional rock at embankment in front of Abutment C to prevent scour.	Monitor	$1,500.00
OBIS_47960	62	NEW CREEK BRIDGE	PENSINI RD	14/08/2018	G2 - Approach adequacy	Settlement of approaches and deck impacting. Both ends monitor retention oof shoulders at south end note cracked retaining wall downstream true right couls loose fill.	Monitor	$12,000.00
OBIS_47915	69	STAIRCASE BRIDGE	SNOWY RD	13/08/2018	W2 - Erosion of abutments	Scour hole under abutment a. Small hole, monitor.	Monitor	$1,500.00
OBIS_9310	68	BROWNS CREEK BRIDGE	SNOWY RD	13/08/2018	W2 - Erosion of abutments	Abutment B undermined at centre 0.3m. monitor. 2018 same, large void approx 1m deep x 2m long.	Monitor	$5,000.00
OBIS_41321	174	CLEINE STOCK UNDERPASS	UTOPIA RD (WESTPORT)	07/05/2017	F5 - Corrosion of steel	Last section of helcor pipe has pitting corrosion with holes. Suspected contamination from swarf. Monitor progress as these culverts have limited life span as far as corrosion is concerned. Ideally concrete the floor and raise concrete sills to protect from effluent. Coating is typically not enough at ground level on its own.	Monitor	$8,000.00
OBIS_9315	75	BLACKWATER CREEK NO.2	WAIUTA RD	12/09/2014	SC4 - Other defects	A couple of grout pockets at deck connection points uncovered exposing steel - watch for movement. consider cleaning out and regrouting.	Monitor	$3,000.00
OBIS_9380	114	RAHU CREEK BRIDGE	WESTBANK RD	11/09/2014	G1 - Appearance	Honeycombing under precast deck slabs - monitor for spalling. 2018 same	Monitor	$30,000.00
Sub Total								$430,550.00
Not Required								

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_50626	12	GILBANK CREEK BRIDGE	ARAPITO RD	30/08/2018	W1 - Waterway adequate	Consider fish passage.	Not Required	$800.00
OBIS_48176	28	CHASM CREEK BRIDGE NO.2	CHARMING CREEK RD	29/08/2018	- Deck	Consider extending running deck to full width of bridge	Not Required	$4,000.00
OBIS_48129	159	BREAK CREEK No 2	McCALLUMS MILL ROAD	27/08/2018	W1 - Waterway adequate	No fish passage consider better spillway at outlet.	Not Required	$850.00
OBIS_48132	161	BREAK CREEK NO 4	McCALLUMS MILL ROAD	27/08/2018	W1 - Waterway adequate	Poor fish passage and apron undermined 500mm at outlet. Consider options for a better fish passage.	Not Required	$850.00
OBIS_48087	162	BREAK CREEK NO 5	McCALLUMS MILL ROAD	27/08/2018	W1 - Waterway adequate	Poor fish passage install spillway rock this will also protect structure from cut back erosion.	Not Required	$2,500.00
Sub Total								$9,000.00

Total Estimate

$725,650.00

Buller District Council
STRUCTURE REPAIR SCHEDULES

Priority Definitions

Priority	Timing
Urgent	Complete within 3 months
High	Complete within 1 year
Medium	Complete within 5 years
Low	Complete within 10 years or as resources allow
Monitor	N/A

114B - Structural Maintenance

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
Urgent								
OBIS_41322	169	HAMPTONS ROCK	BEACH RD (FAIRDOWN)	07/05/2017	G10 - Handrail or guardrail	handrail height insufficient In some areas. Gap between deck/steps too large to prevent fall through. Excess slack in barier wires. loose post top end of stairs abutment B end.	Urgent	$5,000.00
OBIS_41347	104	BULLER CAMP BRIDGE	BULLER RAILWAY RD (SOUTH)	06/05/2017	ST1 - Decay	Beam #3: Heavy decay, Approx. 60-70% loss of section / capacity. REPLACE. Beams # 1 and 2: Early stages of internal decay, with some heavy pocket decay. MONITOR. ABUTMENT A: Pile #1: Approx. 30% loss of section due to centre decay. MONITOR. Pile #2: Approx. 70% loss of section due to decay through back of pile. REPLACE Pile #3: Approx. 20% loss of section due to centre decay. MONITOR. Pile Cap: Heavy decay, 65mm wide void full depth for large section. REPLACE. ABUTMENT B: Pile #1: Approx. 20% loss of section due to centre decay. MONITOR. Pile #2: Approx. 60% loss of section due to decay through back of pile. REPLACE. Pile #3: Approx. 90% loss of section due to centre decay. REPLACE. Pile Cap: Heavy decay, approx. 50-70% loss of section through back of cap. REPLACE. RECOMMEND URGENT POSTING: MAXIMUM GROSS WEIGHT: 2000kg. 2018 - has now been posted. Recommend replacing bridge.	Urgent	$100,000.00
OBIS_49632	61	BULLOCK CREEK BRIDGE	BULLOCK CREEK RD	29/08/2018	1 - Primary load carrying element	Nailing strip heavily decayed causing two deck planks to dip. Replace nailing strip	Urgent	$20,000.00
OBIS_9468	124	FALLS CREEK CULVERT	KARAMEA HIGHWAY	04/09/2014	W2 - Erosion of abutments	Scour on upstream end of culvert. Tree stump near culvert inlet. Recommend placing rock; remove tree stump and extend existing 300mm dia. culvert across private entrance.2018 as previously suggested retain bank with rock and fabric. Risk of outflank and shoulder collapse	Urgent	$5,000.00
OBIS_9467	124	FALLS CREEK CULVERT	KARAMEA HIGHWAY	04/09/2014	W2 - Erosion of abutments	Erosion of material under culvert outlet. Slumping of garound around wingwalls. Recommend placing rock to retain fill. Monitor and consider reinforced concrete apron slab to carry water away form culvert.2018 rock work done but not sufficient to support structure needs significant spillway and shoulder retention. Consider design.	Urgent	$30,000.00
OBIS_40847	170	Fox River Bridge	SH6	23/01/2017	SS2 - Corrosion	Steel tension rods and associated hardware (washers and nuts) are heavily corroded. Significant loss of section and capacity. Although loading on the bridge has been significantly reduced, remaining redundancy is unknown. Recommend further assessment urgently to determine hanger cross section required to support current bridge loading. Removal and refurbishment or replacement of tension rods will likely be required in the short term.	Urgent	$150,000.00
OBIS_40846	170	Fox River Bridge	SH6	23/01/2017	ST1 - Decay	Extent of decay in timber superstructure including truss elements, transoms and road beams is unknown. Recommend detailed inspection and drilling of hardwood timber elements to further assess condition and quantify repairs and maintenance required.	Urgent	$10,000.00
OBIS_40837	170	Fox River Bridge	SH6	23/01/2017	G10 - Handrail or guardrail	Heavily decayed timber posts and rails require replacement along with heavily corroded bolts through metal straps connecting top rail to timber posts, and heavily corroded straps.	Urgent	$2,500.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_44082	1000	REEFTON SUSPENSION BRIDGE	SH6	12/09/2017	ST4 - Bolts and spikes	Eye bolt through TL tower D/S supporting steel barrier cable does not extend fully through the tower. Shank may have corroded away inside tower or be epoxied in. This should be confirmed and if bolt has not been epoxied in place, removed and replaced with a new eye bolt.	Urgent	$500.00
OBIS_40848	170	Fox River Bridge	SH6	23/01/2017	SS3 - Joints	Heavily corroded splice plates (including bolts) at chord splices. Assess what redundancy there is in these connections and carry out repairs as required. Replace plates and fixings, or refurbish existing plates and reinstate with new bolts.	Urgent	$50,000.00
Sub Total								$373,000.00
High								
OBIS_48122	14	ELFORDS CREEK BRIDGE NO.1	ARAPITO RD	28/08/2018	G7 - HD bolts and linkages	Heavy section loss or complete loss of nuts on hold down bolts . Widespread problem. Need done before threads are unusable.	High	$5,000.00
OBIS_9216	13A	KELLY CREEK	ARAPITO RD	03/09/2014	F5 - Corrosion of steel	Heavy corrosion of West U/S pile.under pin abutment	High	$5,000.00
OBIS_44091	1001	BLACKS POINT SUSPENSION BRIDGE	Auld Street	12/09/2017	G10 - Handrail or guardrail	Barrier height typically 840-880mm high but as low as 800mm near mid-span and 680-700mm at the towers. Recommend replacing existing uprights to lift height of top cable supporting barrier. Install new eye bolts through towers to lift cables at ends.	High	$10,000.00
OBIS_44094	1001	BLACKS POINT SUSPENSION BRIDGE	Auld Street	12/09/2017	SS3 - Joints	Main Cable - rope grips are spaced too far apart and first rope grip is located too far out from thimble. Light corrosion on existing rope grips. Recommend removing and replacing existing rope grips with load rated galvanized grips followed by coating in a petroleum based primer and wrapping in Denso tape for protection. Wire Rope supporting barrier - rope grips at TL tower are positioned incorrectly with the saddle located on the dead end of the cable. There are also only two rope grips. Three are required for an effective connection. Cable terminates at TR tower without a thimble causing the cable to deform and crush around the shackle. The cable also terminates with only two rope grips as per the TL tower. Recommend removing and replacing all rope grips so that there are three load rated hot dip galvanized rope grips correctly orientated and positioned each end along with wire rope thimbles. Rope should then be tensioned to remove as much sag between posts as possible and protected as indicated above.	High	$1,500.00
OBIS_9210	8	BAKERS CREEK BRIDGE NO.2	BAKER CREEK RD	03/09/2014	F1 - Settlement	D/S east end road shoulder collapsed behind abutment wall	High	$5,000.00
OBIS_48040	99	BROWN CREEK BRIDGE	BROWN CREEK RD	22/08/2018	G7 - HD bolts and linkages	Bent hold down bolts and mortar pads damaged most piers. Old seismic damage new photos of extent. Bolts sheared downstream beam at south abutment	High	$70,000.00
OBIS_49996	98	COAL CREEK BRIDGE	BROWN CREEK RD	18/09/2018	F1 - Settlement	suspected water loading at south abutment and scour at north abutment both need attention. northern abutment has scoured and undermined approach fill from side creek under wingwall d/s side. water loading suspected behind abutment at south needs diverting and discharging (design required)	High	$15,000.00
OBIS_49997	98	COAL CREEK BRIDGE	BROWN CREEK RD	19/09/2018	F5 - Corrosion of steel	Cut back scrub under spans at ends 3.0 metres clearance	High	$500.00
OBIS_9357	101	ROUGH CREEK BRIDGE	BROWN CREEK RD	10/09/2014	G7 - HD bolts and linkages	HD Bolts either not fully tightened or heavily corroded or missing. This problem is widespread at abutments and pier connections. Tighten loose HD bolts, replace missing / corroded nuts. Some HD bolts may need to be replaced also. 2018 no change	High	$20,000.00
OBIS_41346	104	BULLER CAMP BRIDGE	BULLER RAILWAY RD (SOUTH)	06/05/2017	W2 - Erosion of abutments	Some repairs carried out following last inspection. Earth against cap and ends of beams has caused accelerated decay. Recommend installing a proper headwall if bridge is repaired and retained.2018 water running from abutment B and no retention of fill. Carry out recommended works, divert water and retain	High	$5,000.00
OBIS_9319	76	ROUGH & TUMBLE BRIDGE	BURTONS RD	12/09/2014	G7 - HD bolts and linkages	(G7 and F3) D/S HD bolt connection to abutment 'C' has spalled and exposed reinforcing (heavily corroded) - needs design to repair. HD bolt butted against end of slot in beam. 2018 downstream mortar pad has been repaired, upstream mortar pad is heavily cracked	High	$1,200.00
OBIS_9266	41	MANNS BRIDGE	CAINS RD	05/09/2014	G10 - Handrail or guardrail	Heavy widespead corrosion on flanges of I beams and cross members. Section loss has started. blast and paint. 2018 same, web stiffeners have corroded through and cross braces are heavily corroded. Recommend replacing elements now	High	$60,000.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_41351	29	CHASM CREEK BRIDGE NO.3	CHARMING CREEK RD	07/05/2017	W2 - Erosion of abutments	Significant undermining of abutments. Scour of up to 400mm below leading edge of abutment. Previous repair to Abutment A has also scoured underneath. Abutment A appears to be leaning inward (difficult to discern). Recommend dewatering and constructing a structural floor with anti-scour apron on the upstream edge to prevent further damage.	High	$15,000.00
OBIS_41354	29	CHASM CREEK BRIDGE NO.3	CHARMING CREEK RD	07/05/2017	ST1 - Decay	2017 Drilling. BEAM #1: Minor decay in top 30mm. MONITOR. BEAM #2: Minor decay in top 50mm and centre decay. MONITOR. BEAM #3: Slight discolouration only in top 30mm. BEAM #4: Top 50% of beam completely decayed. REPLACE. BEAM #5: Slight discolouration only in top 30mm. SILLS: ABUTMENT A: Heavily decayed under Beam #5. REPLACE. ABUTMENT B: Heavily decayed against earth fill. REPLACE. Consider installing retention beyond ends of beams to protect beams and sill from contract with ground.	High	$10,000.00
OBIS_41349	30	CHARMING CREEK BRIDGE	CHARMING CREEK RD	07/05/2017	ST1 - Decay	Drilled 2017: BEAM #1: Extensive whitespot, otherwise sound. MONITOR. BEAM #2: Extensive white spot and large loss of section capacity due to decay. REPLACE. BEAM #3: Approx. 50% loss of section resulting in significant loss of capacity. REPLACE. BEAM #4: Whitespot in top half. Early decay in top half. MONITOR. BEAM #5: Approx. 75% loss of section due to decay. REPLACE. SILLS: Significant end decay, otherwise whitespot with moderate centre decay. MONITOR. End sections will likely require replacement prior to next round of drilling. Consider replacing with precast concrete unit (single unit specifically cast to suit existing abutments / sills. Post light vehicles only.	High	$20,000.00
OBIS_9368	105	INWOODS BRIDGE	INWOOD RD	10/09/2014	W2 - Erosion of abutments	Monitor scour potential at south abutment due to natural bend in creek - Rip rap toe of abutment if it deterioates. Now 5-600mm undermined unknown how far under. Deep scour hole. Review pile depths (if any) underpin.	High	$10,000.00
OBIS_9425	133	MUSSONS CREEK CULVERT	KARAMEA HIGHWAY	04/09/2014	F8 - Other defects	Major scour at oulet - true left wingwall undermined. Relocate rock and reinstate wier. 2018 now 800mm drop no fish passage. Install spillway and slurry concrete bypass water during works	High	$3,500.00
OBIS_9403	124	FALLS CREEK CULVERT	KARAMEA HIGHWAY	04/09/2014	F4 - Abrasion	Significant floor loss due to abbrasion. Recommend overlaying a new reinforced concrete floor through bottom of culvert.	High	$6,000.00
OBIS_9424	133	MUSSONS CREEK CULVERT	KARAMEA HIGHWAY	04/09/2014	W2 - Erosion of abutments	Scour in base of culvert sides and nib - no floor, consider pouring reinforced concrete floor in base of culvert and moving larger rock.	High	$6,000.00
OBIS_48079	4	BREAK CREEK BRIDGE	KOHAIHAI	27/08/2018	G10 - Handrail or guardrail	Widespead heavy corrosion on handrail system and fixing. Some dander to pedestrians. 50%+ loss of section in widespread areas.	High	$15,000.00
OBIS_48080	4	BREAK CREEK BRIDGE	KOHAIHAI	27/08/2018	- Beams	Cavity in HDCU at span CD at C upstream cannot see steel strand however recommend concrete repair	High	$3,500.00
OBIS_9252	31	BREWERY CREEK BRIDGE	LEWIS STREET	05/09/2014	W2 - Erosion of abutments	West end D/S behind wing wall, large hole 1.2m deep undermining road shoulder and approach. Slab - could be washing out under old abutment. Find exit of material blind off with cocrete and backfill. 2018 same but both abutments at both sides appear to be undermined.	High	$8,000.00
OBIS_48100	163	BREAK CREEK NO 6	McCALLUMS MILL ROAD	27/08/2018	G7 - HD bolts and linkages	Lindapter clamps not engaged to beam. Extend and clamp under beam see wsp opus for retrofit details	High	$5,000.00
OBIS_9309	67	MOSSEY CREEK BRIDGE NO.2	MOSSEY RD	12/09/2014	W2 - Erosion of abutments	Abutment 'A' and wing wall completely undermined and exposing cluster rail iron piles, previously has had stacked rock underpining. Consider concrete underpin or detailed rock rip rap. (Structural assessment to confirm). 2018 same	High	$20,000.00
OBIS_41336	117	BROWN GREY BRIDGE	PALMERS RD	06/05/2017	F6 - Decay	Abutment caps nearest headwall heavily decayed at Abutments A and C. Steel superstructure is fixed to these caps and currently has minimal restraint at the Abutments. Options are: 1. Replace cap (like for like) and reinstate fixings. 2. Review loading on bridge to assess capacity of one cap alone and if sufficient provide new fixings to remaining / sound cap. Pile #2 at Abutment C is heavily decayed: REPLACE. Pile #3 at Abutment C is marginal: will require replacement in the near future. May be redundant depending on replacement strategy for Pile #2.	High	$20,000.00
OBIS_48008	120	BLUE GREY RIVER	PALMERS RD	21/08/2018	G7 - HD bolts and linkages	Mortar pads at pier c beam 2, and both at abutment d are heavily cracked	High	$15,000.00
OBIS_41342	117	BROWN GREY BRIDGE	PALMERS RD	06/05/2017	SS5 - Other defects	Replace bent lateral restraint - Span B-C (like for like).	High	$500.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_41329	119	UPPER GREY RIVER BRIDGE	PALMERS RD	06/05/2017	SS5 - Other defects	Reinstate loose horizontal tension tie at mid-span blocking Span A-B.	High	$300.00
OBIS_9395	120	BLUE GREY RIVER	PALMERS RD	11/09/2014	W3 - Erosion of piers	Scour around base of piles has exposed steel railway irons at base of concrete piles. Repair: Individually encase top of each steel pile (1-1.5m) in concrete.	High	$8,000.00
OBIS_9393	120	BLUE GREY RIVER	PALMERS RD	11/09/2014	G7 - HD bolts and linkages	No aparent HD bolts to hardwood beams span 1 (north). Recommend providing hold down fixings to timber hardwood beams at abutment / pier.	High	$1,500.00
OBIS_47964	62	NEW CREEK BRIDGE	PENSINI RD	14/08/2018	- Beams	Heavy build up of mosses and silt on beams. Wash and reinstate coating	High	$5,500.00
OBIS_47962	62	NEW CREEK BRIDGE	PENSINI RD	14/08/2018	G6 - Bearings	Mosses silt and corrosion on all bearing locations. Clean and reinstate coating replace hold down nuts as required	High	$3,000.00
OBIS_9457	168A	FLETCHERS BRIDGE	PERSERVERENCE ROAD	10/09/2014	G1 - Appearance	Guardrail post has pulled out of hollow core unit. Repair concrete and reinstate guardrail post.2018 same. Requires engineering input due to drilling through pre-stressed unit.	High	$1,000.00
OBIS_44084	1000	REEFTON SUSPENSION BRIDGE	SH6	12/09/2017	SS3 - Joints	Main Cable - rope grips are spaced too far apart and first rope grip is located too fart out from thimble. Light corrosion on existing rope grips. Recommend removing and replacing existing rope grips with load rated galvanized grips followed by wrapping in denso tape for protection. Wire Rope supporting barrier - rope grips at TL tower are positioned incorrectly with the saddle located on the dead end of the cable. There are also only two rope grips. Three are required for an effective connection. Cable terminates at TR tower without a thimble causing the cable to deform and crush around the shackle. The cable also terminates with only two rope grips as per the TL tower. Recommend removing and replacing all rope grips so that there are three load rated hot dip galvanized rope grips correctly orientated and positioned each end along with wire rope thimbles. Rope should then be tensioned to remove as much sag between posts as possible.	High	$1,500.00
OBIS_40840	170	Fox River Bridge	SH6	23/01/2017	F8 - Other defects	Missing sheathing on piers requires replacement. Horizontal timbers behind piles providing retention to approach fill (abutment A) have largely decayed and disappeared. Diagonal sheathing on river side of piles now provides retention to approach fill. Recommend reinstating timber retention behind piles or alternatively sheathing the front of the piles to provide retention.	High	$10,000.00
OBIS_9322	79	SOMERVILLE BRIDGE No 1	SOMERVILLE RD	12/09/2014	F3 - Spalling	Damage to U/S true right wing wall while placing rock. Gravel scour behind rock behind wingwall.concrete repair and slurry rock to fill voids. 2018 same	High	$2,000.00
OBIS_48139	46	DEADMANS CREEK BRIDGE	UTOPIA RD (WESTPORT)	28/08/2018	S2 - River degrading	River is degrading heavily. Banks falling away on both sides, previous rock work failing.	High	$20,000.00
OBIS_9279	48	LOWES BRIDGE	WATERWORKS RD	10/09/2014	F1 - Settlement	Previous slump of bed material at abutment A (west) has been protected with rock. U/S pile has exposed reinforcing- treat corrosion andunderpin with concrete. 2018 same	High	$3,000.00
OBIS_9379	111	BLACKADDER BRIDGE NO.1	WESTBANK RD	11/09/2014	W2 - Erosion of abutments	Abutment A (NE)undermined - consider underpin. river levels apear to get high and alignment will cause scour under abutment.	High	$3,000.00
Sub Total								$414,500.00
Medium								
OBIS_48116	13	JORDANS CREEK BRIDGE	ARAPITO RD	28/08/2018	G6 - Bearings	Broken mortar pad northwest end and corrosion on rocker bearing plates. In future finish mortar to underside of plate.	Medium	$3,000.00
OBIS_9214	14	ELFORDS CREEK BRIDGE NO.1	ARAPITO RD	03/09/2014	G7 - HD bolts and linkages	Isolated heavy corrosion bottom flange of main beams, coating rubbed off beam webs in places, Stock licking it?. 2018 widespread heavy rust flaking off under goldseal coating isolated areas of up to 10% section loss in flange edges. React before capacity assessment is required	Medium	$20,000.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_48117	13	JORDANS CREEK BRIDGE	ARAPITO RD	28/08/2018	G8 - Expansion joints	Deck and expansion joint leakage on outsides of soffit. Seal	Medium	$6,000.00
OBIS_9225	18	DEANS CREEK ARMCO CULVERT	BACK RD (KONGAHU)	04/09/2014	F5 - Corrosion of steel	Culvert connection to concrete showing signs of heavy corrosion. blast and treat area. 2018 pitting pack rust ringbark corrosion. No holes yet.	Medium	$9,000.00
OBIS_9211	11	BAKERS CREEK NO 3	BAKER CREEK RD	03/09/2014	SS1 - Condition of paint	Gold seal coating rubbed off by vegetation. Needs a trim around abutments. 3 metres clearance.2018 same with section loss beam lower flange edges 3-4mm widespread. Upper flange edges same. Treat within 5 years. Clear soil from beams at abutment A.	Medium	$25,000.00
OBIS_50619	8	BAKERS CREEK BRIDGE NO.2	BAKER CREEK RD	30/08/2018	G7 - HD bolts and linkages	Corrosion to beam bearing plates and Hold Down Bolts	Medium	$15,000.00
OBIS_9206	8	BAKERS CREEK BRIDGE NO.2	BAKER CREEK RD	03/09/2014	18 - Painting : Superstructure elements	Some coating loss (Goldseal) on flange edges, consider recoat within two years - bottom flange section loss. 2018 widespread pack rusting of bottom flanges and edges along with upper flange edge and crevice corrosion. Section loss isolated in these areas up to 1mm. Treat in 5 years.	Medium	$30,000.00
OBIS_9350	94	ITALIAN CREEK BRIDGE	BLAIRS RD	10/09/2014	G9 - Footways	Impact damage U/S kerb PC unit and headwall.	Medium	$2,000.00
OBIS_51188	20	BLUE DUCK CREEK BRIDGE NO.1	BLUE DUCK CREEK RD	11/12/2018	40 - Appearance	Piles appear slender - consider conducting Posting Weight Limit Assessment.	Medium	$6,000.00
OBIS_51187	20	BLUE DUCK CREEK BRIDGE NO.1	BLUE DUCK CREEK RD	11/12/2018	F5 - Corrosion of steel	Horizontal pier bracing member has corroded through.	Medium	$4,000.00
OBIS_9229	20	BLUE DUCK CREEK BRIDGE NO.1	BLUE DUCK CREEK RD	04/09/2014	F1 - Settlement	Ground slump under abutments, exposed rails under abutment blocks. box and pour to fill void.	Medium	$1,500.00
OBIS_9496	182	BEACHSIDE ESTATE MARINE PARADE RD	BRADSHAWS RD	26/09/2014	F1 - Settlement	SOUTH EAST WING WALL CRACKED AND LEANING INWARD. 2018 same, culver unit 4 tilted slightly. Monitor.	Medium	$3,000.00
OBIS_48046	101	ROUGH CREEK BRIDGE	BROWN CREEK RD	22/08/2018	G8 - Expansion joints	Deck leakage at joints over piers at abutments	Medium	$8,000.00
OBIS_48041	99	BROWN CREEK BRIDGE	BROWN CREEK RD	22/08/2018	G8 - Expansion joints	PC deck joints leak and units moved (old seismic activity) heaving of seal and leakage removing goldseal coating on beams. Joints not sealed full width look at repair options	Medium	$25,000.00
OBIS_9356	99	BROWN CREEK BRIDGE	BROWN CREEK RD	10/09/2014	SC1 - Cracking	Spalling in PC unit deck corners- some exposed reo. 2018 no change	Medium	$1,200.00
OBIS_9300	61	BULLOCK CREEK BRIDGE	BULLOCK CREEK RD	09/09/2014	W3 - Erosion of piers	Bolts connecting corbels to pile cap and I beams to corbels heavily corroded. Some nuts missing. 2018 same	Medium	$2,000.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_49635	61	BULLOCK CREEK BRIDGE	BULLOCK CREEK RD	29/08/2018	ST5 - Other defects	Consider extending running deck to full width of bridge	Medium	$8,000.00
OBIS_47944	77	BURTONS CULVERT NO.1	BURTONS RD	13/08/2018	F4 - Abrasion	Abrasion on culvert floor exposing reo along full length. Reo bars bent up out of floor. No apparent corrosion.	Medium	$12,000.00
OBIS_9242	29	CHASM CREEK BRIDGE NO.3	CHARMING CREEK RD	05/09/2014	ST5 - Other defects	Wedges driven under abutment bearers not fully seated- monitor grout pack. (2017) Same.	Medium	$250.00
OBIS_51277	25	STILLWATER CREEK BRIDGE	DE MALMANCHES RD	12/12/2018	G11 - Deck drainage	Consider installing drain holes	Medium	$3,000.00
OBIS_9509	90	FERNDALE BRIDGE NO.2	FERNDALE RD	10/09/2014	F3 - Spalling	Spalling of abutment corner. Carry out structural repair.	Medium	$1,500.00
OBIS_9339	87	BURKES CREEK BRIDGE NO.1	GANNONS RD	10/09/2014	SC2 - Spalling	Spalling on D/S and U/S soffit	Medium	$3,500.00
OBIS_48158	24	TIDAL CREEK BRIDGE	GLASSEYE RD	28/08/2018	SS2 - Corrosion	Heavy rust under original coating hidden by gold seal. Original coating is sheeting off exposing rust bottom flanges mainly. Old pitting evident and new starting	Medium	$35,000.00
OBIS_48206	128	TIDAL CREEK NO.2	KARAMEA HIGHWAY	29/08/2018	- Beams	Old deep pitting in beam flanges widespread 2-3mm deep. Consider when assessing capacity	Medium	$20,000.00
OBIS_9409	127	TIDAL CREEK NO.1	KARAMEA HIGHWAY	03/09/2014	F2 - Cracking	Downstream west end crack in wing wall - monitor.	Medium	$2,000.00
OBIS_9410	128	TIDAL CREEK NO.2	KARAMEA HIGHWAY	03/09/2014	G1 - Appearance	Timber baulks showing signs of movement. Seal loss starting . Monitor and consider investigating tightening existing and / or providing additional deck fixings and possibly running planks. Widespread baulk dlamination. 1 section being replaced at time of inspection. Others moving under load.	Medium	$55,000.00
OBIS_48208	129	TIDAL CREEK NO.3	KARAMEA HIGHWAY	29/08/2018	G2 - Approach adequacy	Settlement in shoulder under kerb ends north side. Retain shoulder	Medium	$3,000.00
OBIS_48161	130	LITTLE WANGANUI BRIDGE	KARAMEA HIGHWAY	28/08/2018	F6 - Decay	Headwalls decayed both ends consider replacing effecting beam end corrosion	Medium	$6,000.00
OBIS_48163	130	LITTLE WANGANUI BRIDGE	KARAMEA HIGHWAY	28/08/2018	ST5 - Other defects	Baulk joints open and growing turf, leaking to steelwork and piers. Consider seal bandage	Medium	$3,000.00
OBIS_48474	134	KARAMEA BRIDGE	KARAMEA HIGHWAY	17/09/2018	G7 - HD bolts and linkages	ZCP and red rust edge corrosion on linkage washers. Coat in 7-10 years. 2018 now 3-6 years.	Medium	$15,000.00
OBIS_49370	125	GLASSEYE CREEK	KARAMEA HIGHWAY	18/09/2018	- Beams	Bad leakage in construction joints and deck soffit reflected in pavement above. Seal deck and investigate possible consequences of reinforcing deterioration	Medium	$15,000.00
OBIS_9199	5	OPARARA BRIDGE	KOHAIHAI	03/09/2014	F5 - Corrosion of steel	Some corrosion under Goldseal in angle iron cross braces and light corrosion on beam flanges. monitor. 2018 Advanced since last inspection now widespread heavy section loss and flaking under gold seal coating on steel beam, cross bracing, bearing plates and fixings.	Medium	$125,000.00
OBIS_48113	5	OPARARA BRIDGE	KOHAIHAI	27/08/2018	F3 - Spalling	North West tombstone end concrete spalling exposing corroded reo bars.	Medium	$1,200.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_9191	1	MOSSEYBURN	KOHAIHAI	02/09/2014	G1 - Appearance	Monitor corrosion under sealant bottom flange and channel braces beginning to show. Remove coating blast and re-apply coating. 2018 old coating flaking under gold seal. Spot rusting widespread with pitting hidden. program painting within 5 years before capacity assessment is necessary	Medium	$25,000.00
OBIS_9454	165	McCALLUMS BRIDGE	McCALLUMS MILL ROAD	04/09/2014	W3 - Erosion of piers	Undermining of piers (pilecap) exposing steel piles (approx. 0.5m). Underpin pilecap with additional concrete.. 2018 piers BC undermined 750mm exposing rail irons can see 5 across pier base could be double rows? Logs on C need removing and rock may be a better option for here.	Medium	$10,000.00
OBIS_48141	51	WILLIAMS BRIDGE	NINE MILE RD	28/08/2018	G7 - HD bolts and linkages	Heavy corrosion at hold down bolts and head wall linkage	Medium	$8,000.00
OBIS_48065	7	BAKERS CREEK BRIDGE NO.1	OPARARA RD	27/08/2018	G8 - Expansion joints	PC Deck joint leakage to steelwork. Seal	Medium	$1,200.00
OBIS_9203	7	BAKERS CREEK BRIDGE NO.1	OPARARA RD	03/09/2014	G6 - Bearings	Bottom flanges have corrosion under gold seal coating, heavy in places with rust sheets.remove coating blast corrosion areas and re-apply coating. 2018 mpre advanced with minor section loss esrimated up to 1mm. Recommend treatment in 5 years with Epoxy or MCU. Test for lead	Medium	$23,000.00
OBIS_48009	120	BLUE GREY RIVER	PALMERS RD	21/08/2018	F2 - Cracking	Horizontal crack in concrete pile at pier b pile 1.	Medium	$15,000.00
OBIS_48010	120	BLUE GREY RIVER	PALMERS RD	21/08/2018	F6 - Decay	Significant decay of deck. Consider deck repairs or replace	Medium	$25,000.00
OBIS_44089	1000	REEFTON SUSPENSION BRIDGE	SH6	12/09/2017	G1 - Appearance	Uneven profile in deck across bridge. Recommend tensioning hanger rods at Transom connection to even up deck profile and ensure even loading into hanger rods / cable.	Medium	$4,000.00
OBIS_49998	70	ALEXANDER BRIDGE	SNOWY RD	19/09/2018	F6 - Decay	leaf drop decaying in between running deck, fully deck structure	Medium	$850.00
OBIS_50021	47	SCOTTS BRIDGE	STEPHEN RD	19/09/2018	G10 - Handrail or guardrail	Various mortar pads under guardrail (up to 5) require re-packing . 2018 same.	Medium	$1,200.00
OBIS_9382	115	SCHOOL CREEK BRIDGE	WESTBANK RD	11/09/2014	SC2 - Spalling	Spalling at west end PC slab - reinforcing heavily corroded. detailed concrete repairs. 2018 - not observed.	Medium	$1,500.00
OBIS_9494	144	WILSON LEAD CULVERT 565	WILSONS LEAD RD	26/09/2014	G3 - Special approach signs	Corrosion starting on plate joining bolts and culvert section - spot blast and paint. 2018, corrosion now quite heavy on bolts.	Medium	$2,500.00
OBIS_47998	116	WOOLLEY CREEK BRIDGE	WOOLLEY CREEK RD	21/08/2018	G8 - Expansion joints	Deck drainage through joints is causing cracking in abutment heads. Consider installing seals and deck joints.	Medium	$30,000.00
Sub Total								$616,400.00
Low								
OBIS_48068	8	BAKERS CREEK BRIDGE NO.2	BAKER CREEK RD	27/08/2018	SC1 - Cracking	Grout loss in PC deck connection pockets. Central span mainly. Reinstate with design	Low	$3,000.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_48021	94	ITALIAN CREEK BRIDGE	BLAIRS RD	21/08/2018	G11 - Deck drainage	Leaking deck joints. Consider installing seal	Low	$6,000.00
OBIS_48043	99	BROWN CREEK BRIDGE	BROWN CREEK RD	22/08/2018	SS1 - Condition of paint	Coating gold seal washed off from deck joint leakage. See expansion joints first	Low	$35,000.00
OBIS_48042	99	BROWN CREEK BRIDGE	BROWN CREEK RD	22/08/2018	F2 - Cracking	Diagonal cracking in abutment headwall face both sides north abutment to waterlevel old seismic damage. Full height.	Low	$5,000.00
OBIS_48175	28	CHASM CREEK BRIDGE NO.2	CHARMING CREEK RD	29/08/2018	G7 - HD bolts and linkages	Hold down bolts at pier appear to have corroded heavily.	Low	$5,000.00
OBIS_9450	146	CULVERT 2472	CONNS CREEK RD	10/09/2014	ST1 - Decay	Consider replacement of downstream old railway. Timber is heavily decayed and rail irons are corroded.	Low	$50,000.00
OBIS_48151	17B	GRANITE CREEK BRIDGE NO 2	GRANITE CREEK RD	28/08/2018	- Deck	Spalling and exposed reo from drainage hole drilling. Consider concrete cover on steel	Low	$3,000.00
OBIS_49368	125	GLASSEYE CREEK	KARAMEA HIGHWAY	18/09/2018	F3 - Spalling	Downstream soffit spall 1 bar exposed heavily corroded	Low	$4,000.00
OBIS_48160	130	LITTLE WANGANUI BRIDGE	KARAMEA HIGHWAY	28/08/2018	G7 - HD bolts and linkages	Corrosion on hold down bolts . Isolated monitor moss in goldseal coating wash and re treat	Low	$5,000.00
OBIS_48165	130	LITTLE WANGANUI BRIDGE	KARAMEA HIGHWAY	28/08/2018	SS2 - Corrosion	Heavy pitting rust lower flanges exposed beams (outer) hidden by goldseal.	Low	$40,000.00
OBIS_51191	185	Corbyvale Stock Underpass	KARAMEA HIGHWAY	11/12/2018	SC2 - Spalling	Spall in soffit likely from construction.	Low	$800.00
OBIS_9196	4	BREAK CREEK BRIDGE	KOHAIHAI	02/09/2014	G8 - Expansion joints	Expansion joints A/C over joint dosn't appear to leak through to structure below. Joint over pier D needs re-sealing. All joints leaking turf in joints and pavement scabbing at span AB	Low	$8,000.00
OBIS_48056	84	DIRTY MARY BRIDGE NO.1	MAI MAI RD	22/08/2018	SC4 - Other defects	Deck unit 2 appears to have tilted 10mm below the other units on the downstream side. This is causing an uneven road surface, but there does not seem to be any cracking in the unit. Monitor and consider repairing mortar under deck unit	Low	$18,000.00
OBIS_48177	180	Coal Creek	MOKIHINUI ROAD	29/08/2018	G7 - HD bolts and linkages	Early stages of corrosion at bolts and plates connecting beams to abutments. Blast and paint	Low	$2,500.00
OBIS_48143	51	WILLIAMS BRIDGE	NINE MILE RD	28/08/2018	- Beams	Early stages of corrosion under gold seal	Low	$6,000.00
OBIS_48064	7	BAKERS CREEK BRIDGE NO.1	OPARARA RD	27/08/2018	G6 - Bearings	Pack rusting of bearing plates under gold seal coating. Heavy on edges treat in 5 years	Low	$2,000.00
OBIS_9201	7	BAKERS CREEK BRIDGE NO.1	OPARARA RD	03/09/2014	SC4 - Other defects	Isolated patch honeycombing d/s south abutment face - probably original	Low	$500.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_41337	117	BROWN GREY BRIDGE	PALMERS RD	06/05/2017	F7 - Date of last boring	Next boring 2023.	Low	$4,000.00
OBIS_9512	63	PENSINI BRIDGE	PENSINI RD	01/10/2014	W3 - Erosion of piers	loss of coating due to wind blown debris. consider clean and re-coating. 2018 same no notable corrosion	Low	$4,000.00
OBIS_48148	56	VIRGIN FLAT BRIDGE	VIRGIN FLAT RD	28/08/2018	G7 - HD bolts and linkages	Hold down bolts are corroded and bent slightly at both upstream beams.	Low	$6,000.00
OBIS_47999	116	WOOLLEY CREEK BRIDGE	WOOLLEY CREEK RD	21/08/2018	G11 - Deck drainage	Puddles on deck. Consider installing more drainage points	Low	$8,000.00
Sub Total								$215,800.00
Monitor								
OBIS_50101	15	OFFICE CREEK BRIDGE	ARAPITO RD	18/09/2018	1 - Primary load carrying element	Longitudinal cracking in soffit and chamfers 1.2 metres from D/S	Monitor	$40,000.00
OBIS_48939	65	MIRFINS BRIDGE	ATARAU RD	20/09/2018	F2 - Cracking	hairline vertical cracks in top centre of hammerhead piers. typical location for fine cracking see inpection photos	Monitor	$2,500.00
OBIS_48938	65	MIRFINS BRIDGE	ATARAU RD	20/09/2018	G6 - Bearings	Elastomeric pad grout pad chamfers cracking, only outside chamfer plaster.	Monitor	$3,500.00
OBIS_44096	1001	BLACKS POINT SUSPENSION BRIDGE	Auld Street	12/09/2017	SS2 - Corrosion	Pitting corrosion of hanger rods and barrier posts. Monitor.	Monitor	$20,000.00
OBIS_44090	1001	BLACKS POINT SUSPENSION BRIDGE	Auld Street	12/09/2017	G5 - Vibration	Bridge is very lively. Consider sway cables to reduce lateral movement.	Monitor	$6,000.00
OBIS_44097	1001	BLACKS POINT SUSPENSION BRIDGE	Auld Street	12/09/2017	SS4 - Rivets or bolts	Hanger rods wearing through cable clamps. Monitor.	Monitor	$0.00
OBIS_41323	169	HAMPTONS ROCK	BEACH RD (FAIRDOWN)	07/05/2017	SC1 - Cracking	Longitudinal cracking and rust staining indicating onset of spalling from corroded reo. Monitor. Consider alternative deck structure when nessessary.	Monitor	$10,000.00
OBIS_9349	93	BOATMANS CREEK BRIDGE	BLAIRS RD	10/09/2014	W3 - Erosion of piers	Pier C undermined 500mm. Railway iron cluster piles exposed. Consider D/S wier or pour concrete to protect piles. 2018 appears to have improved. Monitor.	Monitor	$4,500.00
OBIS_51499	106	BOUNDARY BRIDGE	BOUNDARY RD	19/12/2018	11 - Pier / column	Pier I appears to have rotated due to historic span collapse. Monitor. wide spread cracking in beam to pier connections and pier face near joints. serious cracking around H-J old span collapse 30 years ago. these cracks extend into the split joints in the piers. see photos and notes and assess	Monitor	$200,000.00
OBIS_48049	101	ROUGH CREEK BRIDGE	BROWN CREEK RD	22/08/2018	- Beams	Flood debris damage to gold seal coating at main waterways. Exposing original coatins which is sound currently ie no corrosion evident.	Monitor	$5,000.00
OBIS_49638	76	ROUGH & TUMBLE BRIDGE	BURTONS RD	13/08/2018	SS1 - Condition of paint	Machine damage to gold seal	Monitor	$8,000.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_9505	28	CHASM CREEK BRIDGE NO.2	CHARMING CREEK RD	05/09/2014	F2 - Cracking	Cracking in abutments and pier - monitor. 2018 same	Monitor	$10,000.00
OBIS_9268	42	SYRONS CULVERT	COLLINS RD	05/09/2014	W2 - Erosion of abutments	No retaining wall at culvert inlet/outlet. monitor. 2018 some ground loss at both approaches both sides. Not too bad, monitor	Monitor	$2,500.00
OBIS_41294	178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD	06/05/2017	F1 - Settlement	Approachfill loading headwall slabs and bending them monitor for failure.poor fill and retaing very high with poor quality fill. Pannels are too light for purposes.	Monitor	$35,000.00
OBIS_41299	178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD	06/05/2017	- Deck	Surface grout loss in pockets of deck connectors. No movement evident at present. Assess once cleaned. photograph and report.	Monitor	$750.00
OBIS_41300	178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD	06/05/2017	- Beams	Sharp edge corrosion on rsj flanges with general red rust corrosion isolated. Also isolated general rust corrosion in patches in webs. All up 2%. Beams scond hand with previous pitting in beams under coating. Not specifically causing any corrosion. 7 to 10 years monitor.	Monitor	$45,000.00
OBIS_41295	178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD	06/05/2017	F8 - Other defects	H pile light corrosion at water level monitor	Monitor	$8,500.00
OBIS_48195	26	SAWYERS CREEK BRIDGE	DE MALMANCHES RD	29/08/2018	F2 - Cracking	Old shrinkage cracking in pier cap abutment sills	Monitor	$1,200.00
OBIS_48192	25	STILLWATER CREEK BRIDGE	DE MALMANCHES RD	29/08/2018	SC1 - Cracking	Longitudinal cracking under HDCU span AB lhs beam. In line with hollow cores	Monitor	$8,000.00
OBIS_9257	32	WATSON CREEK	DOMAIN RD (GRANITY)	05/09/2014	F1 - Settlement	D/S culvert section settled below line of other sections by 100mm. 2018 same	Monitor	$5,000.00
OBIS_9343	90	FERNDALE BRIDGE NO.2	FERNDALE RD	10/09/2014	G1 - Appearance	Deck concrete showing wear. 2018 same.	Monitor	$12,000.00
OBIS_9408	127	TIDAL CREEK NO.1	KARAMEA HIGHWAY	03/09/2014	F2 - Cracking	West abutment face old cracking along pile cap - monitor	Monitor	$2,000.00
OBIS_48473	134	KARAMEA BRIDGE	KARAMEA HIGHWAY	17/09/2018	G6 - Bearings	Mortar edges fretting on bearing pads servicible. Monitor	Monitor	$10,000.00
OBIS_48476	134	KARAMEA BRIDGE	KARAMEA HIGHWAY	17/09/2018	F3 - Spalling	Prestressing strand ends corroded and spalled epoxy end caps in beams, sheltered upstream worse. Monitor in 6 years access unit.	Monitor	$50,000.00
OBIS_48477	134	KARAMEA BRIDGE	KARAMEA HIGHWAY	17/09/2018	F4 - Abrasion	Minor abraision of pier column concrete in channel	Monitor	$5,000.00
OBIS_49367	125	GLASSEYE CREEK	KARAMEA HIGHWAY	18/09/2018	F2 - Cracking	Cracking in abutment headwall at A south end. See location notes drawings from inspection	Monitor	$20,000.00
OBIS_9420	132	GRANITE CREEK BRIDGE	KARAMEA HIGHWAY	03/09/2014	F3 - Spalling	Many historic repairs to cracking - epoxy has been used and is fretting off repairs- monitor for future spalling. Suggest alternative repair methodology for future repairs.	Monitor	$20,000.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_48209	129	TIDAL CREEK NO.3	KARAMEA HIGHWAY	29/08/2018	1 - Primary load carrying element	Crack in chamfer outsides? Monitor. Could be concrete joint see photos wary of deck shear issues	Monitor	$20,000.00
OBIS_48203	126	LAKE CREEK CULVERT	KARAMEA HIGHWAY	29/08/2018	- Beams	Leakage in culvert wall true right at chamfer through old cracking monitor	Monitor	$2,000.00
OBIS_51190	185	Corbyvale Stock Underpass	KARAMEA HIGHWAY	11/12/2018	G11 - Deck drainage	Leakage between units	Monitor	$5,000.00
OBIS_51501	134	KARAMEA BRIDGE	KARAMEA HIGHWAY	19/12/2018	SC4 - Other defects	Exposed reinforcing in diaphragm.	Monitor	$2,000.00
OBIS_9474	132	GRANITE CREEK BRIDGE	KARAMEA HIGHWAY	03/09/2014	F3 - Spalling	Historic spalling on piers.	Monitor	$15,000.00
OBIS_9411	128	TIDAL CREEK NO.2	KARAMEA HIGHWAY	03/09/2014	F5 - Corrosion of steel	UC piles showing early signs of corrosion - Monitor.	Monitor	$30,000.00
OBIS_9396	121	TOBIN CREEK CULVERT	KARAMEA HIGHWAY	04/09/2014	F1 - Settlement	Bow in roof - could be original, monitor for tearing. 2018 no change	Monitor	$1,500.00
OBIS_9194	3	CANDLE CREEK BRIDGE	KOHAIHAI	02/09/2014	F8 - Other defects	old epoxy repairs to D/S deck unit at centre monitor	Monitor	$12,000.00
OBIS_9334	84	DIRTY MARY BRIDGE NO.1	MAI MAI RD	11/09/2014	G1 - Appearance	Surface corrosion on bolts connecting PFC braces	Monitor	$8,000.00
OBIS_48106	165	McCALLUMS BRIDGE	McCALLUMS MILL ROAD	27/08/2018	SS1 - Condition of paint	Flood debris damage to coating. Monitor for corrosion.	Monitor	$20,000.00
OBIS_9475	163	BREAK CREEK NO 6	McCALLUMS MILL ROAD	04/09/2014	W2 - Erosion of abutments	Monitor errosion of fill behind timber headwall and under pile cap (western abutment A)	Monitor	$5,500.00
OBIS_9431	159	BREAK CREEK No 2	McCALLUMS MILL ROAD	04/09/2014	F1 - Settlement	Large gaps (50-100mm) between sections of culvert pipe. Monitor. May require relaying of pipes.	Monitor	$80,000.00
OBIS_48188	181	Millerton Culverts	MILLERTON TK (STOCKTON RD)	29/08/2018	F4 - Abrasion	Early stages of abrasion in culvert invert. Monitor	Monitor	$12,000.00
OBIS_48191	40	MINE CREEK BRIDGE NO.2	MILLERTON TK (STOCKTON RD)	29/08/2018	F5 - Corrosion of steel	Early stages of corrosion at bolts in culvert. Monitor	Monitor	$10,000.00
OBIS_48145	158	CULVERT 2250	MILL ST (EAST)	21/08/2018	F2 - Cracking	Large vertical crack in head wall between culvert pipes. Does not appear active, monitor	Monitor	$5,000.00
OBIS_51435	167A	Palmer Rd Culvert	PALMERS RD	17/12/2018	32 - Wing walls	Upstream stacked stone wing walls appear unstable. Monitor.	Monitor	$6,000.00
OBIS_47963	62	NEW CREEK BRIDGE	PENSINI RD	14/08/2018	W2 - Erosion of abutments	Cracked down stream true right wing wall. Could contribute to approach settlement eventually. Monitor and plan for retention works	Monitor	$20,000.00
OBIS_50028	168	Perseverance Bridge	PERSERVERENCE ROAD	19/09/2018	- Beams	small spalls at each end of unit soffits. these are from the strands used for lifters. visible above in carridgeway.	Monitor	$5,500.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_50027	168	Perseverance Bridge	PERSERVERENCE ROAD	19/09/2018	1 - Primary load carrying element	Hairline cracking internal corners of T units where web meets flange of precast units all. out 700 mm typically. ends are restrained in concrete at piers and hogged	Monitor	$2,500.00
OBIS_50025	168	Perseverance Bridge	PERSERVERENCE ROAD	19/09/2018	W2 - Erosion of abutments	Abutment a well protected with rock but steel h piles exposed and corroding (slowly)	Monitor	$5,500.00
OBIS_40839	170	Fox River Bridge	SH6	23/01/2017	F4 - Abrasion	Minor abrasion of piles. Up to approx. 40mm reduction in diameter of piles.	Monitor	$20,000.00
OBIS_44088	1000	REEFTON SUSPENSION BRIDGE	SH6	12/09/2017	SS2 - Corrosion	Stainless steel bolts used through steel cable clamps. Potential for galvanic corrosion due to dissimilar metals in contact with one another. Monitor.	Monitor	$8,000.00
OBIS_44085	1000	REEFTON SUSPENSION BRIDGE	SH6	12/09/2017	SS2 - Corrosion	Corrosion on TR tower tie back cables. Monitor.	Monitor	$5,000.00
OBIS_44086	1000	REEFTON SUSPENSION BRIDGE	SH6	12/09/2017	SS2 - Corrosion	Pitting corrosion of hanger rods and barrier posts. Monitor.	Monitor	$10,000.00
OBIS_44087	1000	REEFTON SUSPENSION BRIDGE	SH6	12/09/2017	SS4 - Rivets or bolts	Hanger rods wearing through cable clamps. Monitor.	Monitor	$10,000.00
OBIS_40841	170	Fox River Bridge	SH6	23/01/2017	F5 - Corrosion of steel	Moderate corrosion of steel bolts through piers.	Monitor	$20,000.00
OBIS_47954	79	SOMERVILLE BRIDGE No 1	SOMERVILLE RD	13/08/2018	F1 - Settlement	Minor Settlement at abut a approach. Monitor	Monitor	$15,000.00
OBIS_47957	81	THOMPSON ARMCO CULVERT	SOMERVILLE RD	13/08/2018	F4 - Abrasion	Minor abrasion on concrete floor. Monitor	Monitor	$12,000.00
OBIS_44078	175	LANDCORP STOCK UNDERPASS	SOMERVILLE RD	12/09/2017	F1 - Settlement	Gap opening up between units through the centre. This may result in loss of gravel fines from cover fill above through gap. May have been like this since construction. Monitor.	Monitor	$4,000.00
OBIS_50020	47	SCOTTS BRIDGE	STEPHEN RD	19/09/2018	G8 - Expansion joints	All joints leaking at piers and occasional longitudinal joint leaks. Keep carriageway sealed and seal external edges of joints. Monitor HDCUs for longitudinal shearing, heavy vehicle by pass. 2018 same.	Monitor	$8,000.00
OBIS_50022	47	SCOTTS BRIDGE	STEPHEN RD	19/09/2014	F2 - Cracking	Vertical hairline cracking centrally in hammerhead pier faces as indicated in notes. 2018 same.	Monitor	$8,000.00
OBIS_50023	47	SCOTTS BRIDGE	STEPHEN RD	19/09/2014	F3 - Spalling	vaious minor spalls in HDCUs likely installation no strands exposed. 2018 same.	Monitor	$5,000.00
OBIS_48149	56	VIRGIN FLAT BRIDGE	VIRGIN FLAT RD	28/08/2018	- Deck	Some end decay in deck planks. Monitor	Monitor	$2,000.00
OBIS_48171	48	LOWES BRIDGE	WATERWORKS RD	28/08/2018	W3 - Erosion of piers	Piles at pier exposed approx 200mm. Monitor.	Monitor	$1,000.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_49764	111	BLACKADDER BRIDGE NO.1	WESTBANK RD	21/08/2018	SC1 - Cracking	Very fine longitudinal cracking in hollow core units	Monitor	$40,000.00
Sub Total								$969,950.00

Total Estimate

$2,589,650.00

Priority Definitions

Priority	Timing
Urgent	Complete within 3 months
High	Complete within 1 year
Medium	Complete within 2 years
Low	Complete within 5 years or as resources allow
Monitor	N/A

114D - Guardrail Maintenance

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
High								
OBIS_48144	52	LAGOON CREEK BRIDGE	ALMA RD	28/08/2018	G10 - Handrail or guardrail	Loose terminal end cables all	High	$200.00
OBIS_48017	93	BOATMANS CREEK BRIDGE	BLAIRS RD	21/08/2018	G10 - Handrail or guardrail	Kerb blocks cracking up, widespread	High	$2,000.00
OBIS_48020	94	ITALIAN CREEK BRIDGE	BLAIRS RD	21/08/2018	G10 - Handrail or guardrail	Significant kerb block and guardrail damage at upstream abut b and tombstone end, also at downstream guardrail abutment a	High	$12,000.00
OBIS_48154	20	BLUE DUCK CREEK BRIDGE NO.1	BLUE DUCK CREEK RD	28/08/2018	G10 - Handrail or guardrail	Broken terminal end post loose cables south end	High	$150.00
OBIS_48044	100	CAMP CREEK BRIDGE	BROWN CREEK RD	22/08/2018	G10 - Handrail or guardrail	BCT cables loose tighten	High	$1,000.00
OBIS_48047	101	ROUGH CREEK BRIDGE	BROWN CREEK RD	22/08/2018	G10 - Handrail or guardrail	Guardrail post mounting nuts various partly or completely corroded. Widespread issue install new nuts prepare and paint threads!	High	$12,000.00
OBIS_47940	76	ROUGH & TUMBLE BRIDGE	BURTONS RD	13/08/2018	G10 - Handrail or guardrail	Impact damage to both guard rails. Upright posts bent, approximately half bridge requires repair	High	$6,000.00
OBIS_48221	146	CULVERT 2472	CONNS CREEK RD	29/08/2018	G10 - Handrail or guardrail	Restrict traffic away from downstream railway section by narrowing kerb and site rails. Kerb also needs repair.	High	$800.00
OBIS_41292	178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD	06/05/2017	G10 - Handrail or guardrail	Clean guardrail when attending to deck drainage.	High	$350.00
OBIS_48038	91	FERNDALE BRIDGE NO.1	FERNDALE RD	22/08/2018	G10 - Handrail or guardrail	Impact damage to upstream abutment a approach guardrail. Also all terminal end cables are loose	High	$600.00
OBIS_48035	90	FERNDALE BRIDGE NO.2	FERNDALE RD	22/08/2018	G10 - Handrail or guardrail	Kerb is completely gone from impact damage	High	$8,000.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_48033	87	BURKES CREEK BRIDGE NO.1	GANNONS RD	22/08/2018	G10 - Handrail or guardrail	Loose terminal end cables - all	High	$150.00
OBIS_48157	24	TIDAL CREEK BRIDGE	GLASSEYE RD	28/08/2018	G10 - Handrail or guardrail	Handrail c section corroded heavily poor design for corrosion resistance. Consider using pipe top rail c section is not durable in this location.	High	$6,500.00
OBIS_48199	122	SANDEL CREEK CULVERT	KARAMEA HIGHWAY	29/08/2018	G10 - Handrail or guardrail	Loose BCT Cables tighten	High	$100.00
OBIS_9401	124	FALLS CREEK CULVERT	KARAMEA HIGHWAY	04/09/2014	G10 - Handrail or guardrail	Sight rail on downstream TR side of culvert is hanging in mid air due to ground slumping. Recommend reinstating sight rail.2018 huge drop out here still hanging. Recomend installing gr system for safety upgrade.	High	$20,000.00
OBIS_48054	82	MAI MAI BRIDGE	MAI MAI RD	22/08/2018	G10 - Handrail or guardrail	Terminal end cables loose	High	$120.00
OBIS_9333	83	FAIRBRASS BRIDGE	MAI MAI RD	11/09/2014	G10 - Handrail or guardrail	Terminal end cables loose. 2018 same	High	$150.00
OBIS_48057	85	DIRTY MARY BRIDGE NO.2	MAI MAI RD	22/08/2018	G10 - Handrail or guardrail	Upstream guardrail impact damaged whole length. Loose terminal end cables, tighten	High	$7,500.00
OBIS_9441	163	BREAK CREEK NO 6	McCALLUMS MILL ROAD	04/09/2014	G10 - Handrail or guardrail	Replace broken timber kerbs on western approach. 2018 ongoing	High	$400.00
OBIS_41326	119	UPPER GREY RIVER BRIDGE	PALMERS RD	06/05/2017	G10 - Handrail or guardrail	Broken kerb on upstream side of bridge at Abutment D end of bridge requires repair.	High	$3,000.00
OBIS_41335	117	BROWN GREY BRIDGE	PALMERS RD	06/05/2017	G10 - Handrail or guardrail	Corroded fixings on underside of kerb require replacement.	High	$2,500.00
OBIS_9479	168A	FLETCHERS BRIDGE	PERSERVERENCE ROAD	10/09/2014	G10 - Handrail or guardrail	Reattach guardrail post (as for SC2)	High	$500.00
OBIS_47914	69	STAIRCASE BRIDGE	SNOWY RD	13/08/2018	G10 - Handrail or guardrail	Impact damage to concrete kerbs. Abut a upstream side, and centre downstream side.	High	$2,000.00
OBIS_9323	79	SOMERVILLE BRIDGE No 1	SOMERVILLE RD	12/09/2014	G10 - Handrail or guardrail	Check and tighten terminal end cables. 2018 same	High	$150.00
OBIS_44298	107	MAIRS BRIDGE	WESTBANK RD	07/09/2017	G10 - Handrail or guardrail	Impact damage to barrier at each end of bridge. Steel repairs to pipe rails required.	High	$1,500.00
OBIS_47986	110	PADDY GOURLEYS BRIDGE	WESTBANK RD	21/08/2018	G10 - Handrail or guardrail	Tighten terminal end cables	High	$200.00
Sub Total								$87,870.00
Medium								
OBIS_9288	52	LAGOON CREEK BRIDGE	ALMA RD	09/09/2014	G10 - Handrail or guardrail	Widepread corrosion to top gap on handrail.early stages spot blast or mechanical removal and treat with zinc rich paint. 2018 same	Medium	$500.00
OBIS_48123	14	ELFORDS CREEK BRIDGE NO.1	ARAPITO RD	27/08/2018	G10 - Handrail or guardrail	Light isolated corrosion on guardrail. Monitor	Medium	$750.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_48066	8	BAKERS CREEK BRIDGE NO.2	BAKER CREEK RD	27/08/2018	G10 - Handrail or guardrail	Guardrail post fixings heavily corroded section loss. Post mounting plates also affected. Replace nuts prep and paint plates.	Medium	$3,500.00
OBIS_9354	99	BROWN CREEK BRIDGE	BROWN CREEK RD	10/09/2014	W2 - Erosion of abutments	Kerb damage U/S and D/S. reinstate. 2018 same	Medium	$3,500.00
OBIS_9264	41	MANNS BRIDGE	CAINS RD	05/09/2014	G10 - Handrail or guardrail	Isolated heavy corrosion to handrail pipes. Light corrosion on posts (paint). Replace pipes. 2018 same	Medium	$5,000.00
OBIS_9342	90	FERNDALE BRIDGE NO.2	FERNDALE RD	10/09/2014	G10 - Handrail or guardrail	Kerbs all damaged - replace. U/S kerb connection bolt broken out of PC deck unit	Medium	$5,000.00
OBIS_48138	16	BLACKWATER DRAIN	GRANITE CREEK RD	28/08/2018	G10 - Handrail or guardrail	Handrail post west downstream end impacted isolated corrosion. Repair post and treat corrosion	Medium	$450.00
OBIS_9223	17B	GRANITE CREEK BRIDGE NO 2	GRANITE CREEK RD	03/09/2014	G10 - Handrail or guardrail	Corrosion handrail post nuts (replace) minor corrosion in posts (starting). Pipes ok - paint. 2018 appear to have been replaced however rusting again treat gr post plates as well. Seek coating advice	Medium	$2,500.00
OBIS_9219	17	GRANITE CREEK BRIDGE NO.1	GRANITE CREEK RD	03/09/2014	G10 - Handrail or guardrail	Widespread corrosion on handrail posts, pipes look ok, replace post base nut with galv nuts and paint. Advancing to pitting rust 2018	Medium	$5,000.00
OBIS_9416	130	LITTLE WANGANUI BRIDGE	KARAMEA HIGHWAY	03/09/2014	ST5 - Other defects	Kerb timber broken north end upstream - replace	Medium	$350.00
OBIS_9351	96	LITTLE LANDING CREEK BRIDGE	LANDING CREEK RD	10/09/2014	G10 - Handrail or guardrail	guardrail post block outs rotated or smashed, impact damage to rails. Rotate and nail. replace w section. 3 areas of impacted rail on bridge. Block outs replaced still non compliant round guardrail posts. 2018 same.	Medium	$1,500.00
OBIS_48052	103	MCDONALDS BRIDGE	MCDONALDS RD	22/08/2018	G10 - Handrail or guardrail	Guardrail block outs rotated	Medium	$250.00
OBIS_9477	39	Mine Creek No 1	MILLERTON TK (STOCKTON RD)	05/09/2014	SC4 - Other defects	Investigate and repair damage at base of guardrail post.	Medium	$300.00
OBIS_47967	62A	New Creek Road Half Bridge	NEW CREEK ROAD	14/08/2018	G10 - Handrail or guardrail	Damaged guardrail 2 sections	Medium	$600.00
OBIS_9304	63	PENSINI BRIDGE	PENSINI RD	10/09/2014	G10 - Handrail or guardrail	Guard rail terminal ends too low at north end- possibly due to silt build up. Upstream true right approach bct impacted. Consider retaining shoulder edge fill under guardrail.	Medium	$3,000.00
OBIS_9443	168	Perseverance Bridge	PERSERVERENCE ROAD	10/09/2014	G10 - Handrail or guardrail	Straighten and nail in place guardrail / post blockouts. 2018 decay in many guardrail block outs will require replacement	Medium	$1,500.00
OBIS_9311	69	STAIRCASE BRIDGE	SNOWY RD	12/09/2014	SC4 - Other defects	1x Broken kerb unit U/S true right	Medium	$650.00
OBIS_9374	110	PADDY GOURLEYS BRIDGE	WESTBANK RD	11/09/2014	G10 - Handrail or guardrail	Impact damage to guardrail D/S	Medium	$1,200.00
Sub Total								$35,550.00
Low								
OBIS_48118	13	JORDANS CREEK BRIDGE	ARAPITO RD	28/08/2018	G10 - Handrail or guardrail	Isolated moderate rust corrosion on fixings and bearing plates of handrail . Spot paint	Low	$850.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_9207	8	BAKERS CREEK BRIDGE NO.2	BAKER CREEK RD	03/09/2014	G10 - Handrail or guardrail	Kerb damage (impact) U/S side unit 6 2018 x2 sevicable	Low	$750.00
OBIS_9366	104	BULLER CAMP BRIDGE	BULLER RAILWAY RD (SOUTH)	10/09/2014	G10 - Handrail or guardrail	Minor corrosion to pipe connections at posts. Same (2017).	Low	$750.00
OBIS_9237	26	SAWYERS CREEK BRIDGE	DE MALMANCHES RD	04/09/2014	G10 - Handrail or guardrail	Monitor light corrosion on handrail capping. Advancing 3-5years replace	Low	$5,500.00
OBIS_51450	87	BURKES CREEK BRIDGE NO.1	GANNONS RD	17/12/2018	G10 - Handrail or guardrail	Bolt missing from guardrail post.	Low	$2,000.00
OBIS_9295	59	LITTLE TOTARA BRIDGE	HANDS RD	09/09/2014	G10 - Handrail or guardrail	Early signs of corrosion on nuts/handrail post bases. Handrail pipes- areas of heavy corrosion 5% (Spot treatment required). 2018 same	Low	$2,500.00
OBIS_9428	134	KARAMEA BRIDGE	KARAMEA HIGHWAY	04/09/2014	G10 - Handrail or guardrail	Guardrail blockouts rotated - straighten and fix in place.	Low	$150.00
OBIS_48112	5	OPARARA BRIDGE	KOHAIHAI	27/08/2018	G10 - Handrail or guardrail	Minor corrosion of handrails on West side of structure.	Low	$8,000.00
OBIS_9390	117	BROWN GREY BRIDGE	PALMERS RD	11/09/2014	G10 - Handrail or guardrail	Handrail paintwork 2/10	Low	$1,200.00
OBIS_51496	62	NEW CREEK BRIDGE	PENSINI RD	19/12/2018	22 - Guardrail / handrail / safety fences	Kerb block is not sufficient for edge protection. Consider installing site rail or guardrail.	Low	$10,000.00
OBIS_9314	73	BLACKWATER BRIDGE NO.1	WAIUTA RD	12/09/2014	G10 - Handrail or guardrail	Paint handrail within 2 years. 2018 same	Low	$1,200.00
OBIS_47935	75	BLACKWATER CREEK NO.2	WAIUTA RD	13/08/2018	G10 - Handrail or guardrail	Paint guardrail within 2 years. Possible to key in with Blackwater no 1 bridge	Low	$2,500.00
Sub Total								$35,400.00
Monitor								
OBIS_48941	65	MIRFINS BRIDGE	ATARAU RD	20/09/2018	G10 - Handrail or guardrail	red rust corrosion on galv capping rails. replace 5-7 years	Monitor	$55,000.00
OBIS_48168	55	BRADSHAWS CREEK BRIDGE NO.2	BRADSHAWS RD	28/08/2018	G10 - Handrail or guardrail	Centre guardrail on downstream side slightly damaged and concrete chipped. Monitor and consider repair with other guardrail works	Monitor	$500.00
OBIS_9235	25	STILLWATER CREEK BRIDGE	DE MALMANCHES RD	04/09/2014	G10 - Handrail or guardrail	Handrail pipes isolated light corrosion- post and HD bolts good	Monitor	$1,500.00
OBIS_51500	123	SURVEYORS CREEK BRIDGE	KARAMEA HIGHWAY	19/12/2018	22 - Guardrail / handrail / safety fences	Early stage of corrosion on guardrail.	Monitor	$300.00
OBIS_48475	134	KARAMEA BRIDGE	KARAMEA HIGHWAY	17/09/2018	G10 - Handrail or guardrail	Corrosion on Guardrail fixings under soffit, expect replacement in 7-10 years	Monitor	$50,000.00
OBIS_9284	51	WILLIAMS BRIDGE	NINE MILE RD	09/09/2014	G10 - Handrail or guardrail	Minor corrosion on handrail posts. 2018 same	Monitor	$2,000.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
Sub Total								$109,300.00

Total Estimate

$268,120.00

Buller District Council
STRUCTURE REPAIR SCHEDULES

Priority Definitions

Priority	Timing
Urgent	Complete within 3 months
High	Complete within 1 year
Medium	Complete within 2 years
Low	Complete within 5 years or as resources allow
Monitor	N/A

I - Further Investigation Required

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
Urgent								
OBIS_44296	1001	BLACKS POINT SUSPENSION BRIDGE	Auld Street	12/10/2017	G10 - Handrail or guardrail	Barrier height varies from 840-880mm high above deck level. Current version of NZ Outdoor Visitor Structures Standard (SNZHB8630:2004) requires a barrier height of 1100mm. The New Zealand Building Code (NZBC D1) also requires 1100mm in this location. Previous versions of the NZ Building Code around when this bridge was refurbished likely required 900-1000mm. Recommend further investigation into required barrier height across suspension bridge	Urgent	$20,000.00
OBIS_41318	176	O'CONNOR TRAIN WAGON CHASSIS	O'CONNER ROAD	07/05/2017	F6 - Decay	Recomend drilling investigation of abutment piles and caps (suspect!). Whitespot decay evident on Pile #1 at Abutment B.	Urgent	$2,500.00
OBIS_41320	176	O'CONNOR TRAIN WAGON CHASSIS	O'CONNER ROAD	07/05/2017	SS2 - Corrosion	Heavy widespread flaking rust and section loss through out rail chassis structure below. Small section steel members spanning a considerable distance. Recommend completing a load assessment to verify Class 1 loading capacity if this has not already been completed. Bridge will likely require posting for reduced loading.	Urgent	$2,500.00
OBIS_41341	117	BROWN GREY BRIDGE	PALMERS RD	06/05/2017	SS5 - Other defects	Bridge has been widened at some stage and solid blocking between beams has been removed. Recommend PWL assessment to review restraint to beams and capacity of bridge. Bridge to be posted accordingly.	Urgent	$2,500.00
OBIS_40838	170	Fox River Bridge	SH6	23/01/2017	F6 - Decay	Piles show evidence of insect / worm attack near water line. Possible Teredo Worm attack. Extent of internal pile damage is unknown. Further investigation (drilling) is required to confirm extent of pile deterioration. Treatment of existing piles or replacement will be required.	Urgent	$2,500.00
OBIS_49999	70	ALEXANDER BRIDGE	SNOWY RD	19/09/2018	G3 - Special approach signs	Confirm if the bridge has been posted correctly. Should be posted to Class 1 with 10km/hr for Heavy Vehicles.	Urgent	$250.00
Sub Total								$30,250.00
High								

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_9352	98	COAL CREEK BRIDGE	BROWN CREEK RD	10/09/2014	G7 - HD bolts and linkages	No apparent HD bolt at south end - there is a linkage rod in place. Appears that the span has impacted to the south and has broken wingwall away from abutment backwall. 2018 still the same abutment may have rotated little change	High	$2,500.00
OBIS_48110	5	OPARARA BRIDGE	KOHAIHAI	27/08/2018	G7 - HD bolts and linkages	X4 bearing plate linkages missing from both sides of bridge	High	$12,000.00
OBIS_9275	45	CHRISTMAS BRIDGE	POWERHOUSE RD (FAIRDOWN)	05/09/2014	ST6 - Date of last boring	Confirm whether this bridge has had drilling and PWL assessment.	High	$6,000.00
OBIS_44080	1000	REEFTON SUSPENSION BRIDGE	SH6	12/09/2017	G10 - Handrail or guardrail	Barrier height varies from 940-980mm high above deck level. Current version of NZ Outdoor Visitor Structures Standard (SNZHB8630:2004) requires a barrier height of 1100mm. The New Zealand Building Code (NZBC D1) also requires 1100mm in this location. Previous versions of the NZ Building Code around when this bridge was refurbished likely required 900-1000mm. Recommend further investigation into required barrier height across suspension bridge.	High	$20,000.00
OBIS_9276	46	DEADMANS CREEK BRIDGE	UTOPIA RD (WESTPORT)	10/09/2014	W3 - Erosion of piers	Centre pier piles under pile cap showing. 700mm out of bed level. 4x square concrete piles. investigate pile lengths with drawings. monitor. 2018 appears worse, now 1.5m exposed	High	$8,000.00
Sub Total								$48,500.00
Medium								
OBIS_51449	94	ITALIAN CREEK BRIDGE	BLAIRS RD	17/12/2018	G1 - Appearance	There is a rubber mat across the width of the bridge. Investigate purpose of mat and remove as it may be a hazard to traffic.	Medium	$100.00
OBIS_48016	92	REDMONDS CREEK BRIDGE	BOATMANS RD	21/08/2018	G2 - Approach adequacy	Deck surfacing ~200mm. Rip and remake so thickness < 50mm, or assess bridge for additional dead load.	Medium	$4,000.00
OBIS_9508	92	REDMONDS CREEK BRIDGE	BOATMANS RD	10/10/2014	SS5 - Other defects	Hooked bars to connect deck to beams have very little anchorage to top flange of beam. Recommend checking design drawings (if any) to confirm intent of these connectors.	Medium	$1,000.00
OBIS_49995	98	COAL CREEK BRIDGE	BROWN CREEK RD	17/09/2014	G6 - Bearings	mortar pad damage at central pier B. appears to be chamfers only. see photos and drawings	Medium	$15,000.00
OBIS_9504	61	BULLOCK CREEK BRIDGE	BULLOCK CREEK RD	09/09/2014	F6 - Decay	Original timber pier - recommend drilling. 2018 same	Medium	$4,000.00
OBIS_48181	61	BULLOCK CREEK BRIDGE	BULLOCK CREEK RD	29/08/2018	W3 - Erosion of piers	Piles at abutment a are exposed approximately 1m above original bed level. Pile length should be investigated and length above ground should be coated appropriately.	Medium	$4,000.00
OBIS_9513	96	LITTLE LANDING CREEK BRIDGE	LANDING CREEK RD	01/10/2014	W2 - Erosion of abutments	monitor abutment scour. No change check if piled. Monitor and underpin when if required. 2018 same.	Medium	$5,000.00
OBIS_9335	84	DIRTY MARY BRIDGE NO.1	MAI MAI RD	11/09/2014	SC4 - Other defects	Monitor precast slab movement, units may be moving causing cracks in joints. (may be flexing as trucks pass over) Water tracking through cracks in deck seal. COL POR joints and seal or apply flexible sealandt to joints.	Medium	$4,000.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_41305	177	MOKIHINUI PEDESTRIAN BRIDGE	MOKIHINUI ROAD	07/05/2017	G2 - Approach adequacy	Consider installing retaining boards and fill to reduce trip hazards at south approach.	Medium	$350.00
OBIS_9446	168	Perseverance Bridge	PERSERVERENCE ROAD	10/09/2014	W3 - Erosion of piers	Erosion around piers B and C. Recommend reviewing design of piers and investigating need for protecting against scour.	Medium	$5,000.00
OBIS_9313	71	MCVICARS BRIDGE	SNOWY RD	12/09/2014	W2 - Erosion of abutments	Rock stack abutment toes - starting to erode. re-instate ongoing. could be done periodically by hand.2018 same, investigate if piled or pad footing.	Medium	$5,000.00
Sub Total								$47,450.00
Low								
OBIS_9470	41	MANNS BRIDGE	CAINS RD	24/09/2014	G1 - Appearance	areas of spalling under deck centre.particularly bad at joint between pc deck units in bridge centre. could be movement related. 2018 same.	Low	$10,000.00
OBIS_9407	126	LAKE CREEK CULVERT	KARAMEA HIGHWAY	04/09/2014	W2 - Erosion of abutments	Monitor scour at outlet. Consider placing rock to protect against scour. 2018 same walls foundered on solid rock	Low	$2,000.00
OBIS_41331	119	UPPER GREY RIVER BRIDGE	PALMERS RD	06/05/2017	F7 - Date of last boring	Hardwood components drilled. Early decay typically observed in piles. MONITOR. Next drilling 2023.	Low	$5,000.00
OBIS_44301	107	MAIRS BRIDGE	WESTBANK RD	07/09/2017	F7 - Date of last boring	Piers drilled September 2017. Next Drilling 2021.	Low	$5,000.00
Sub Total								$22,000.00
Monitor								
OBIS_9359	101	ROUGH CREEK BRIDGE	BROWN CREEK RD	10/09/2014	F1 - Settlement	Minor settlement crack at north abutment across road 1m from abutment wall. 2018 same	Monitor	$2,500.00
OBIS_41345	104	BULLER CAMP BRIDGE	BULLER RAILWAY RD (SOUTH)	06/05/2017	F7 - Date of last boring	Bored 2017. Next boring 2023. ST6 Same.	Monitor	$1,500.00
OBIS_41353	29	CHASM CREEK BRIDGE NO.3	CHARMING CREEK RD	07/05/2017	ST6 - Date of last boring	Drilled 2017. Next drilling 2023.	Monitor	$1,500.00
OBIS_41350	30	CHARMING CREEK BRIDGE	CHARMING CREEK RD	07/05/2017	F7 - Date of last boring	Drilled 2017. Next drilling 2023.	Monitor	$1,500.00
OBIS_9296	59	LITTLE TOTARA BRIDGE	HANDS RD	09/09/2014	W3 - Erosion of piers	Monitor pier scour under pile cap approx 1.2m now on Pier D. investigate pile length. 2018 now 1.5m at piers c and d, and part of pier b. Investigate pile length.	Monitor	$50,000.00

Work ID	Structure No	Structure Name	Road Name	Date Insp	Ref	Comments	Priority	Cost Estimate
OBIS_9198	4	BREAK CREEK BRIDGE	KOHAIHAI	02/09/2014	G1 - Appearance	Cracking in Precast units ends above piers	Monitor	$20,000.00
OBIS_9385	116	WOOLLEY CREEK BRIDGE	WOOLLEY CREEK RD	11/09/2014	F3 - Spalling	Constuction joint at piers allowing water to track down rough joint - could lead to future spalling. May require concrete repairs and installation of deck joints to protect pier caps.	Monitor	$20,000.00
Sub Total								$97,000.00

Total Estimate

$245,200.00

Appendix C

Bridge Valuations

BULLER
DISTRICT COUNCIL

wsp | OPUS

Structure ID	Structure Name	Road Name	Structure Type	Replacement Cost	Year Constr	Assess Remain Life	Age	Base Life	RUL (yrs)	ODRC	Annual St Line Depr
52	LAGOON CREEK BRIDGE	ALMA RD	Bridge	$179,568.00	1988	69	31	100	65	$122,862.00	$1,890.00
12	GILBANK CREEK BRIDGE	ARAPITO RD	Culvert	$144,000.00	1991	68	28	100	68	$103,074.00	$1,516.00
13	JORDANS CREEK BRIDGE	ARAPITO RD	Bridge	$326,340.00	1972	45	47	95	36	$143,271.00	$3,980.00
14	ELFORDS CREEK BRIDGE NO.1	ARAPITO RD	Bridge	$278,400.00	1980	30	39	80	26	$113,100.00	$4,350.00
15	OFFICE CREEK BRIDGE	ARAPITO RD	Culvert	$48,000.00	1950	20	69	100	20	$10,909.00	$545.00
13A	KELLY CREEK	ARAPITO RD	Bridge	$83,520.00	1960	4	59	80	4	$5,388.00	$1,347.00
65	MIRFINS BRIDGE	ATARAU RD	Bridge	$1,506,505.00	1985	70	34	100	66	$1,004,337.00	$15,217.00
1001	BLACKS POINT SUSPENSION BRIDGE	Auld Street	Footbridge	$220,414.00							
18	DEANS CREEK ARMCO CULVERT	BACK RD (KONGAHU)	Culvert	$86,400.00	1982	13	37	50	11	$20,221.00	$1,838.00
19	BLACKWATER CREEK CULVERT NO.1	BACK RD (KONGAHU)	Culvert	$105,600.00	1984	10	35	50	10	$24,000.00	$2,400.00
8	BAKERS CREEK BRIDGE NO.2	BAKER CREEK RD	Bridge	$162,864.00	1962	12	57	95	14	$32,573.00	$2,327.00
11	BAKERS CREEK NO 3	BAKER CREEK RD	Bridge	$135,720.00	1980	32	39	80	31	$60,976.00	$1,967.00
43	VEALES STOCK UNDERPASS	BEACH RD (FAIRDOWN)	Culvert	$105,600.00	1995	31	24	60	27	$57,024.00	$2,112.00
44	WET LEAD CULVERT	BEACH RD (FAIRDOWN)	Culvert	$93,600.00	1983	50	36	100	46	$53,156.00	$1,156.00
169	HAMPTONS ROCK	BEACH RD (FAIRDOWN)	Footbridge	$18,818.00		5		100	72	$18,818.00	$261.00
93	BOATMANS CREEK BRIDGE	BLAIRS RD	Bridge	$330,750.00	1962	40	57	95	30	$115,378.00	$3,846.00
94	ITALIAN CREEK BRIDGE	BLAIRS RD	Bridge	$132,240.00	1964	40	55	95	36	$52,896.00	$1,469.00
95	RAGLANS CREEK BRIDGE	BLAIRS RD	Bridge	$115,884.00	1964	60	55	100	37	$47,118.00	$1,273.00
20	BLUE DUCK CREEK BRIDGE NO.1	BLUE DUCK CREEK RD	Bridge	$309,876.00	1988	40	31	80	39	$175,147.00	$4,491.00

Structure ID	Structure Name	Road Name	Structure Type	Replacement Cost	Year Constr	Assess Remain Life	Age	Base Life	RUL (yrs)	ODRC	Annual St Line Depr
92	REDMONDS CREEK BRIDGE	BOATMANS RD	Bridge	$83,520.00	1970	40	49	95	43	$39,465.00	$918.00
106	BOUNDARY BRIDGE	BOUNDARY RD	Bridge	$913,066.00	1938	20	81	100	6	$63,702.00	$10,617.00
55	BRADSHAWS CREEK BRIDGE NO.2	BRADSHAWS RD	Culvert	$108,000.00	2004	42	15	60	38	$78,923.00	$2,077.00
182	BEACHSIDE ESTATE MARINE PARADE RD	BRADSHAWS RD	Culvert	$57,600.00	2010	79	9	60	42	$48,384.00	$1,152.00
98	COAL CREEK BRIDGE	BROWN CREEK RD	Bridge	$716,870.00	1967	43	52	95	39	$310,644.00	$7,965.00
99	BROWN CREEK BRIDGE	BROWN CREEK RD	Bridge	$374,850.00	1965	40	54	95	38	$156,531.00	$4,119.00
100	CAMP CREEK BRIDGE	BROWN CREEK RD	Bridge	$146,160.00	1985	68	34	100	66	$97,440.00	$1,476.00
101	ROUGH CREEK BRIDGE	BROWN CREEK RD	Bridge	$435,708.00	1970	45	49	95	43	$205,884.00	$4,788.00
54	BRUNINGS BRIDGE	BRUNINGS RD	Bridge	$256,824.00	1984	60	35	100	56	$159,802.00	$2,854.00
104	BULLER CAMP BRIDGE	BULLER RAILWAY RD (SOUTH)	Bridge	$73,080.00	1940	0	79	70	-2		
61	BULLOCK CREEK BRIDGE	BULLOCK CREEK RD	Bridge	$265,350.00	1968	19	51	75	15	$61,235.00	$4,082.00
89	BURKES CREEK NO.2	BURKES CREEK RD	Culvert	$72,000.00	2003	50	16	60	44	$53,695.00	$1,220.00
76	ROUGH & TUMBLE BRIDGE	BURTONS RD	Bridge	$271,950.00	1963	40	56	95	36	$107,585.00	$2,988.00
77	BURTONS CULVERT NO.1	BURTONS RD	Culvert	$60,000.00	2000	50	19	60	40	$41,379.00	$1,034.00
78	BURTONS CULVERT NO.2	BURTONS RD	Culvert	$158,400.00	1992	80	27	50	22	$72,600.00	$3,300.00
41	MANNS BRIDGE	CAINS RD	Bridge	$370,272.00	1966	25	53	95	21	$106,517.00	$5,072.00
36	MILLER STREAM ARCH	CALLIOPE STREET	Culvert	$144,000.00	1968	56	51	100	52	$73,412.00	$1,412.00
34	GRANITY ARCH	CALLIOPE STREET	Culvert	$144,000.00	1952	24	67	100	20	$33,488.00	$1,674.00
28	CHASM CREEK BRIDGE NO.2	CHARMING CREEK RD	Bridge	$302,412.00	1965	26	54	80	22	$88,708.00	$4,032.00
29	CHASM CREEK BRIDGE NO.3	CHARMING CREEK RD	Bridge	$42,804.00	1960	9	59	70	5	$3,397.00	$679.00
30	CHARMING CREEK BRIDGE	CHARMING CREEK RD	Bridge	$42,804.00	1960	1	59	70	5	$3,397.00	$679.00
42	SYRONS CULVERT	COLLINS RD	Culvert	$57,600.00	1984	22	35	60	18	$19,938.00	$1,108.00
146	CULVERT 2472	CONNS CREEK RD	Bridge	$41,760.00	1940	0	79	80	-3		
178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD	Bridge	$466,671.00	2000	25	19		-18		
25	STILLWATER CREEK BRIDGE	DE MALMANCHES RD	Bridge	$440,560.00	1982	60	37	100	56	$268,166.00	$4,789.00
26	SAWYERS CREEK BRIDGE	DE MALMANCHES RD	Bridge	$187,572.00	1990	63	29	100	59	$127,204.00	$2,156.00

Structure ID	Structure Name	Road Name	Structure Type	Replacement Cost	Year Constr	Assess Remain Life	Age	Base Life	RUL (yrs)	ODRC	Annual St Line Depr
32	WATSON CREEK	DOMAIN RD (GRANITY)	Culvert	$57,600.00	1980	18	39	60	14	$15,508.00	$1,108.00
91	FERNDALE BRIDGE NO.1	FERNDALE RD	Bridge	$194,532.00	1992	70	27	100	73	$143,443.00	$1,965.00
90	FERNDALE BRIDGE NO.2	FERNDALE RD	Bridge	$104,122.00	1975	40	44	95	41	$50,821.00	$1,240.00
87	BURKES CREEK BRIDGE NO.1	GANNONS RD	Bridge	$91,280.00	1950	20	69	100	27	$25,943.00	$961.00
88	GANNONS BRIDGE	GANNONS RD	Bridge	$481,793.00	1960	40	59	95	34	$178,054.00	$5,237.00
24	TIDAL CREEK BRIDGE	GLASSEYE RD	Bridge	$317,520.00	1985	48	34	95	44	$181,440.00	$4,124.00
16	BLACKWATER DRAIN	GRANITE CREEK RD	Bridge	$187,746.00	1976	50	43	100	46	$98,140.00	$2,133.00
17	GRANITE CREEK BRIDGE NO.1	GRANITE CREEK RD	Bridge	$464,491.00	1974	48	45	100	44	$232,245.00	$5,278.00
17B	GRANITE CREEK BRIDGE NO 2	GRANITE CREEK RD	Bridge	$464,755.00	1971	42	48	100	38	$207,773.00	$5,468.00
59	LITTLE TOTARA BRIDGE	HANDS RD	Bridge	$529,352.00	1980	55	39	100	51	$303,336.00	$5,948.00
105	INWOODS BRIDGE	INWOOD RD	Bridge	$76,560.00	1985	63	34	95	59	$49,098.00	$832.00
121	TOBIN CREEK CULVERT	KARAMEA HIGHWAY	Culvert	$237,600.00	1956	10	63	50	6	$20,965.00	$3,494.00
122	SANDEL CREEK CULVERT	KARAMEA HIGHWAY	Culvert	$115,200.00	1969	37	50	90	33	$46,361.00	$1,405.00
123	SURVEYORS CREEK BRIDGE	KARAMEA HIGHWAY	Bridge	$1,336,440.00	1982	67	37	100	63	$850,462.00	$13,499.00
135	WHISKEY CREEK CULVERT	KARAMEA HIGHWAY	Culvert	$93,600.00	1966	34	53	90	30	$34,244.00	$1,141.00
124	FALLS CREEK CULVERT	KARAMEA HIGHWAY	Culvert	$54,000.00	1934	7	85	90	3	$1,862.00	$621.00
185	Corbyvale Stock Underpass	KARAMEA HIGHWAY	Other								
125	GLASSEYE CREEK	KARAMEA HIGHWAY	Bridge	$230,076.00	1953	30	66	100	27	$67,522.00	$2,501.00
126	LAKE CREEK CULVERT	KARAMEA HIGHWAY	Culvert	$108,000.00	1962	30	57	90	26	$34,244.00	$1,317.00
127	TIDAL CREEK NO.1	KARAMEA HIGHWAY	Bridge	$278,928.00	1950	22	69	100	18	$58,380.00	$3,243.00
128	TIDAL CREEK NO.2	KARAMEA HIGHWAY	Bridge	$391,608.00	1932	15	87	80	11	$44,409.00	$4,037.00
129	TIDAL CREEK NO.3	KARAMEA HIGHWAY	Bridge	$307,558.00	1951	28	68	100	19	$67,949.00	$3,576.00
130	LITTLE WANGANUI BRIDGE	KARAMEA HIGHWAY	Bridge	$670,799.00	1931	15	88	80	11	$75,294.00	$6,845.00
131	CALLARIS CREEK CULVERT	KARAMEA HIGHWAY	Culvert	$288,000.00	1969	32	50	90	28	$104,727.00	$3,740.00
131a	BLACKWATER CREEK CULVERT NO.2	KARAMEA HIGHWAY	Culvert	$172,800.00	1978	45	41	60	13	$42,385.00	$3,260.00
132	GRANITE CREEK BRIDGE	KARAMEA HIGHWAY	Bridge	$876,524.00	1949	16	70	100	12	$129,855.00	$10,821.00

Structure ID	Structure Name	Road Name	Structure Type	Replacement Cost	Year Constr	Assess Remain Life	Age	Base Life	RUL (yrs)	ODRC	Annual St Line Depr
133	MUSSONS CREEK CULVERT	KARAMEA HIGHWAY	Culvert	$86,400.00	1965	32	54	100	28	$29,867.00	$1,067.00
134	KARAMEA BRIDGE	KARAMEA HIGHWAY	Bridge	$2,968,312.00	1981	48	38	100	48	$1,676,223.00	$34,921.00
172	JONES STOCK UNDERPASS	KARAMEA HIGHWAY	Bridge		1950	50	69	100	31		
173	BJERRING STOCK UNDERPASS	KARAMEA HIGHWAY	Bridge		1980	50	39	100	64		
6	QUINLANS BRIDGE	KOHAIHAI	Bridge	$649,293.00	1988	84	31	100	58	$427,943.00	$7,378.00
5	OPARARA BRIDGE	KOHAIHAI	Bridge	$1,099,560.00	1961	21	58	95	21	$296,035.00	$14,097.00
4	BREAK CREEK BRIDGE	KOHAIHAI	Bridge	$591,675.00	1992	74	27	100	61	$414,853.00	$6,801.00
3	CANDLE CREEK BRIDGE	KOHAIHAI	Culvert	$64,800.00	1992	60	27	100	75	$48,119.00	$642.00
2	STONEY CREEK BRIDGE	KOHAIHAI	Culvert	$110,400.00	1992	56	27	100	64	$78,507.00	$1,227.00
1	MOSSEYBURN	KOHAIHAI	Bridge	$160,950.00	1962	30	57	95	26	$51,033.00	$1,963.00
96	LITTLE LANDING CREEK BRIDGE	LANDING CREEK RD	Bridge	$83,520.00	1980	60	39	100	61	$51,462.00	$844.00
31	BREWERY CREEK BRIDGE	LEWIS STREET	Bridge	$206,712.00	1988	30	31	100	26	$95,973.00	$3,691.00
82	MAI MAI BRIDGE	MAI MAI RD	Bridge	$427,415.00	1982	67	37	100	63	$271,991.00	$4,317.00
83	FAIRBRASS BRIDGE	MAI MAI RD	Bridge	$62,466.00	1975	52	44	95	48	$32,949.00	$686.00
84	DIRTY MARY BRIDGE NO.1	MAI MAI RD	Bridge	$114,179.00	1975	40	44	95	48	$60,226.00	$1,255.00
85	DIRTY MARY BRIDGE NO.2	MAI MAI RD	Bridge	$76,212.00	1976	40	43	95	49	$41,037.00	$837.00
86	JACKS CREEK BRIDGE	MAI MAI RD	Bridge	$190,008.00	1980	70	39	100	66	$120,582.00	$1,827.00
53	MARTINS CREEK BRIDGE NO.2	MARTINS CREEK RD	Bridge	$313,896.00	1985	61	34	100	57	$198,801.00	$3,488.00
159	BREAK CREEK No 2	McCALLUMS MILL ROAD	Culvert	$28,800.00	1970	1	49	90	1	$588.00	$588.00
160	BREAK CREEK No 3	McCALLUMS MILL ROAD	Culvert	$43,200.00	1975	39	44	90	39	$20,546.00	$527.00
161	BREAK CREEK NO 4	McCALLUMS MILL ROAD	Culvert	$64,800.00	1975	39	44	90	39	$30,820.00	$790.00
162	BREAK CREEK NO 5	McCALLUMS MILL ROAD	Culvert	$43,200.00	1975	2	44	90	-2		
163	BREAK CREEK NO 6	McCALLUMS MILL ROAD	Bridge	$175,496.00	1970	29	49	80	25	$60,102.00	$2,404.00
164	BREAK CREEK NO 7	McCALLUMS MILL ROAD	Culvert	$120,000.00	2004	41	15	60	41	$89,455.00	$2,182.00
165	McCALLUMS BRIDGE	McCALLUMS MILL ROAD	Bridge	$296,352.00	1970	30	49	75	26	$104,124.00	$4,005.00
103	MCDONALDS BRIDGE	MCDONALDS RD	Bridge	$248,472.00	1988	73	31	100	69	$173,177.00	$2,510.00

Structure ID	Structure Name	Road Name	Structure Type	Replacement Cost	Year Constr	Assess Remain Life	Age	Base Life	RUL (yrs)	ODRC	Annual St Line Depr
39	Mine Creek No 1	MILLERTON TK (STOCKTON RD)	Bridge	$96,466.00	1980	57	39	100	53	$56,183.00	$1,060.00
40	MINE CREEK BRIDGE NO.2	MILLERTON TK (STOCKTON RD)	Culvert	$156,000.00	1989	19	30	50	15	$53,182.00	$3,545.00
181	Millerton Culverts	MILLERTON TK (STOCKTON RD)	Culvert	$54,000.00	1970	42	49	100	38	$23,860.00	$628.00
158	CULVERT 2250	MILL ST (EAST)	Culvert	$144,000.00	1950	20	69	100	16	$27,429.00	$1,714.00
27	CHASM CREEK BRIDGE NO.1	MOKIHINUI ROAD	Bridge	$150,336.00	1948	24	71	100	20	$33,408.00	$1,670.00
180	Coal Creek	MOKIHINUI ROAD	Bridge	$175,392.00	1990	67	29	100	63	$121,425.00	$1,927.00
184	Burkes Creek Ford	MOKIHINUI ROAD	Other			100					
177	MOKIHINUI PEDESTRIAN BRIDGE	MOKIHINUI ROAD	Footbridge	$20,386.00		15		70	71	$20,386.00	$287.00
67	MOSSEY CREEK BRIDGE NO.2	MOSSEY RD	Bridge	$103,008.00	1980	57	39	100	53	$59,994.00	$1,132.00
38	McMillans Bridge	NANSEN STREET	Bridge	$90,188.00	1950	35	69	80	12	$13,529.00	$1,127.00
37	NAPIER STREET BRIDGE	NAPIER ST	Bridge	$137,982.00	1948	25	71	100	21	$31,842.00	$1,516.00
62A	New Creek Road Half Bridge	NEW CREEK ROAD	Other			45					
50	ARCHERS BRIDGE	NINE MILE RD	Bridge	$341,863.00	1963	40	56	95	27	$112,565.00	$4,169.00
51	WILLIAMS BRIDGE	NINE MILE RD	Bridge	$229,889.00	1977	45	42	95	41	$114,944.00	$2,804.00
183	O'Connor Home Stock Underpass	NINE MILE RD	Other		2018	100	1				
176	O'CONNOR TRAIN WAGON CHASSIS	O'CONNER ROAD	Bridge	$103,345.00		2					
7	BAKERS CREEK BRIDGE NO.1	OPARARA RD	Bridge	$215,208.00	1963	24	56	95	22	$61,488.00	$2,795.00
171	RHINDS STOCK UNDERPASS	OPARARA RD	Bridge		1980	46	39	100	66		
167A	Palmer Rd Culvert	PALMERS RD	Culvert	$51,840.00	1960	25	59	60	-3		
117	BROWN GREY BRIDGE	PALMERS RD	Bridge	$271,656.00	1950	7	69	75	3	$11,478.00	$3,826.00
118	PALMER BRIDGE	PALMERS RD	Bridge	$115,884.00	1993	80	26	100	69	$85,064.00	$1,233.00
119	UPPER GREY RIVER BRIDGE	PALMERS RD	Bridge	$269,730.00	1940		79	75	6	$19,266.00	$3,211.00
120	BLUE GREY RIVER	PALMERS RD	Bridge	$272,832.00	1950	10	69	80	6	$22,122.00	$3,687.00
62	NEW CREEK BRIDGE	PENSINI RD	Bridge	$277,830.00	1970	25	49	80	25	$95,147.00	$3,806.00
63	PENSINI BRIDGE	PENSINI RD	Bridge	$223,440.00	1970	40	49	95	38	$98,729.00	$2,598.00
168	Perseverance Bridge	PERSERVERENCE ROAD	Bridge	$1,466,080.00	1985	65	34	100	61	$951,392.00	$15,597.00

Structure ID	Structure Name	Road Name	Structure Type	Replacement Cost	Year Constr	Assess Remain Life	Age	Base Life	RUL (yrs)	ODRC	Annual St Line Depr
168A	FLETCHERS BRIDGE	PERSERVERENCE ROAD	Bridge	$168,780.00	1975	52	44	100	48	$89,027.00	$1,855.00
45	CHRISTMAS BRIDGE	POWERHOUSE RD (FAIRDOWN)	Bridge	$139,200.00	1970	19	49	75	15	$33,143.00	$2,210.00
170	Fox River Bridge	SH6	Footbridge		1929	0	90	70	-34		
1000	REEFTON SUSPENSION BRIDGE	SH6	Footbridge	$103,694.00				75	68	$103,695.00	$1,525.00
66	MOSSEY CREEK BRIDGE NO.1	SNOWY RD	Bridge	$168,084.00	1989	80	30	100	76	$121,661.00	$1,601.00
68	BROWNS CREEK BRIDGE	SNOWY RD	Bridge	$115,884.00	1975	55	44	95	51	$62,873.00	$1,233.00
70	ALEXANDER BRIDGE	SNOWY RD	Bridge	$172,886.00	1975	39	44	80	35	$77,577.00	$2,216.00
69	STAIRCASE BRIDGE	SNOWY RD	Bridge	$137,026.00	1975	55	44	95	51	$74,343.00	$1,458.00
71	MCVICARS BRIDGE	SNOWY RD	Bridge	$122,496.00	1985	70	34	100	66	$81,664.00	$1,237.00
49	SOAPWORKS BRIDGE	SOAPWORKS RD (EXCELSIOR RD)	Bridge	$518,674.00	1982	70	37	100	57	$317,897.00	$5,577.00
97	PROGRESS JUNCTION BRIDGE	SOLDIERS RD	Bridge	$87,696.00	1982	67	37	100	63	$55,807.00	$886.00
81	THOMPSON ARMCO CULVERT	SOMERVILLE RD	Culvert	$100,800.00	1985	40	34	50	15	$31,500.00	$2,100.00
79	SOMERVILLE BRIDGE No 1	SOMERVILLE RD	Bridge	$277,830.00	1982	67	37	100	63	$176,801.00	$2,806.00
80	SOMERVILLE BRIDGE NO.2	SOMERVILLE RD	Bridge	$412,336.00	1983	40	36	100	64	$266,560.00	$4,165.00
175	LANDCORP STOCK UNDERPASS	SOMERVILLE RD	Culvert	$54,886.00	1960		59	100	44	$23,676.00	$538.00
47	SCOTTS BRIDGE	STEPHEN RD	Bridge		1987		32	100	71		
102	SWAMP CREEK BRIDGE	SWAMP CREEK RD	Bridge	$321,930.00	1969	47	50	95	43	$150,467.00	$3,499.00
58	WALLS CREEK CULVERT	TAURANGA BAY RD	Culvert	$144,000.00	1987	25	32	60	21	$58,154.00	$2,769.00
46	DEADMANS CREEK BRIDGE	UTOPIA RD (WESTPORT)	Bridge	$282,240.00	1986	59	33	100	55	$178,428.00	$3,244.00
174	CLEINE STOCK UNDERPASS	UTOPIA RD (WESTPORT)	Culvert	$156,816.00	2008		11		-10		
56	VIRGIN FLAT BRIDGE	VIRGIN FLAT RD	Bridge	$150,336.00	1970	25	49	80	21	$45,754.00	$2,179.00
57	VIRGIN FLAT N0.2	VIRGIN FLAT RD	Culvert	$54,000.00	2003	45	16	60	41	$39,536.00	$964.00
72	RED JACK CREEK CULVERT	WAIUTA RD	Culvert	$105,600.00	1960	15	59	50	11	$16,835.00	$1,530.00
73	BLACKWATER BRIDGE NO.1	WAIUTA RD	Bridge	$206,503.00	1950	42	69	100	38	$74,029.00	$1,948.00
75	BLACKWATER CREEK NO.2	WAIUTA RD	Bridge	$154,512.00	1970	47	49	95	43	$73,011.00	$1,698.00
48	LOWES BRIDGE	WATERWORKS RD	Bridge	$258,720.00	1980	70	39	100	54	$151,857.00	$2,812.00

Structure ID	Structure Name	Road Name	Structure Type	Replacement Cost	Year Constr	Assess Remain Life	Age	Base Life	RUL (yrs)	ODRC	Annual St Line Depr
107	MAIRS BRIDGE	WESTBANK RD	Bridge	$1,298,856.00	1948		71	75	11	$176,388.00	$16,035.00
110	PADDY GOURLEYS BRIDGE	WESTBANK RD	Bridge	$182,839.00	1988	74	31	100	70	$127,987.00	$1,828.00
111	BLACKADDER BRIDGE NO.1	WESTBANK RD	Bridge	$209,496.00	1987	60	32	100	69	$144,552.00	$2,095.00
112	PAKIHI CREEK CULVERT	WESTBANK RD	Culvert	$105,600.00	1988	60	31	50	18	$39,600.00	$2,200.00
114	RAHU CREEK BRIDGE	WESTBANK RD	Bridge	$329,428.00	1970	30	49	95	44	$157,552.00	$3,581.00
115	SCHOOL CREEK BRIDGE	WESTBANK RD	Bridge	$64,380.00	1970	40	49	95	38	$28,447.00	$749.00
144	WILSON LEAD CULVERT 565	WILSONS LEAD RD	Culvert	$288,000.00	1990		29	50	15	$100,465.00	$6,698.00
116	WOOLLEY CREEK BRIDGE	WOOLLEY CREEK RD	Bridge	$595,197.00	1938	20	81	100	11	$71,947.00	$6,541.00

OBIS Standard Bridge Replacement Rates

STRUCTURE	DESCRIPTION	UNIT	RATE
Bridge	Standard multi-span	m	$2,300
Bridge	Standard single span	m	$2,600
Bridge	Standard complex	m	$3,500
Bridge	Single lane multi-span	m	$2,450
Bridge	Single lane single span	m	$2,900
Bridge	Single lane complex	m	$3,850
Culvert	Culvert Armco 2.4m diameter	m	$5,000
Culvert	Culvert Armco 4.0m diameter	m	$10,000
Culvert	Culvert Armco 4.2 x 2.8m diameter	m	$11,000
Culvert	Culvert concrete box 2.5m x 2m	m	$6,000
Bridge	No replacement	-	-
Culvert	Culvert concrete box 4.0m x 2.5m	m	$10,000
Footbridge	Simple footbridge	m	$2,000
Footbridge	Complex footbridge	m	$3,200

Base Life for Valuation Assessment

STRUCTURE	DECK	BEAMS	FOUNDATIONS	BASE LIFE
Bridge	Concrete	Concrete	Concrete	100
Bridge	Concrete	Steel	Concrete	95
Culvert	Concrete	Concrete	Concrete	100
Bridge	Concrete	Masonry	Concrete	100
Footbridge	Concrete	Masonry	Concrete	100
Footbridge	Concrete	Concrete	Concrete	100
Footbridge	Concrete	Steel	Concrete	95
Culvert	Concrete	Unknown	Unknown	60
Culvert	Concrete	Concrete	Unknown	90
Culvert	Masonry	Masonry	Unknown	100
Culvert	Steel	Unknown	Unknown	50
Footbridge	Steel	Steel	Concrete	90
Footbridge	Timber	Steel	Steel	80
Footbridge	Timber	Timber	Steel	75
Bridge	Timber	Timber	Steel	75
Footbridge	Timber	Timber	Timber	70
Footbridge	Timber	Timber	Concrete	75
Bridge	Timber	Timber	Timber	70
Bridge	Timber	Timber	Concrete	75
Footbridge	Timber	Steel	Timber	75
Bridge	Timber	Steel	Timber	75
Footbridge	Timber	Steel	Concrete	80
Bridge	Timber	Steel	Concrete	80
Bridge	Timber	Steel	Steel	80

wsp | OPUS

www.wsp-opus.co.nz

Project Number: 6-WBUL0.47

Road Structures Lifecycle Management Plan 2020

Buller District Council

14 August 2020

wsp

150 YEARS IN AOTEAROA

Contact Details

Jeremy Waldin

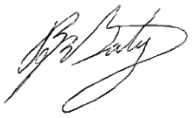
WSP
12 Moorhouse Avenue
Christchurch 8011
+64 3 363 5400
+64 27 224 8389
jeremy.waldin@wsp.com

Document Details:

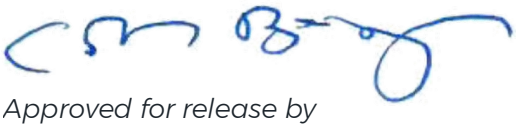
Date: 14th August 2020
Reference: 6-WBUL0.47
Status: FINAL

Prepared by
Rem Markland (Senior Engineering Technician)

*Katherine Ragg (*Projects Technician*)*



Reviewed by
Ben Baty
Senior Bridge & Civil Structures Engineer



Approved for release by
Christopher Bergin
Business Manager West Coast

Document History and Status

Revision	Date	Author	Reviewed by	Approved by	Status
1	May 2020	Rem Markland	Ben Baty	Christopher Bergin	Draft
		Katherine Ragg			
2	August 2020	-	Ben Baty	Christopher Bergin	Final

Revision Details

Revision	Details
2	- Culvert 2472 included in disposals – reduces overall number of structures and total asset value. Applicable sections 1.3, 1.3.1, 1.4, 1.5.1, 3.2.1, Tables 2-1 (increased disposals and reduced bridge numbers), 2-2, Table 2-3, 3-4, 3-7, 3-9 - Table 3-9 – Replacement costs revised - Bridges 176 and 178 removed from data (Private access)

Contents

Disclaimers and Limitations 1

Key Abbreviations 2

Executive Summary 3

1 Introduction 4

1.1 Purpose 4

1.2 Scope 4

1.3 Description of the Asset 4

1.4 General distribution of Bridges and Major Culverts 6

1.5 Specific areas and environmental factors 6

2 Road Structure Inventory 7

2.1 Bridge and Major Culvert Data 7

2.2 Special Purpose Roads 8

2.3 Road Structures Data Storage 8

2.4 Road Structure Age Profile 9

2.5 Valuations 9

2.6 Heritage Road Structures 11

3 Road Structure Condition, Maintenance, Component Replacement and Renewals 11

3.1 Inspections 11

3.2 Road Structure Condition 13

3.3 Condition rating 16

3.4 Maintenance and Component Replacement Backlog 16

3.5 Maintenance and Component Replacement Forecasts 17

3.6 Replacement Programme 17

4 Levels of Service 19

4.1 General 19

4.2 Load Capacity 19

4.3 Level of Service Deficiencies 24

5 Risk and Resilience 26

5.1 General 26

6 Data 27

6.1 General 27

6.2 Data Improvements 27

List of Figures

Figure 1: Typical Road Bridge types for BDC assets 5
Figure 2: Typical BDC Culvert types 5
Figure 3: Typical : Distribution map of Road bridges and culverts in the Buller District 6
Figure 4: Left - BDC Bridge Age Profile, Right - BDC Culvert Age Profile 9
Figure 5: West Coast Cumulative % Age Profiles Left - Bridges, Right - Culverts 9

List of Tables

Table 2-1 : Number and asset value of bridges and major culverts 7
Table 2-2 : List of disposals to D.O.C in 2019 8
Table 2-3: Valuation Summary 10
Table 3-1: Visual assessment grading used by BDC 12
Table 3-2: Weighting factors 12
Table 3-3: Inspection history and types of inspection for BDC bridge stock 12
Table 3-4 : Breakdown of BDC Bridge stock 13
Table 3-5 : Breakdown of BDC Large Culvert stock 13
Table 3-6: BDC Structures requiring condition related inspections 15
Table 3-7 : Summary of outstanding funding requirements from OBIS 16
Table 3-8 : Ten-year Maintenance and Component Replacement Forecast 17
Table 3-9: Ten-year bridge replacement programme 18
Table 4-1 : Posted Road Structures 20
Table 4-2 : 50 MAX Restrictive Structures 21
Table 4-3: HPMV Loading restrictions on Karamea Highway 23
Table 4-4: Structures with Barrier Deficiencies 24
Table 4-5: Narrow Structures 25
Table 4-6: Structures with deficient fish passage 25
Table 4-7: Level of Service Improvement Programme Summary 26

Disclaimers and Limitations

This report ('**Report**') has been prepared by WSP exclusively for [Buller District Council] ('**Client**') in relation to the development of a Lifecycle Management Plan for the management and funding justification for Bridges and Large Culverts ('**Purpose**') and in accordance with the Westland District Council Structures Life Cycle Management Plan Offer of Service dated 1st April 2020. The findings in this Report are based on and are subject to the assumptions specified in the Report. WSP accepts no liability whatsoever for any reliance on or use of this Report, in whole or in part, for any use or purpose other than the Purpose or any use or reliance on the Report by any third party.

In preparing the Report, WSP has relied upon data, surveys, analyses, designs, plans and other information ('**Client Data'**) provided by or on behalf of the Client. Except as otherwise stated in the Report, WSP has not verified the accuracy or completeness of the Client Data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in this Report are based in whole or part on the Client Data, those conclusions are contingent upon the accuracy and completeness of the Client Data. WSP will not be liable in relation to incorrect conclusions or findings in the Report should any Client Data be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP.

Key Abbreviations

The following abbreviations have been used within this report:

Abut	Abutment
BEM	Bridge End Marker
BDC	Buller District Council
D/S	Downstream
G/R	Guardrail
HD	Holding Down
HPMV	High Productivity Motor Vehicle
H/R	Handrail
LA	Local Authority
MAH	Mixed Australian Hardwood
NZAMS	New Zealand Asset Management Support
PR	Pinus Radiata
PWL	Posting Weight Limit
NZTA	New Zealand Transport Agency
U/S	Upstream
WC	Work Category
WW	Waterway

Executive Summary

The key purpose of this Life Cycle Management Plan is to report on condition, asset performance and risk profile of the Buller District Council Road Structures, including financial forecasts for maintenance and renewals. This Life Cycle Management Plan is prepared as a supporting document to the 2021/24 three-year funding programme.

Inventory: BDC has 144 road structures at a total replacement value of $44.1M. This is based on current figures provided. The average age of bridges is 41 years and culverts 39 years. It is noted that there had been a number of structures identified that are yet to be valued, or have been previously valued in the incorrect category, however the impact of this is only minor in nature. There were 8 recent disposals of BDC structures identified. These were all associated with DOC structures previously managed by BDC on Bullock Creek Road and McCallums Road which are now managed by DOC since its change in status as an RCA.

Condition: The highway bridges and culverts are in relatively good condition based on inspections carried out in 2018. Condition issues are typically focussed around the following issues with waterway issues and scour damage, decay and degradation of timber components, and structural steel corrosion. BDCs roading structures are in similar condition to other local authorities on the West Coast considering similar environments and age of the assets.

Funding Forecast: Over the next funding cycle the average funding requests will increase to around 0.69% of the asset replacement value, which is far higher than the current 0.25%, which is based on the historic funding application of approximately $110k/year, however it is noted that this is a particularly low value and well below straight-line depreciation levels (~$500k). It is noted that this is particularly low in comparison to other districts around the country owing to the average age of the stock being fairly young with low associated maintenance requirements. This recommended increase is primarily due to costs associated with the bridge stock aging in an aggressive environment, increasing maintenance of timber structures, and coating and corrosion related repairs. Following this period, average funding requests are expected to reduce to 0.50% of the asset replacement value moving forward.

Condition based replacements: The following structures are proposed for replacement for condition related reasons during 2021-24:

- Buller Camp Bridge (104)
- Palmer Road Culver (167A)
- Cleine Stock Underpass (174)
- Brown Grey Bridge (117)
- Falls Creek Bridge (124)
- Kelly Creek Bridge (13A)

Levels of Service:

- There are thirteen bridges currently or proposed to be posted on the network
- There are twenty-one bridges restrictive to 50MAX and a further 3 which are HPMV restrictive. It is noted that a number of these are located on the Karamea Highway. The SH67 Mokihinui River Bridge previously restricted access to this route, however this was recently strengthened.
- There are 94 single lane structures across the network, with 4 of these with a carriageway width of below 3m
- Of the remaining 49 structures, 2 of these have a carriageway below the target width of 6m.
- There are 15 bridge structures that do not currently have any form of side protection.

Over the next three years, efforts to improve levels of service will focus on:

- Strengthening and improvements to HPMV and 50 MAX restrictive structures on the Karamea Highway.
- Reducing the number of posted bridges.
- Developing a prioritised programme of bridge barrier improvements

The following structures are proposed for improvement or replacement for level of service reasons in 2021/24:

- (117) Brown Grey Bridge (RUL=5)
- (128) Tidal Creek No.2 (RUL=9)
- (130) Little Wanganui River Bridge (RUL=9)
- (120) Palmers Rd, Blue Grey River

The key issues presently faced by the district include:

- Waterway issues (debris build-up and impact, scour and aggradation)
- Vulnerable structure types (buried corrugated metal culverts, timber structures)
- Corrosion of structures in aggressive environment hidden by Gold Seal Coating
- Fish passage.
- Seismically vulnerable structures

1 Introduction

1.1 Purpose

The purpose of this Lifecycle Management Plan (LCMP) is to report on the condition, asset performance and risk profile of the Buller District Council (BDC) Road Structures, including financial forecasts for maintenance and renewals. The main goals of the report are to identify risks (and opportunities) within the network and develop an improvement plan to enhance current knowledge of these assets, fill gaps and better understand/manage risks and opportunities identified through the report.

1.2 Scope

This report encompasses structures supporting road traffic within the BDC road network, particularly bridges and large culverts with waterway area greater than 3.4m^2. Non-road structures known as “Other Significant Structures” (refer NZTA S6) such as retaining walls, small culverts, non-road bridges, river protection, sign gantries, tunnels and geotechnical assets are excluded from the scope of this report.

This report is based on readily available information provided by BDC, within various reports and the council’s asset database.

1.3 Description of the Asset

There is currently a total of 143 roading assets in the Buller District region. A full list of BDC’s Roading Structures Inventory Summary can be found in Appendix A of this report. The assets are broken down into the following categories:

1.3.1 Road bridges

There are 100 road bridges in the BDC region. These bridges consist of Modern prestressed concrete, reinforced concrete, steel I beam and timber bridges. These range from 2.2m long structures to the 163m long Karamea Bridge. These descriptions are determined by the superstructure material and in some case these materials are combined. A breakdown of each Bridge in its superstructure element can be found below in Table 3-2.

Figure 1: Typical Road Bridge types for BDC assets

1.3.2 Major Culverts

There are 43 major Culverts in the BDC region. These Culverts consist of Modern precast reinforced concrete, cast in situ reinforced concrete, corrugated metal culverts and reinforced concrete pipe culverts. These structures include stock underpasses and 1 ford for the purpose of this report. The culvert structures are categorised as corrugated metal culverts and concrete culverts in Table 3-3 below.

Figure 2: Typical BDC Culvert types

1.4 General distribution of Bridges and Major Culverts

The structures are distributed in approximately 3 areas: The West Coast coastline, The Mid to Upper Grey Valley and Mid Buller River; and The Maruia Valley around Springs Junction.

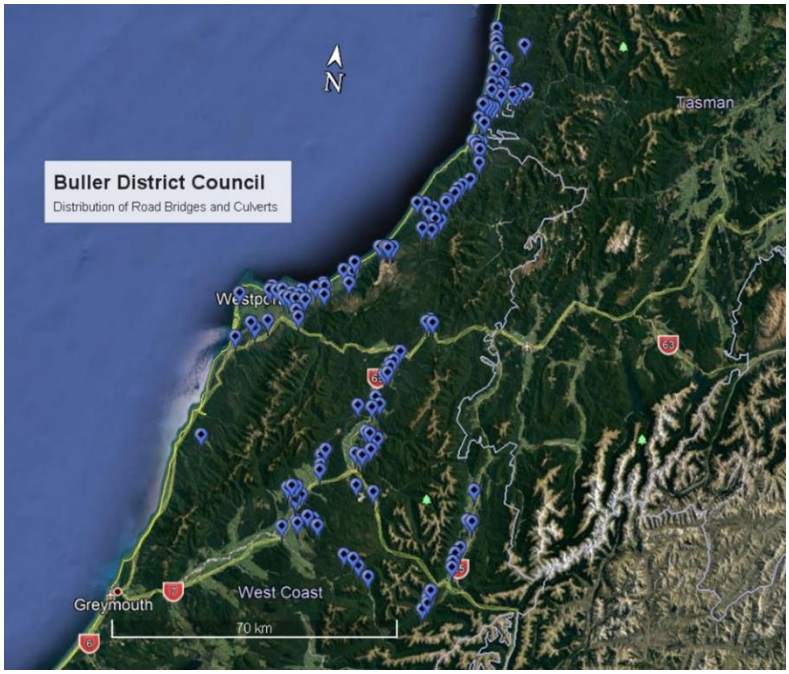


Figure 3: *Typical :* Distribution map of Road bridges and culverts in the Buller District

1.5 Specific areas and environmental factors

1.5.1 Area 1: Coastline

There are 83 road structures (58.9%) are distributed along the coastline and these structures range from 200metres to 11 kilometres inland of the coast line These structures service a combination of urban townships and main arterial routes, along with farming and mining access roads. This area has the Special Purpose Road from the Mokihinui Bridge to the Karamea Bridge and from the Oparara Bridge to Kohaihai north of Karamea. The volumes of traffic are reasonably high with heavy vehicles moving freight, coal, milk and timber. This is a High-Medium Corrosivity Zone due to an aggressive surf and prevailing onshore winds along the West Coast being predominantly Westerly.. In addition the specific surface corrosion rates can increase due to proximity of vegetation or forested areas, dairy effluents and sheltered unwashed surfaces. These areas will have the highest maintenance costs in terms of corrosion protection in the total bridge and culvert stock.

1.5.2 Area 2: Mid to Upper Grey Valley

There are 45 road structures (31.9%) are distributed along the mid Grey Valley to mid Buller River. These structures range from 40kilometres to 60 kilometres eastward of the coast line. These structures service a combination of urban townships and main arterial routes, along with farming and mining access roads. The volumes of traffic are reasonably high with heavy vehicles consisting of dairy tankers, stock trucks, logging trucks and coal.
This area is considered to be a Medium to Low Corrosivity Zone, induced corrosion of reinforced concrete structures. in addition, the specific surface corrosion rates can increase due to proximity of vegetation or forested areas, dairy effluents and sheltered unwashed surfaces.

1.5.3 Area 3: Maruia Valley

There are 13 structures (9.2%) are distributed around Springs junction and Maruia river area. These structures range from 70-75 kilometres eastward of the coastline., and service mostly dairy farm properties in the area and generally have low volumes of traffic, however regular cycles of stock truck, farm machinery and milk tankers placing demands on vulnerable structures.
This area is considered to be a Low Corrosivity Zone, this presents a lower corrosion risk to steel structures and over time, induced corrosion of reinforced concrete structures. in addition, the specific surface corrosion rates can increase due to proximity of vegetation or forested areas, dairy effluents and sheltered unwashed surfaces

2 Road Structure Inventory

2.1 Bridge and Major Culvert Data

The Bridge and Major Culvert asset data held on record is summarised in the table below. This identifies the total value of individual assets with replacement value greater than $10M, and also any planned acquisitions and disposals within the 2021/24 three-year period. Replacement costs are provided based on the most recent valuation figures, or using a figure of $5,000/m2 where the value of acquisitions has not yet been determined

Table 2-1 : Number and asset value of bridges and major culverts

DESCRIPTION	NUMBER OF STRUCTURES	PLAN AREA (M^2)	REPLACEMENT COST	COMMENTS
Road Bridges	98	11,011	$38,717,858	Includes all bridges but excludes acquisitions and disposals
Replacement Value > $10M	0	0		
Road Culverts	43	3264	$4,620,193	Includes all Culverts but excludes acquisitions and disposals
Acquisitions	0	0	-	No planned acquisitions currently known
Disposals	9		$1,222,461	Listed below in Table 2-2

The breakdown of road bridges and major culverts above in Table 2-1 exclude the foot bridge structures in the district and the disposals which are listed in Table 2-2 below.

It has been advised that as of May-June 2019 the structures listed below have been handed over to the Department of Conservation who are the actual owners of the structures and the Road Controlling Authority. For many years BDC have carried out the inspections and surveillance of these structures. Please note that data associated with these disposed structures has not been included in this report. Please note also that Bridge 176 and 178 have been removed from the asset as these have been confirmed to be located on private land. These are not included in the list of disposals.

Table 2-2 : List of disposals to D.O.C in 2019

BRIDGE ID	ROAD NAME	BRIDGE NAME	COMMENTS
146	CONNS CREEK RD	CUKVERT 2472	Hand over to Department of Conservation May / June 2019
159	McCALLUMS MILL ROAD	BREAK CREEK No 2	Hand over to Department of Conservation May / June 2019
160	McCALLUMS MILL ROAD	BREAK CREEK No 3	Hand over to Department of Conservation May / June 2019
161	McCALLUMS MILL ROAD	BREAK CREEK NO 4	Hand over to Department of Conservation May / June 2019
162	McCALLUMS MILL ROAD	BREAK CREEK NO 5	Hand over to Department of Conservation May / June 2019
163	McCALLUMS MILL ROAD	BREAK CREEK NO 6	Hand over to Department of Conservation May / June 2019
164	McCALLUMS MILL ROAD	BREAK CREEK NO 7	Hand over to Department of Conservation May / June 2019
165	McCALLUMS MILL ROAD	McCALLUMS BRIDGE	Hand over to Department of Conservation May / June 2019
61	BULLOCK CREEK ROAD	BULLOCK CREEK BRIDGE	Hand over to Department of Conservation May / June 2019

2.2 Special Purpose Roads

From the Mokihinui Bridge to the Karamea Bridge and from the Oparara Bridge to Kohaihai, roads are classified as “Special Purpose”.

All work on these stretches of road is fully subsidised by Land Transport New Zealand.

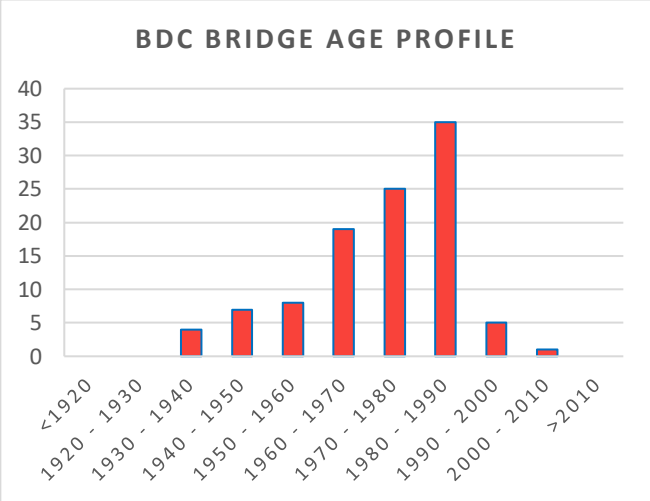
Road maintenance is undertaken by external contractors, with the Council overseeing the specifications and management of these contracts.

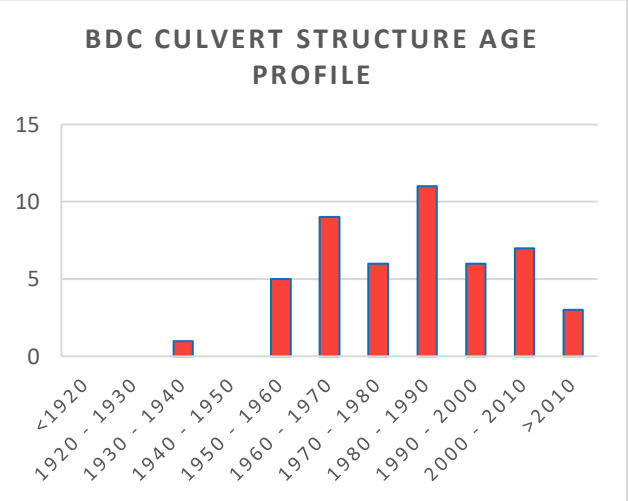
2.3 Road Structures Data Storage

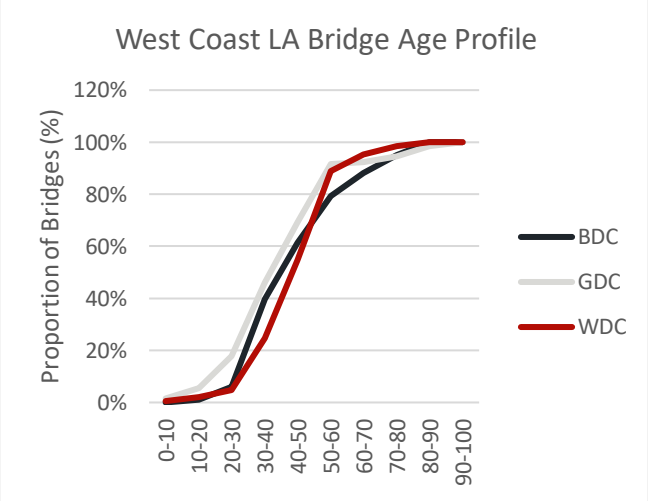
Buller District Council have engaged WSP for bridge inspection, reporting and investigation works. The structure Inventories, condition assessment, maintenance recommendations, maintenance schedules and valuations are all stored in the Online Bridge Information System (OBIS). These structures were introduced to OBIS in 2014. Collection and improvements of data and are an ongoing process.

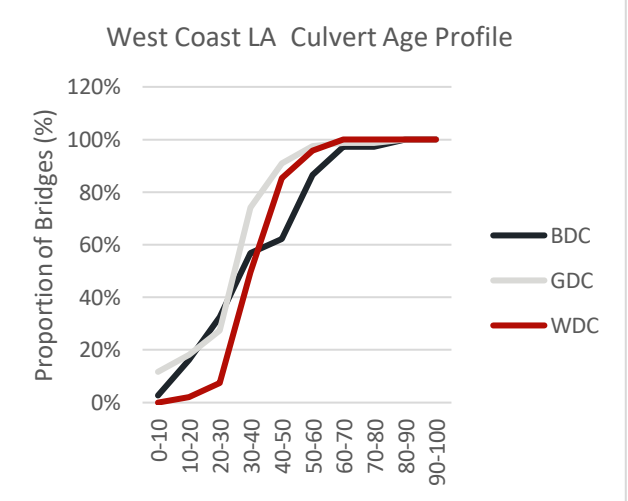
OBIS read only access allows council to generate reports and maintenance schedules as they require them. This data collection with frequent inspections and further investigations have assisted the council to manage their structures up to date.

2.4 Road Structure Age Profile









The average age of bridges is 49 years old and the average age of culverts is 41 years old. 88% of the bridge stock is less than 70 years old, indicating that approximately 12% of the bridge stock is expected to reach end of life in the next 30 years (assuming a 100-year design life). The culvert stock is newer, 97% of culverts are less than 70 years old, however a greater portion (32% compared to 6% for bridges) are less than 30 years old. This is a similar age profile to other comparable West Coast local councils, as shown in the figures below, noting that BDC has a very slightly older stock overall. At the current rate BDC is replacing structures, the number of structures at end of life should remain relatively constant over the next 30 years. However, after this 30-year period, large portions of BDC's bridge stock will be reaching end of life. Therefore, a maintenance and replacement strategy to level this spike is recommended.

2.5 Valuations

The OBIS system has a module for undertaking Bridge Valuations in accordance with NZ Infrastructure Asset Valuation & Depreciation Guidelines (Edition 2.0, 2006). The bridge valuations undertaken for BDC are consistent with that undertaken by WSP Opus for other Local Authorities

Based on existing bridge information held in the OBIS database and user applied 'weighting' factors to represent the current condition of the bridge, this module provides the following key outputs for each structure:

- Remaining Useful Life (RUL)
- Replacement Cost
- Optimised Depreciation Replacement Cost (ODRC)
- Annual Straight-Line Depreciation

Table 2-3: Valuation Summary

below summarises the results of the valuation assessment:

Table 2-3: Valuation Summary

VALUATION SUMMARY	2018	2020
Total Bridge Replacement Cost	$39,431,000	$43,338,051
Optimised Depreciated Replacement Cost	$16,985,283	$19,352,830
Annual Straight-Line Depreciation	$462,126	$513,830

Key issues and explanations:

- Bridges have not been broken down to component level when undertaking the valuations. Valuating bridges at a component level would make the valuation exercise much more onerous and would likely result in no significant change in outcome. The approach taken is considered appropriate at this point in time.
- Existing data has been used from 2018 valuations, with the value of disposals removed. Additional valuation has been completed for structure No. 47 – Scotts Bridge, where no previous valuation had been completed. No new valuations for structures with missing critical data have been completed.
- The replacement costs have been optimised based on the structure replacement type and the level of service required. In many instances we have identified that existing bridges would be more cost effectively replaced with a culvert type structure providing the same level of service.
- Bridge replacement costs are based on square metre rates for the various types of bridges, being applied to the deck area of the bridge. The deck area is taken as the overall width (the greater of the width between kerbs or handrails) multiplied by the length of the bridge. For the length of the bridge we have used an assessed 'Equivalent Length' which assumes spill through batters being used in place of retaining wall abutments. This is in order to more effectively represent the basis of the unit cost rates.
- Culvert replacement costs are based on lineal metre rates for the various types of culverts.

- To account for the varying life expectancies of the main bridge components (deck, beams and foundations) which typically affect the overall life of the structure, a 'Base Life' is adopted based on the type of materials used in the main components of the bridge.
- Technical Factors (table 4.6.3 of the Valuation Guidelines) are used to account for variances in design standards, construction and material quality, operational and environmental stresses and other factors. These factors have an effect on the life of a structure and are used to adjust the 'Base Life' to provide the 'Useful Life'.
- The Remaining Useful Life (RUL) is the 'Useful Life' less the age of the structure. Where structures are nearing the end of life or are older than their typical 'Useful Lives', the calculation of the RUL can give inappropriate answers (i.e. negative values or significantly lower than expected/assessed values for the RUL). We have taken account of this by using our assessment of the Remaining Life (based on inspection) for the RUL where considered appropriate. The Useful Life is adjusted accordingly. This provides a more meaningful assessment of the Optimised Depreciated Replacement Cost for BDC's bridging assets.
- 'Straight Line' Depreciation has been adopted for this valuation exercise.

The above figures indicate the following:

- The annual straight-line depreciation rate for bridge assets has decreased from $462k in 2018 to $513k in 2020. This increase is influenced by the removal of disposals, the additional Scott Bridge valuation, and inflation over time.
- The optimised depreciated replacement cost has increased from $17.0M in 2018 to $19.4M in 2020. This increase is also influenced by the disposals and increase in Scott Bridge valuation, however outside of this the rate of inflation over this period and indicates that maintenance and component replacement is keeping pace with the assets' depreciation over time.
- The total bridge asset replacement cost has increased from $39.4M in 2018 to $44.0M in 2020. This increase is primarily due to the increase in construction costs since 2018. While the overall number of assets has reduced, it is noted that those removed from the bridge stock are of relatively low value compared to the rest of BDC's bridge assets.

2.6 Heritage Road Structures

Heritage Road Structures are defined as those which are:

- Registered with Heritage NZ as Category 1 or 2 structures;
- Constructed prior to 1900, and therefore are subject to the consenting requirements of the Historic Places Act; or
- Scheduled in District Plans as Heritage Items.

There are no listed heritage Road Structures within Buller District Council. A review of the District Plan parts 14.1 [Schedule of historic buildings and sites] and 14.2 [Historic Buildings and Structures] did not list any bridge structures having significant historic or cultural listing.

3 Road Structure Condition, Maintenance, Component Replacement and Renewals

3.1 Inspections

The BDC have endeavoured to carry out bridge inspections on nominally on a 3-yearly basis, with the most recent of these being completed in 2018. Condition is assessed in accordance with

section B.2 of the International Infrastructure Management Manual (IIMM) – Version 3.0 (2006). This involves a visual assessment of each of the major elements of the structure in accordance with the five-point rating system detailed in Figure B.5 of the IIMM, as shown in Figure 3-1.

Table 3-1: Visual assessment grading used for BDC Condition Ratings

Rating	Description of Condition
1	Excellent Condition: *Only cyclic maintenance required*
2	Very Good: *Minor maintenance required plus cyclic maintenance*
3	Good: *Significant maintenance required*
4	Average: *Significant renewal / upgrade*
5	Poor: *Unserviceable*

Each major element has been given a weighting factor based on risk, cost to maintain, demand for service and urgency to upgrade. The weightings adopted are outlined in Table 3.2:

Table 3-2: Weighting factors

Element	Weighting Factor
General (Appearance)	0.1
Foundations/Substructure	0.35
Waterway and Scour	0.2
Superstructure	0.35

Based on the weighting factors, an overall condition rating is then calculated for each structure.

Additional cyclic inspections have been carried out since 2014 to present day by WSP on request of council for structural input to repairs or scour work design as they have arisen. These have not been included in the overall inspection history in terms of the bridge stock management. A brief summary of previous inspections complying with the NZTA S6 Policy are listed below in Table 3-3.

Table 3-3: Inspection history and types of inspection for BDC bridge stock

INSPECTION YEAR	NUMBER OF STRUCTURES INSPECTED	INSPECTION TYPE/DESCRIPTION	INSPECTION PROVIDER	% OF STRUCTURES INSPECTED	COMMENTS
2014	155	• General	WSP	98.7%	Capture of all structures to OBIS data base for first time. 2 missed and later inspected in 2017
2017	18	• Principal • Special • Drilling investigation	WSP	11.5%	12 Principal inspections.

		• PWL Assessments			6-Drilling investigations and PWL Assessments
2018	142	• Principal from ground access • Access unit inspections	WSP	90.5%	133-Ground based Principal Inspections 9-Access unit inspections
2020	6	• Special • Drilling investigation • PWL Assessments	WSP	4%	6-Drilling investigations and PWL assessments
2021	152	• General	WSP	98.7%	Recommended general inspections/ Including Coating survey for steel structures

.

3.2 Road Structure Condition

3.2.1 General

Buller District Council's bridge and culvert stock comprise of the following:

Table 3-4 : Breakdown of BDC Bridge stock

BRIDGE SUPERSTRUCTURE MATERIAL	TOTAL NUMBER
Reinforced Concrete	17
Prestressed concrete	33
Steel	46
Timber	4
Cable (suspension)	0
Total Road Bridges	101

Table 3-5 : Breakdown of BDC Large Culvert stock

CULVERT MATERIAL	TOTAL NUMBER
Corrugated Metal	10
Concrete	33
Total Large Road Culverts	*43*

The bridge and culvert stock comprise approximately half concrete and half steel structures, noting that a number of steel superstructures in particular have timber components. Overall, the asset is in good condition. Common issues on the network include corrosion of steel components, waterway issues such as scour damage and bed aggradation/degradation, and decaying timber components. It is noted that there are 13 posted structures making up a relatively high proportion of the network. Approximately half of these postings are due to condition issues related to steel degradation and decaying timber components.

3.2.1 Reinforced and Prestressed Concrete Superstructure Bridges

BDC have 50 reinforced and pre-stressed bridge structures in the district making up 35.5% of the bridge stock.

These bridges are generally in excellent condition, with structural works required generally medium or low priority. These structures have construction dates ranging from 1974-1993 giving an average age of 40 years. With a design life of 100 years these structures are nearing midlife. Maintenance issues noted with these structures generally consist of damage from impact and abrasion and waterway scour which are typical issues for any bridge in their working environment.

3.2.2 Steel Superstructure Bridges

BDC have 46 bridges with steel superstructures making up 32% of the total bridge stock in the district.

These structures range from good to poor condition due to corrosion, particularly in the coastal area of the district. Construction dates range from 1931-2000 giving the widest age range of the structures age. It is noted that a number of these structures have timber components such as Foundations (Abutments and Piers) and timber deck systems, which are influencing the overall condition ratings, and will required additional monitoring, structural repairs or replacement far earlier than the steel superstructure condition would indicate.

Approximately 90% of BDC steel bridges coated in Gold Seal (a grease type coating applied over the previous coating system). In some lower corrosivity zones this has performed acceptably, however a number of structures coated with this product in the coastal areas have deteriorated more rapidly. Deterioration has been observed as active pack rusting and, in some cases total section loss. The current approximate cost estimate for repairs or replacements of the steel superstructure protective coating systems of the High to medium being 1-5 years is approximately $250k. Coating maintenance can extend the useful life of a structure, however the current/future level of service requirements and condition of combined materials in the structure need to be considered on a case by case basis. BDC should need to consider developing a protective coating management plan for the steel bridges. These plans assist with understanding the most appropriate intervention time for coating maintenance and assist with spreading the costs to a more manageable funding cycle.

3.2.3 Timber Superstructure Bridges

BDC have 4 bridges with timber superstructures, making up only 2.7% of the total bridge stock. These are generally in average to poor condition. This small amount of timber structures is good as these structures tend to be older, and generally have high maintenance requirements as they age and decay. These structures range in construction dates of 1940-1970 and as such have been in service for up to 80 years, with components from younger structures often recycled from previous structures. The condition of these bridges is currently being managed with drilling investigation PWL assessments on a 6-yearly frequency.

In addition to these 4 timber structures, there are 5 steel superstructure bridges with Mixed Australian Hardwood (MAH) foundations as noted above in 3.2.2. These structures are listed below in Table 7 requiring future condition related inspections.

3.2.4 Corrugated Metal Pipe Culverts

BDC have 11 metal pipe culverts making up 7.6% of the total BDC roading structures. These structures typically comprise aluminium and galvanised corrugated steel plates

The construction dates for these structures range from 1956-2008 giving an oldest age of 64 years and an average of 40 years. The condition of these culverts is currently good to very good, performing well for their current age and in the coastal corrosivity zones. Typical defects include corrosion, damaged structural floors, and one requiring monitoring due to settlement bulging (121 Tobin Creek Culvert) see below comments in Table 7.

Future condition related inspections should include removal of small steel samples to evaluate the condition of the fill side of the steel to determine the remaining useful life starting with assessing the oldest culverts first and coastal locations

3.2.5 Concrete Culverts

BDC have 32 concrete culverts making up 22.2% of the total BDC roading structures. These structures consist of cast insitu reinforced concrete (oldest types), reinforced concrete pipes, box culverts and box culvert stock underpasses. The construction dates for these structures range from 1934-2018 giving an oldest structure age of 86 years and an average age of 44 years. These structures are generally in good condition, with typical defects including scour damage, retained fill loss, and minor spalling.

3.2.6 Road Structures Requiring Condition Related Inspections

A list of bridges requiring cyclic or condition related inspections and testing are listed below in table 7

Table 3-6: BDC Structures requiring condition related inspections

BRIDGE ID	ROAD NAME	BRIDGE NAME	REASON
176	O'CONNER ROAD	O'CONNOR TRAIN WAGON CHASSIS	MAH Piles and Caps at abutments Steel railway wagon chassis superstructure with risk of hidden corrosion Drilling 2025
117	PALMERS RD	BROWN GREY BRIDGE	MAH Piles and Caps at abutments Drilling 2023. Strengthening underway
119	PALMERS RD	UPPER GREY RIVER BRIDGE	MAH Piles and Caps at abutments 2x MAH Piers Drilling 2023
120	PALMERS RD	BLUE GREY RIVER	1 x MAH beam Approach span of 3 spans (rest are steel) Drilling 2025
107	WESTBANK RD	MAIRS BRIDGE	MAH Piles and Caps at abutments 9x MAH Piers all operating in an aggressive waterway Drilling 2023
29	CHARMING CREEK ROAD	CHASM CREEK BRIDGE NO 3	Drilling 2023
30	CHARMING CREEK ROAD	CHARMING CREEK BRIDGE	MAH Beams Drilling 2023
45	CHRISTMAS BRIDGE	POWER HOUSE ROAD (FAIRDOWN)	MAH Beams Drilling 2025
61	BULLER CAMP BRIDGE	BULLER RAILWAY ROAD	MAH Piles and Caps at abutments MAH Beams Drilling 2025

121	Karamea Highway	TOBIN CREEK CULVERT	Culvert has a large bulge through centre and should be replaced within 10yrs. Inspect annually-consider steel samples for fill side condition

3.3 Condition rating

	General Rating	Foundation Rating	Waterway Rating	Superstructure Rating	Overall Rating	No. Structures
Bridges	1.64	1.75	1.92	1.85	1.74	101
Culverts	1.69	1.90	2.05	1.76	1.76	43
All Structures	1.66	1.80	1.96	1.83	1.75	144

The overall condition of the BDC bridge stock is very good. The areas of lowest rating are waterways and foundations, with defects typically related to scour damage, abrasion damage to inverts and decay of timber substructure elements.

Works that should be undertaken to combat the deterioration of BDC's bridge assets include:

- Continuing to renew old timber bridges. Where this is not economical, sealing the approaches, installing running deck planks and clearing abutment shelves are proactive measures to prolong the life of these assets;
- Removing willows adjacent to bridges and undertaking scour protection works.
- Painting steel beams;
- Undertaking concrete repairs;
- Constructing inverts to corroded metal culverts.

3.4 Maintenance and Component Replacement Backlog

The table below outlines the existing maintenance backlog based on information in OBIS from the most recent inspections. This back log does not include the costs associated with non-road assets and disposals.

Table 3-7 : Summary of outstanding funding requirements from OBIS

PRIORITY	ROUTINE MAINTENANCE (WC 114A)	STRUCTURAL MAINTENANCE / COMPONENT REPLACEMENT (WC114B)
Urgent (prompt action – within 3 months)	$150.00	$100,000
High (within one year)	$36,050	$386,000
Medium (within two years)	$73,450	$592,400
Low (within five years)	$8,250	$921,250
Total	**$117,900**	**$2,000,150**

The routine/structural maintenance and component replacement backlog recorded in OBIS is $1.41M. Based on current valuation data, this represents 5.0% of the total replacement value. This is a relatively typical figure, representing an asset in generally good condition.

3.5 Maintenance and Component Replacement Forecasts

The table below presents future forecasts for maintenance and component replacement spending. These figures are based on NZ Transport Agency Work Categories 114A, 114B/215A and 114D (Routine and Structural Bridge Maintenance and Guardrail Maintenance).

Table 3-8 : Ten-year Maintenance and Component Replacement Forecast

FINANCIAL YEAR	20/21	21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30
Replacement Value (000, 000's)	43.3M	43.3M	43.3M	43.3M	43.3M	43.3M	43.3M	43.3M	43.3M	43.3M
Funding Forecast (000s)	108k	220k	300k	300k	300k	250k	220k	220k	220k	220k
% of Replacement Value	0.25	0.50	0.69	0.69	0.69	0.58	0.50	0.50	0.50	0.50

The BDC have historically allocated a set annual funding budget for bridge maintenance. The breakdown of the annual funding has been supplied by BDC and is based on the 2019-2020 financial year.

- Local Road bridge Maintenance 62K & Local roads Structure component replacement 30K
- Special Purpose Road bridge maintenance 13K and Structure component replacement 3K

This gives a total of 75K for maintenance and a total of 33k for structural component replacements for the Buller District. The money is spent as per allocation of works in paragraph one above.

With a number of structures in the 70-80 year age range and a large proportion located within a coastal environment, it is expected that over the next 10-20 years major maintenance requirements are likely to increase. This is also reflected in the current maintenance backlog. As such, it is recommended that current funding levels are increased to $300k/year over the next 5 years to address some of these issues in the short to medium term, with a reduction to $220k/year in the 5 – 10 year range. These changes will help to avoid an increasing backlog, which may lead to a significant spike in spending requirements or a reduction in levels of service due to increasing posting requirements; and allow for construction cost increases.

3.6 Replacement Programme

Table 3-4 below outlines the ten-year bridge replacement programme. Note, these bridges are considered to be nearing the end-of-life due to condition reasons. Bridges requiring replacement predominantly due to Level of Service deficiencies have been listed in a separate section further in this report.

Table 3-9: Ten-year bridge replacement programme

BRIDGE ID	BRIDGE NAME	REMAINING LIFE	COMMENTS	ESTIMATED REPLACEMENT COST
104	Buller Camp Bridge	0	Life could be extended through drilling and repair works although unlikely to exceed 5-10yrs.	$160,000
167a	Palmer Road Culvert	0	Recommend replacement with a concrete culvert	$90,000
174	Cleine Stock Underpass	0	Appears to be in reasonable condition with isolated corrosion pinholes. Noted thin steel material will not last in this environment	$160,000
117	Brown Grey Bridge	3	Bridge piers and abutments drilled in 2017. Next drilling planned for 2023. Strengthening in progress	$1,000,000
124	Falls Creek Culvert	3	Life could be extended through repairs including new invert and retaining works. Appropriate remedial works likely to achieve another 15-20+ years.	$175,000
13A	Kelly Creek Bridge	4	Bridge is nearing the end of its life – recommend replacing within 4yrs.	$160,000
29	Chasm Creek Bridge No. 3	5	Bridge drilled in 2017. Likely okay until next drilling in 2023.	$110,000
30	Charming Creek Bridge	5	Bridge drilled in 2017. Repairs and maintenance are required to extend life of bridge. Likely replacement with box culvert	$110,000
119	Upper Grey River Bridge	6	Bridge drilled in 2017. Likely okay until next drilling in 2023.	$680,000
120	Blue Grey River Bridge	6	Life could be extended through replacement of deck and underpinning of piers. This could achieve 20+ yrs. RUL.	$1,000,000
121	Tobin Creek Culvert	6	Culvert has a large bulge through centre and should be replaced within 10yrs.	$840,000

128	Tidal Creek No.2	9	30km/hr. restriction on single lane bridge. Unable to support HPMV steel structure with timber baulk deck	$1,800,000
130	Little Wanganui River Bridge	9	Able to support 50 Max loading however restricts HPMV loads and would require replacement. Moderate corrosion of steel components	$4,800,000
			TOTAL	$11,085,000

There is a total of 13 recommended bridge replacements based on condition for the assets. It is noted that these are rough order costs for structure replacement, and are different to asset value provided in structure valuations. It is recommended that a bridge replacement budget of 40-90% of the annual depreciation be allowed to maintain a council's bridging stock.
For BDC this equates to an annual replacement budget of $206,050 to $465,61. It is noted that there are significant structures (particularly on the Karemea Highway) with relatively high replacement costs. Review of options around these structures should be progressed.
It is noted that Bridge 176 has not been included on the list of condition based replacements. This structure is inspected by BDC, however is located on, and provides access to, private property only.

4 Levels of Service

4.1 General

General levels of service in the Buller District are good with most access on main arterial routes allowing 50 MAX loading. For HPMV access on these main arterial routes there are a few restrictions on the Karamea Highway that will require replacement or strengthening to achieve the suitable levels of service for the area's growth opportunities. These structures appear in the HPMV restrictions, level of service and replacement programme.

In addition to the Karamea Highway, the next area with the most undesirable levels of service are the Palmer Road structures. These structures provide access to dairy farming properties with low vehicle traffic, however do see heavy vehicle traffic such as milk tankers, stock trucks and agricultural equipment, and as such are restrictive to industrial movements. These structures also feature in the replacement programme, posted road structures and 50 MAX restricted bridges tables in this report.

It is also noted that BDC have a relatively high proportion of posted structures due to a combination of deteriorating components and typically poor cross bracing. It is noted that many of these structures are small structures serving a small number of properties, and in some cases are potentially located on private property.

4.2 Load Capacity

4.2.1 Posted Structures (General Access Restriction)

Any Road Controlling Authority (RCA) may impose weight and/or speed restriction (bridge posting) on any bridge it 'owns in order to protect the structure and extend its remaining life. Before it can do this, the RCA must obtain a certificate from a chartered professional engineer stating that a detailed inspection of the bridge has been completed and that it is their opinion that the use of the bridge by vehicles exceeding the imposed weight or speed restrictions will overload the bridge to the extent that failure is likely to occur.

To communicate the bridge posting (and make it legally enforceable), the RCA must:

- Advertise the posting in a local newspaper (using standard form); and
- Erect and maintain signs near each end of the bridge (using standard signs)

Separately, the RCA is required to forward to NZ Transport Agency (within 7 days of publication) a copy of the advertisement along with confirmation that they have received the certificate from a chartered professional engineer.

The posting remains in place for a maximum of 12 months but can be renewed each year (requires advertisement and new certificate (+ detailed inspection) from chartered professional engineer).

Table 4-1 below lists those road structures currently posted to prevent access by General Access Vehicles (i.e. current legal loads complying with Schedule 3, Parts 1 & 2 of the Vehicle Dimension and Mass Rule (VDAM) 2016.

Table 4-1 : Posted Road Structures

BRIDGE ID	BRIDGE NAME	ROAD NAME	CURRENT POSTED RESTRICTION (WEIGHT, AXLE WEIGHT, AND/OR SPEED)	POSTED?	COMMENTS
13A	KELLY CREEK	ARAPITO RD	10% Class 1. 1000 kg AAL 30km/hr.	Yes	End of road structure limited property access. Likely to be replaced with Box Culvert
30	CHARMING CREEK BRIDGE	CHARMING CREEK ROAD	Light Vehicles only	No	Access to Charming Creek walkway. No expected heavy industry in this area
20	BLUE DUCK CREEK BRIDGE NO.1	CAPTAINS CREEK RD	80% Class 1. 7800kg AAL 10km/hr.	Recommended	Only recently assessed Access to limited farm properties
104	BULLER CAMP BRIDGE	BULLER RAILWAY RD (SOUTH)	Gross 2000 kg	Yes	Access to one private property
128	TIDAL CREEK NO.2	KARAMEA HIGHWAY	30km/hr.	Recommended	Special Purpose Road. Karamea Highway. Main arterial route to Karamea region
176	O'CONNOR TRAIN WAGON CHASSIS	PALMERS RD	Light Vehicles only	Yes	Not Assessed Access to one private property
117	BROWN GREY BRIDGE	PALMERS RD	35% Class 1. 10km/hr	Recommended	Access to limited Dairy farm properties. Recent PWL Assessment 23rd

					October 2019. Requires posting. If beams are fully restrained the outcome is: 95% Class 1. 10km/hr AAL 6800kgs (works to strengthen in progress)
120	BLUE GREY RIVER	PALMERS RD	10 km/hr.	Recommended	Only recently assessed Access to limited Dairy farm properties.
62	NEW CREEK BRIDGE	PENSINI RD	10km/hr	Unknown	Recently strengthened Access to limited Dairy farm and mining properties.
70	ALEXANDER BRIDGE	SNOWY RD	10km/hr	No	Not currently posted with speed limit Access to limited Dairy farm properties.
56	VIRGIN FLAT NO1. BRIDGE	VIRGIN FLAT RD	30km/hr.	Yes	Access to limited Dairy farm properties.
165	MCCALLUMS BRIDGE	MCCALLUMS MILL ROAD	No Oscillating Axels	Yes	End of road structure. D.O.C disposal
178	CRUSHINGTON FARM	CRUSHINGTON FARMS ACCESS RD	8200kg AAL	Yes	Access to limited Dairy farm properties. Off line

BDC have 13 posted bridges in total. Some of the bridges listed above have speed restrictions in place to allow Class 1 vehicles to cross, whilst the other structures with combinations of reduced capacity, axle load limitations and speed restrictions require strengthening or replacement to allow full Class 1 traffic. The 2018 bridge report identified 9 road bridges with posting weight restrictions. A further 4 posting recommendations from 2019-2020 have yet to be carried out as this is a recent development. These structures are indicated as “Recommended” in the table above.

4.2.2 50 Max Restrictions

Bridges in the Buller District that currently have 50 MAX restrictions have been identified in the website- Waka Kotahi NZ Transport Agency 50MAX-information for road controlling authorities.

21 bridges are identified as being restrictive to 50 MAX vehicles. Table (3-8) below list the restricted bridges and addition comments have been added to describe specific uses or issues with these structures where known

Table 4-2 : 50 MAX Restrictive Structures

BRIDGE ID	BRIDGE NAME	ROAD NAME	COMMENTS

14	ELFORDS CREEK BRIDGE NO.1	ARAPITO RD	May improve cross bracing installation.
13A	KELLY CREEK	ARAPITO RD	Restricted to 1000kg Axel Limits. End of road structure limited property access. Likely to be replaced
8	BAKERS CREEK BRIDGE NO.2	BAKER CREEK RD	Slender beam and concrete deck system. May require strengthening to achieve 50MAX
20	BLUE DUCK CREEK BRIDGE NO.1	BLUE DUCK CREEK RD	
104	BULLER CAMP BRIDGE	BULLER RAILWAY RD (SOUTH)	Timber structure requiring replacement. End of road servicing 1 property
61	BULLOCK CREEK BRIDGE	BULLOCK CREEK RD	D.O.C property likely to be a disposal in near future
41	MANNS BRIDGE	CAINS RD	
29	CHASM CREEK BRIDGE NO.3	CHARMING CREEK RD	
30	CHARMING CREEK BRIDGE	CHARMING CREEK RD	Access to charming creek walk track. No expected heavy industry traffic
146	CULVERT 2472	CONNS CREEK RD	Narrow structure with site rail to prevent loading outer edge. Buried iron rails and timber with heavy corrosion.
178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD	Serving 1 x property
88	GANNONS BRIDGE	GANNONS RD	Large span plate girder structure with non-composite deck. Difficult to increase loading without significant upgrade. End of road structure not servicing heavy industry
31	BREWERY CREEK BRIDGE	LEWIS STREET	
162	BREAK CREEK NO 5	McCALLUMS MILL ROAD	D.O.C property likely to be a disposal in near future
165	McCALLUMS BRIDGE	McCALLUMS MILL ROAD	D.O.C property likely to be a disposal in near future
176	O'CONNOR TRAIN WAGON CHASSIS	O'CONNER ROAD	Restricted to Light Vehicles Only. End of road structure private property access.
117	BROWN GREY BRIDGE	PALMERS RD	35% Class 1 / 10km/hr recent PWL Assessment 23rd October 2019. Requires posting Servicing limited farms

120	BLUE GREY RIVER	PALMERS RD	100 Class 1 / 10km/hr recent Drilling and PWL Assessment 23rd October 2019 Servicing limited farms
45	CHRISTMAS BRIDGE	POWERHOUSE RD (FAIRDOWN)	Decay is close to reducing the capacity below 100% Class 1.
70	ALEXANDER BRIDGE	SNOWY RD	100% Class 1. 10km/hr. With new deck system, requires posting Servicing limited farms.*
107	MAIRS BRIDGE	WESTBANK RD	Timber deck, Steel superstructure on hardwood piles, servicing several dairy farms however alternative access from Springs Junction end of Westbank road

*Further correspondence from WSP has indicated this structure is suitable for 50MAX loading. This should be reflected in further updates to Waka Kotahi NZ Transport Agency.

4.2.1 HPMV and Overweight Vehicle Restrictions

The following BDC bridges were assessed by WSP for 50MAX loading and HPMV loading in 2016 (6-WBUL0.31/00002) for the Karamea Highway Bridges. All structures meet the 50MAX loading requirements with exception to Tidal Creek Bridge No. 2, the work was completed for the narrowing to allow 50MAX and with a 30Km/hr speed limit applied.

HPMV access to the Karamea Highway was previously restricted by NZTA SH67 Mokihinui Bridge, however in 2017 NZTA carried out strengthening to the SH67 Mokihinui Bridge opening up potential access to the Karamea Highway for HPMV loads. As such, restrictions to HPMV access to the route are the BDC managed structures outlined below. Replacement and strengthening options for this route could be considered to enable HPMV traffic.

Table 4-3: HPMV Loading restrictions on Karamea Highway

BRIDGE ID	BRIDGE NAME	Drawings used in Assessment	50 Max Assessment Result	HPMV Assessment Result
128	Tidal Creek No. 2 Bridge	Aurecon deck replacement drawings, dated 2010	2016-Reduce Kerbs to 3.7m and speed restriction of 30km/hr allows 50MAX	Unable to support full HPMV loading Not assessed.
129	Tidal Creek No. 3 Bridge	As-built drawings dated 1951	Able to support 50 Max loading	Unable to support full HPMV loading would require strengthening
130	Little Wanganui River Bridge	Ministry of Works – strengthening drawings dated 1984	Able to support 50 Max loading	Unable to support full HPMV loading would require replacement

4.3 Level of Service Deficiencies

4.3.1 Barrier Deficiencies

There are 15 bridges with no structure mounted barriers. These are listed in Table 4-4 below.

Table 4-4: Structures with Barrier Deficiencies

BRIDGE ID	BRIDGE NAME	ROAD NAME	COMMENTS
13A	KELLY CREEK	ARAPITO RD	Straight approaches to ford bypass structure. Low fall height.
11	BAKERS CREEK NO 3	BAKER CREEK RD	Straight approach to structure providing access to private property
28	CHASM CREEK BRIDGE NO.2	CHARMING CREEK RD	Straight approach to rural single lane structure. Moderate to High fall height.
29	CHASM CREEK BRIDGE NO.3	CHARMING CREEK RD	Single lane timber structure with timber deck, tight approach to South. Short span.
30	CHARMING CREEK BRIDGE	CHARMING CREEK RD	Straight approach to single lane timber structure, moderate curve at South end. Low fall height.
146	CULVERT 2472	CONNS CREEK RD	Straight approach to structure. Carriageway has been reduced in width to prevent traffic loading to downstream deck edge
178	CRUSHINGTON FARMS	CRUSHINGTON FARMS ACCESS RD	Straight approach to single lane narrow structure. Provides access to a limited number of properties. High fall height.
38	MCMILLANS BRIDGE	NANSEN STREET	Single lane steel structure with timber deck. Provides access to private property. Low fall height.
118	PALMER BRIDGE	PALMERS RD	Straight approach to HDCU single lane structure. Recommended approach guardrail. Steep drop on downstream side. Provides access to a limited number of properties.
119	UPPER GREY RIVER BRIDGE	PALMERS RD	Straight approach to very narrow structure. Sight rails and handrails to be considered for visibility.
62	NEW CREEK BRIDGE	PENSINI RD	Steel structure with concrete deck. Steep and tight approach to south.
45	CHRISTMAS BRIDGE	POWERHOUSE RD (FAIRDOWN)	Single lane timber bridge without barrier. Decay likely to impact load capacity shortly.
68	BROWNS CREEK BRIDGE	SNOWY RD	Pretty rural, may not be such an issue. Low fall height

69	STAIRCASE BRIDGE	SNOWY RD	Pretty rural, may not be such an issue. Moderate fall height
71	MCVICARS BRIDGE	SNOWY RD	Pretty rural, may not be such an issue. Moderate fall height

4.3.2 Narrow Structures

There are 94 single lane structures across the network. Of these single lane structures, 4 have a carriageway width of 3m of less. For the remaining two-lane structures, only 2 are more than 0.8m below the targeted width of 6m. These structures are listed below.

Table 4-5: Narrow Structures

BRIDGE ID	BRIDGE NAME	ROAD NAME	NO. LANES	ROAD WIDTH (M)
13A	KELLY CREEK	ARAPITO RD	1	3
11	BAKERS CREEK NO 3	BAKER CREEK RD	1	3
72	REC JACK CREEK CULVERT	WAIUTA RD	2	4
125	GLASSEYE CREEK	KARAMEA HIGHWAY	2	4.98
176	O'CONNOR TRAIN WAGON CHASSIS	O'CONNER ROAD	1	2.38
119	UPPER GREY RIVER BRIDGE	PALMERS RD	1	2.95

4.3.3 Fish Passage

The New Zealand Fish Passage Guidelines 3 were introduced in April 2018. This document outlines requirements for fish passage to protect New Zealand's native fish species. Culverts with a spillway which may impede fish passage were flagged during the inspections. Table 4-6 below shows a list of these structures.

Table 4-6: Structures with deficient fish passage

BRIDGE NO	BRIDGE NAME	ROAD NAME
36	MILLER STREAM ARCH	CALLIOPE STREET
77	BURTONS CULVERT NO 1	BURTONS ROAD
78	BURTONS CULVERT NO 2	BURTONS ROAD
124	FALLS CREEK CULVERT	KARMEA HIGHWAY
131a	BLACK WATER CREEK CULVERT NO 2	KARMEA HIGHWAY
133	MUSSONS CREEK CUVLERT	KARMEA HIGHWAY
181	MILLERTON CULVERTS	MILLERTON TRACK

4.3.4 *Level of Service Improvement Programme*

The following table presents the highest priority Road Structures for improvement due to the Level of Service issues above (i.e. load capacity, number of lanes, width, vertical clearance, flood performance, barriers, pedestrian/cyclist access etc).

Table 4-7: Level of Service Improvement Programme Summary

BRIDGE ID	BRIDGE NAME	REMAINING LIFE (DUE TO LOS REASONS)	COMMENTS	ESTIMATED UPGRADE/ REPLACEMENT COST ($000)
117	BROWN GREY BRIDGE	5 Years RUL Single lane	WSP are preparing strengthening options to upgrade, however 95% class 1 can only be achieved. Future still dependent on MAH foundation condition.	$300
128	TIDAL CREEK NO.2	9 Years RUL single lane	Strategic early replacement proposed to support HPMV.	$400
130	Little Wanganui River Bridge	9 Years RUL single lane	Strengthening required to support HPMV, or strategic replacement.	$670
120	PALMERS RD	BLUE GREY RIVER	Restricted 10km/hr 1 x MAH beam Approach span of 3 spans (rest are steel) Timber approach span will eventually limit capacity. Low vehicle usage however Milk tanker and agricultural usage is frequent	$300

5 Risk and Resilience

5.1 General

A comprehensive risk review has not been undertaken for the stock, however from our knowledge of the stock through bridge inspections, the known risks and resilience issues for Buller District Council's bridge stock are:

- Scour damage
- Degradation of timber components
- Corrosion of steel superstructure elements hidden by Gold Seal coating.
- Live load capacity for increased Level of Service requirements (e.g. HPMV routes) (refer section 4.2).
- Structures without barriers.
- Seismically vulnerable structures.

A timber drilling programme is undertaken on a 6-yearly cycle to drill structural timber components. Based on the findings from these drilling inspections, structural repairs or posting weight limits are recommended to mitigate risk associated with deteriorating timber components.

BDC have not been any risk or resilience screenings for their roading assets. Scour risk and seismic risk screenings could be undertaken to identify high risk structures and determine resilience improvements that could be made.

6 Data

6.1 General

Data used in this report is derived from bridge inventory data filtered from WSP Online Bridge Information System (OBIS), which is currently used for BDC asset management. This data was also checked against NZTA website 50MAX restrictions for the area. Searches were made in the New Zealand Heritage and District Plan site for heritage structures.

Documents and records stored in OBIS were used to identify latest PWL, 50MAX and HPMV information. Current condition of structures have been reviewed against the recommended maintenance items to consider replacements and remaining useful life.

Additional data was supplied by BDC in terms of completed bridge maintenance and operating procedures

Information provided by BDC confirmed the following information:

- BDC internal inspection processes by their network contractor
- BDC standard annual funding amounts for maintenance work categories
- Recent disposals of roading structures
- Current maintenance schedules showing completed maintenance backlogs
- Good local knowledge of specific structures and their levels of service

6.2 Data Improvements

The data for BDC have a good data set for their bridge stock, which is held on a reliable and quickly accessible database. As bridge asset management is always a work in progress, all entities need to consistently update changes in the roading structure condition, changes to load capacity etc. to get the best knowledge of the assets.
Areas for improvement should be noted below:

- Updating structural maintenance with drawings and specifications for completed works as they are completed
- Updating changes to PWL for structures as they are assessed (ongoing)
- Annually updating completed routine and structural maintenance schedules to keep backlog up to date for accurate funding requests.
- Adding missing fields of data in future inspections to improve the system
- Uploading specific bridge investigation reports
- Update existing and new structures details values for valuation purposes

Appendix A
BDC Roading Structures Inventory Summary

APPENDIX A: BDC Roading Structures Inventory Summary

Structure ID	Structure Name	Road Name	Displ	Structure Type	Deck Material	Beam Material	Foundation Material	Length (m)	Width for Valuation (m)	Year Const	RUL (yrs)
52	LAGOON CREEK BRIDGE	ALMA RD	0.36	Bridge	Concrete	Concrete	Concrete	10.00	4.30	1988	65
12	GILBANK CREEK BRIDGE	ARAPITO RD	1.45	Culvert	Concrete	Concrete	Concrete	6.00		1991	68
13	JORDANS CREEK BRIDGE	ARAPITO RD	4.3	Bridge	Concrete	Steel	Concrete	28.40	3.70	1972	36
14	ELFORDS CREEK BRIDGE NO.1	ARAPITO RD	5.67	Bridge	Timber	Steel	Concrete	24.00	3.20	1980	26
15	OFFICE CREEK BRIDGE	ARAPITO RD	5.99	Culvert	Concrete	Concrete	Concrete	3.60	3.70	1950	20
13A	KELLY CREEK	ARAPITO RD	8.72	Bridge	Timber	Steel	Steel	8.90	3.00	1960	4
65	MIRFINS BRIDGE	ATARAU RD	1.13	Bridge	Concrete	Concrete	Concrete	126.00	4.30	1985	66
18	DEANS CREEK ARMCO CULVERT	BACK RD (KONGAHU)	0.98	Culvert	Steel	Unknown	Unknown	12.00	6.00	1982	11
19	BLACKWATER CREEK CULVERT NO.1	BACK RD (KONGAHU)	4.29	Culvert	Steel	Unknown	Unknown	28.00	6.00	1984	10
8	BAKERS CREEK BRIDGE NO.2	BAKER CREEK RD	0.45	Bridge	Concrete	Steel	Concrete	12.50	3.60	1962	14
11	BAKERS CREEK NO 3	BAKER CREEK RD	1.11	Bridge	Timber	Steel	Concrete	12.40	3.00	1980	31
43	VEALES STOCK UNDERPASS	BEACH RD (FAIRDOWN)	0.25	Culvert	Concrete	Unknown	Unknown	7.00	7.50	1995	27
44	WET LEAD CULVERT	BEACH RD (FAIRDOWN)	0.9	Culvert	Concrete	Concrete	Concrete	6.10	6.10	1983	46
93	BOATMANS CREEK BRIDGE	BLAIRS RD	0.4	Bridge	Concrete	Steel	Concrete	29.00	3.75	1962	30
94	ITALIAN CREEK BRIDGE	BLAIRS RD	2.42	Bridge	Concrete	Steel	Concrete	9.40	3.80	1964	36
95	RAGLANS CREEK BRIDGE	BLAIRS RD	3.09	Bridge	Concrete	Concrete	Concrete	10.80	3.70	1974	37
20	BLUE DUCK CREEK BRIDGE NO.1	BLUE DUCK CREEK RD	1.07	Bridge	Timber	Steel	Steel	33.68	3.10	1988	39
92	REDMONDS CREEK BRIDGE	BOATMANS RD	2.01	Bridge	Concrete	Steel	Concrete	7.00	4.00	1970	43
106	BOUNDARY BRIDGE	BOUNDARY RD	1.92	Bridge	Concrete	Concrete	Concrete	96.00	3.08	1938	6
55	BRADSHAWS CREEK BRIDGE NO.2	BRADSHAWS RD	0.73	Culvert	Concrete	Unknown	Unknown	8.80	4.50	2004	38
182	BEACHSIDE ESTATE MARINE PARADE RD	BRADSHAWS RD		Culvert	Concrete	Unknown	Unknown	8.00	6.50	2010	42
98	COAL CREEK BRIDGE	BROWN CREEK RD	1.5	Bridge	Concrete	Steel	Concrete	71.00	3.80	1967	39
99	BROWN CREEK BRIDGE	BROWN CREEK RD	2.6	Bridge	Concrete	Steel	Concrete	33.60	3.75	1965	38
100	CAMP CREEK BRIDGE	BROWN CREEK RD	4.5	Bridge	Concrete	Concrete	Concrete	11.00	4.00	1985	66
101	ROUGH CREEK BRIDGE	BROWN CREEK RD	6.87	Bridge	Concrete	Steel	Concrete	38.00	3.80	1970	43
54	BRUNINGS BRIDGE	BRUNINGS RD	1.05	Bridge	Concrete	Concrete	Concrete	17.00	4.10	1984	56
104	BULLER CAMP BRIDGE	BULLER RAILWAY RD (SOUTH)	0.03	Bridge	Timber	Timber	Timber	6.70	3.50	1940	-2
89	BURKES CREEK NO.2	BURKES CREEK RD	0.94	Culvert	Concrete	Unknown	Unknown	6.00	4.40	2003	44
76	ROUGH & TUMBLE BRIDGE	BURTONS RD	0.58	Bridge	Concrete	Steel	Concrete	25.30	3.70	1963	36
77	BURTONS CULVERT NO.1	BURTONS RD	2.51	Culvert	Concrete	Unknown	Unknown	10.00		2000	40
78	BURTONS CULVERT NO.2	BURTONS RD	2.82	Culvert	Steel	Unknown	Unknown	10.00	6.00	1992	22
41	MANNS BRIDGE	CAINS RD	1.2	Bridge	Concrete	Steel	Concrete	28.00	3.80	1966	21
36	MILLER STREAM ARCH	CALLIOPE STREET	1.25	Culvert	Concrete	Concrete	Concrete	8.00	6.00	1968	52
34	GRANITY ARCH	CALLIOPE STREET	1.316	Culvert	Concrete	Concrete	Concrete	7.00	6.00	1952	20
28	CHASM CREEK BRIDGE NO.2	CHARMING CREEK RD	4.18	Bridge	Timber	Steel	Concrete	23.00	3.95	1965	22
29	CHASM CREEK BRIDGE NO.3	CHARMING CREEK RD	4.57	Bridge	Timber	Timber	Timber	3.00	4.10	1960	5
30	CHARMING CREEK BRIDGE	CHARMING CREEK RD	8.75	Bridge	Timber	Timber	Timber	3.00	4.10	1960	5
42	SYRONS CULVERT	COLLINS RD	1.72	Culvert	Concrete	Unknown	Unknown	6.00	7.60	1984	18
25	STILLWATER CREEK BRIDGE	DE MALMANCHES RD	0.1	Bridge	Concrete	Concrete	Concrete	37.00	4.05	1982	56
26	SAWYERS CREEK BRIDGE	DE MALMANCHES RD	0.52	Bridge	Concrete	Concrete	Concrete	6.80	4.90	1990	59
32	WATSON CREEK	DOMAIN RD (GRANITY)	0.31	Culvert	Concrete	Unknown	Unknown	7.40	6.00	1980	14
91	FERNDALE BRIDGE NO.1	FERNDALE RD	0.11	Bridge	Concrete	Concrete	Concrete	13.20	4.30	1992	73
90	FERNDALE BRIDGE NO.2	FERNDALE RD	0.73	Bridge	Concrete	Steel	Concrete	7.60	3.74	1975	41
87	BURKES CREEK BRIDGE NO.1	GANNONS RD	0.845	Bridge	Concrete	Concrete	Concrete	10.00	3.05	1950	27
88	GANNONS BRIDGE	GANNONS RD	4.8	Bridge	Concrete	Steel	Concrete	44.00	3.80	1960	34
24	TIDAL CREEK BRIDGE	GLASSEYE RD	0.38	Bridge	Concrete	Steel	Concrete	27.03	3.60	1985	44
16	BLACKWATER DRAIN	GRANITE CREEK RD	0.9	Bridge	Concrete	Concrete	Concrete	12.19	4.15	1976	46
17	GRANITE CREEK BRIDGE NO.1	GRANITE CREEK RD	1.6	Bridge	Concrete	Concrete	Concrete	36.58	4.27	1974	44
17B	GRANITE CREEK BRIDGE NO 2	GRANITE CREEK RD	4.317	Bridge	Concrete	Concrete	Concrete	36.58	4.16	1971	38
59	LITTLE TOTARA BRIDGE	HANDS RD	4.12	Bridge	Concrete	Concrete	Concrete	47.00	4.27	1980	51
105	INWOODS BRIDGE	INWOOD RD	0.405	Bridge	Concrete	Steel	Concrete	5.30	4.00	1985	59
121	TOBIN CREEK CULVERT	KARAMEA HIGHWAY	1.94	Culvert	Steel	Unknown	Unknown	18.60		1956	6
122	SANDEL CREEK CULVERT	KARAMEA HIGHWAY	8.495	Culvert	Concrete	Concrete	Unknown	10.00		1969	33
123	SURVEYORS CREEK BRIDGE	KARAMEA HIGHWAY	9.71	Bridge	Concrete	Concrete	Concrete	37.00	8.60	1982	63
124	FALLS CREEK CULVERT	KARAMEA HIGHWAY	14.52	Culvert	Concrete	Concrete	Unknown	8.50	6.00	1934	3

185	Corbyvale Stock Underpass	KARAMEA HIGHWAY	16.461	Culvert	Concrete	Concrete	Concrete	10.10	8.50		
125	GLASSEYE CREEK	KARAMEA HIGHWAY	18.875	Bridge	Concrete	Concrete	Concrete	9.75	4.98	1953	27
126	LAKE CREEK CULVERT	KARAMEA HIGHWAY	25.23	Culvert	Concrete	Concrete	Unknown	18.30		1962	26
127	TIDAL CREEK NO.1	KARAMEA HIGHWAY	29	Bridge	Concrete	Concrete	Concrete	12.60	7.45	1950	18
128	TIDAL CREEK NO.2	KARAMEA HIGHWAY	29.1	Bridge	Timber	Steel	Steel	35.00	3.70	1932	11
129	TIDAL CREEK NO.3	KARAMEA HIGHWAY	30.47	Bridge	Concrete	Concrete	Concrete	12.60	8.08	1951	19
130	LITTLE WANGANUI BRIDGE	KARAMEA HIGHWAY	32.44	Bridge	Timber	Steel	Steel	75.00	3.35	1931	11
131	CALLARIS CREEK CULVERT	KARAMEA HIGHWAY	33.8	Culvert	Concrete	Concrete	Unknown	15.00		1969	28
131a	BLACKWATER CREEK CULVERT NO.2	KARAMEA HIGHWAY	43.21	Culvert	Concrete	Unknown	Unknown	12.50	9.85	1978	13
132	GRANITE CREEK BRIDGE	KARAMEA HIGHWAY	43.66	Bridge	Concrete	Concrete	Concrete	42.70	7.32	1949	12
133	MUSSONS CREEK CULVERT	KARAMEA HIGHWAY	47.02	Culvert	Concrete	Concrete	Concrete	12.50		1965	28
134	KARAMEA BRIDGE	KARAMEA HIGHWAY	49.15	Bridge	Concrete	Concrete	Concrete	163.00	4.30	1981	48
172	JONES STOCK UNDERPASS	KARAMEA HIGHWAY		Bridge	Concrete	Concrete	Concrete		11.63	1950	29
173	BJERRING STOCK UNDERPASS	KARAMEA HIGHWAY		Culvert	Concrete	Concrete	Concrete	10.10	10.10	1980	64
6	QUINLANS BRIDGE	KOHAIHAI	0	Bridge	Concrete	Concrete	Concrete	54.00	4.19	1988	58
5	OPARARA BRIDGE	KOHAIHAI	3.33	Bridge	Concrete	Steel	Concrete	93.00	4.08	1961	21
4	BREAK CREEK BRIDGE	KOHAIHAI	8.85	Bridge	Concrete	Concrete	Concrete	49.30	4.20	1992	61
3	CANDLE CREEK BRIDGE	KOHAIHAI	10.55	Culvert	Concrete	Concrete	Concrete	9.00	6.00	1992	75
2	STONEY CREEK BRIDGE	KOHAIHAI	11.76	Culvert	Concrete	Concrete	Concrete	6.00	6.00	1992	64
1	MOSSEYBURN	KOHAIHAI	13.95	Bridge	Concrete	Steel	Concrete	12.70	3.70	1962	26
96	LITTLE LANDING CREEK BRIDGE	LANDING CREEK RD	1.29	Bridge	Concrete	Concrete	Concrete	6.70	4.00	1980	61
31	BREWERY CREEK BRIDGE	LEWIS STREET	0.3	Bridge	Concrete	Concrete	Concrete	9.00	5.40	1988	26
82	MAI MAI BRIDGE	MAI MAI RD	1.945	Bridge	Concrete	Concrete	Concrete	43.00	3.70	1982	63
83	FAIRBRASS BRIDGE	MAI MAI RD	3.365	Bridge	Concrete	Steel	Concrete	4.90	3.59	1975	48
84	DIRTY MARY BRIDGE NO.1	MAI MAI RD	5.59	Bridge	Concrete	Steel	Concrete	8.50	3.86	1975	48
85	DIRTY MARY BRIDGE NO.2	MAI MAI RD	5.99	Bridge	Concrete	Steel	Concrete	8.00	3.65	1976	49
86	JACKS CREEK BRIDGE	MAI MAI RD	7.6	Bridge	Concrete	Concrete	Concrete	16.00	3.90	1980	66
53	MARTINS CREEK BRIDGE NO.2	MARTINS CREEK RD	0.07	Bridge	Concrete	Concrete	Concrete	23.00	4.10	1985	57
103	MCDONALDS BRIDGE	MCDONALDS RD	0.08	Bridge	Concrete	Concrete	Concrete	18.00	4.20	1988	69
158	CULVERT 2250	MILL ST (EAST)		Culvert	Concrete	Concrete	Concrete	24.00		1950	16
39	Mine Creek No 1	MILLERTON TK (STOCKTON RD)	3.4	Bridge	Concrete	Concrete	Concrete	7.55	4.20	1980	53
40	MINE CREEK BRIDGE NO.2	MILLERTON TK (STOCKTON RD)	4.05	Culvert	Steel	Unknown	Unknown	13.00	6.00	1989	15
181	Millerton Culverts	MILLERTON TK (STOCKTON RD)		Culvert	Concrete	Concrete	Concrete	8.00	7.00	1970	38
27	CHASM CREEK BRIDGE NO.1	MOKIHINUI ROAD	2.03	Bridge	Concrete	Concrete	Concrete	10.50	3.60	1948	20
180	Coal Creek	MOKIHINUI ROAD	4.2	Bridge	Concrete	Concrete	Concrete	11.70	4.20	1990	63
184	Burkes Creek Ford	MOKIHINUI ROAD		Culvert	Concrete	Concrete	Concrete	20.00	3.20	2016	
67	MOSSEY CREEK BRIDGE NO.2	MOSSEY RD	0.69	Bridge	Concrete	Concrete	Concrete	10.00	3.70	1980	53
38	McMillans Bridge	NANSEN STREET		Bridge	Timber	Steel	Concrete		3.36	1950	12
37	NAPIER STREET BRIDGE	NAPIER ST	1.46	Bridge	Concrete	Concrete	Concrete	12.10	3.05	1948	21
62A	New Creek Road Half Bridge	NEW CREEK ROAD		Other	Concrete	Unknown	Concrete	14.50		1972	
50	ARCHERS BRIDGE	NINE MILE RD	3.92	Bridge	Concrete	Steel	Concrete	30.60	3.80	1963	27
51	WILLIAMS BRIDGE	NINE MILE RD	6.02	Bridge	Concrete	Steel	Concrete	18.30	3.67	1977	41
183	O'Connor Home Stock Underpass	NINE MILE RD		Other	Concrete	Concrete	Concrete			2018	
7	BAKERS CREEK BRIDGE NO.1	OPARARA RD	0.5	Bridge	Concrete	Steel	Concrete	19.00	3.66	1963	22
171	RHINDS STOCK UNDERPASS	OPARARA RD	3.36	Bridge	Concrete	Concrete	Concrete	3.60	8.40	1980	66
167A	Palmer Rd Culvert	PALMERS RD	2.8	Culvert	Concrete	Unknown	Unknown	9.00	4.40	1960	-3
117	BROWN GREY BRIDGE	PALMERS RD	4.37	Bridge	Timber	Steel	Timber	31.00	3.08	1950	3
118	PALMER BRIDGE	PALMERS RD	5.35	Bridge	Concrete	Concrete	Concrete	6.10	3.70	1993	69
119	UPPER GREY RIVER BRIDGE	PALMERS RD	6.54	Bridge	Timber	Steel	Timber	31.70	2.95	1940	6
120	BLUE GREY RIVER	PALMERS RD	8.65	Bridge	Timber	Steel	Steel	28.00	3.20	1950	6
62	NEW CREEK BRIDGE	PENSINI RD	1.25	Bridge	Timber	Steel	Concrete	27.00	3.50	1970	25
63	PENSINI BRIDGE	PENSINI RD	2.55	Bridge	Concrete	Steel	Concrete	19.00	4.00	1970	38
168	Perseverance Bridge	PERSERVERENCE ROAD	0.45	Bridge	Concrete	Concrete	Concrete	131.00	4.00	1985	61
168A	FLETCHERS BRIDGE	PERSERVERENCE ROAD	4.23	Bridge	Concrete	Concrete	Concrete	12.50	3.88	1975	48
45	CHRISTMAS BRIDGE	POWERHOUSE RD (FAIRDOWN)	1.88	Bridge	Timber	Timber	Concrete	8.20	4.00	1970	15
66	MOSSEY CREEK BRIDGE NO.1	SNOWY RD	1.45	Bridge	Concrete	Concrete	Concrete	14.00	4.20	1989	76
68	BROWNS CREEK BRIDGE	SNOWY RD	13.3	Bridge	Concrete	Steel	Concrete	12.00	3.70	1975	51
70	ALEXANDER BRIDGE	SNOWY RD	18.3	Bridge	Timber	Steel	Concrete	13.50	3.60	1975	35
69	STAIRCASE BRIDGE	SNOWY RD	20.715	Bridge	Concrete	Steel	Concrete	11.00	3.75	1975	51
71	MCVICARS BRIDGE	SNOWY RD	28.215	Bridge	Concrete	Concrete	Concrete	11.00	3.20	1985	66
49	SOAPWORKS BRIDGE	SOAPWORKS RD (EXCELSIOR RD)	0.96	Bridge	Concrete	Concrete	Concrete	44.90	4.10	1982	57
97	PROGRESS JUNCTION BRIDGE	SOLDIERS RD	5.25	Bridge	Concrete	Concrete	Concrete	14.00	3.60	1982	63
81	THOMPSON ARMCO CULVERT	SOMERVILLE RD	0.23	Culvert	Steel	Unknown	Unknown	14.00	6.50	1985	15
79	SOMERVILLE BRIDGE No 1	SOMERVILLE RD	2.53	Bridge	Concrete	Concrete	Concrete	22.60	4.50	1982	63
80	SOMERVILLE BRIDGE NO.2	SOMERVILLE RD	3.2	Bridge	Concrete	Concrete	Concrete	33.00	4.25	1983	64
175	LANDCORP STOCK UNDERPASS	SOMERVILLE RD		Culvert	Concrete	Concrete	Concrete	12.40	12.06	1960	44

47	SCOTTS BRIDGE	STEPHEN RD	1.1	Bridge	Concrete	Concrete	Concrete	82.00	4.30	1987	69
102	SWAMP CREEK BRIDGE	SWAMP CREEK RD	0.35	Bridge	Concrete	Steel	Concrete	32.00	3.65	1969	43
58	WALLS CREEK CULVERT	TAURANGA BAY RD	3.87	Culvert	Concrete	Unknown	Unknown	19.20	6.00	1987	21
46	DEADMANS CREEK BRIDGE	UTOPIA RD (WESTPORT)	4.14	Bridge	Concrete	Concrete	Concrete	25.00	4.00	1986	55
174	CLEINE STOCK UNDERPASS	UTOPIA RD (WESTPORT)		Culvert	Concrete	Steel	Concrete	12.00	10.27	2008	-10
56	VIRGIN FLAT BRIDGE	VIRGIN FLAT RD	2.59	Bridge	Timber	Steel	Concrete	11.00	3.60	1970	21
57	VIRGIN FLAT N0.2	VIRGIN FLAT RD	3.4	Culvert	Concrete	Unknown	Unknown	6.00	4.20	2003	41
72	RED JACK CREEK CULVERT	WAIUTA RD	3.6	Culvert	Steel	Unknown	Unknown	9.00	4.00	1960	11
73	BLACKWATER BRIDGE NO.1	WAIUTA RD	5.73	Bridge	Concrete	Concrete	Concrete	13.70	4.30	1950	38
75	BLACKWATER CREEK NO.2	WAIUTA RD	7.8	Bridge	Concrete	Steel	Concrete	10.00	3.70	1970	43
48	LOWES BRIDGE	WATERWORKS RD	1.11	Bridge	Concrete	Concrete	Concrete	22.00	4.00	1980	54
107	MAIRS BRIDGE	WESTBANK RD	0.03	Bridge	Timber	Steel	Timber	136.80	3.57	1948	11
110	PADDY GOURLEYS BRIDGE	WESTBANK RD	4.26	Bridge	Concrete	Concrete	Concrete	15.00	3.70	1988	70
111	BLACKADDER BRIDGE NO.1	WESTBANK RD	4.5	Bridge	Concrete	Concrete	Concrete	14.00	4.30	1987	69
112	PAKIHI CREEK CULVERT	WESTBANK RD	7.47	Culvert	Steel	Unknown	Unknown	10.00		1988	18
114	RAHU CREEK BRIDGE	WESTBANK RD	9.2	Bridge	Concrete	Steel	Concrete	27.30	4.15	1970	44
115	SCHOOL CREEK BRIDGE	WESTBANK RD	10.73	Bridge	Concrete	Steel	Concrete	4.90	3.70	1970	38
144	WILSON LEAD CULVERT 565	WILSONS LEAD RD	1.3	Culvert	Steel	Unknown	Unknown	24.00		1990	15
116	WOOLLEY CREEK BRIDGE	WOOLLEY CREEK RD	1.15	Bridge	Concrete	Concrete	Concrete	60.00	3.25	1938	11

wsp.com/nz

APPENDIX E: MAJOR PROJECT DELIVERY MODEL

BULLER DISTRICT COUNCIL
Te Kaunihera O Kawatiri

INFRASTRUCTURE SERVICES

GUIDELINE

TITLE:	Major Project Delivery Model
PORTFOLIO:	ALL
FUNCTION:	ALL
COORDINATOR:	ALL
PREPARED BY:	M.Duff
MANAGER:	N/A
CIRCULATION:	Infrastructure Services

DATE:	Jun 2019
DOCUMENT ID:	G01
REVISION/VERSION:	0/4
GROUP MANAGER:	M.Duff

Context

Major projects are identified in terms of significance, complexity, expenditure, community benefit and risk to Council.

Development of a delivery model which supports a full lifecycle approach to major projects is imperative to exercise due diligence and ensure no surprises.

This requires proper preparation and planning, including front end loading study phases (concept, selection and feasibility) to influence successful outcomes for stakeholders.

Doing this "homework" to a sufficient level, and early in the project lifecycle will:

- Drive more efficient implementation
- Maximise benefits and opportunities
- Reduce impact of change
- Manage risk

BULLER DISTRICT COUNCIL
Te Kaunihera O Kawatiri

Purpose

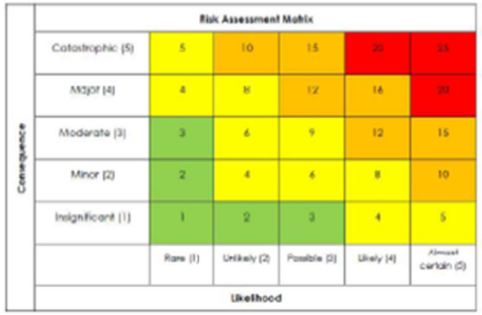
The purpose of this guideline is to provide Infrastructure Services with a consistent model for the delivery of major projects across all portfolios.

Risk Management

Risk is the effect of uncertainty on achieving objectives. Risk Management is the identification, assessment and prioritisation of risk factors. The typical process involves:

- Define the objective
- Identify the threats
- Assess the risk
- Control the risk
- Monitor the process

Strategies, methods and tools including risk workshops, risk registers, risk matrix and hierarchy of controls can then be applied to manage risk.



The key risk factors for major projects can generally be categorised as follows:

- Planning Risks
  - Statutory, Environmental, Public Consultation, Site Establishment, Variations, Legal Compliance, Consents & Licences, Time & Cost Overruns
- Design Risks
  - Information Quality, Redesign, Performance, Variations, Resources, Flexibility, Design Standards, Inflation, Time & Cost Overruns
- Construction Risks
  - Site Conditions, Weather Conditions, Site Access, Public Protest, Labour Resources, Material Resources, Commissioning, Cost Control, Construction Methods, Workmanship, Related Facilities/Services, Variations, Extensions of Time, Interfaces, Contractor Works, Site Health & Safety, Utilities, Industrial Action, Interruptions, Inflation, Existing Liabilities, Time & Cost Overruns, Force Majeure
- Operating Risk
  - Latent Defects, Service Availability, Service Performance, Estimation Errors, Materials, Utilities, Resource Plans, Industrial Action, Residual Equipment, Variations, Environmental Compliance, Third Party Claims, Cost Control, Future Proof, Maintenance, Health & Safety, Design Deficiencies, Infrastructure Damage (Insurable & Uninsurable), Inflation, Subcontractor Performance, Force Majeure
- Financial Risk
  - Affordability, Interest Rates (pre/post Financial Close), FOREX (if applicable), Taxation, Residual Value, Insurance Scope & Cost, Patronage, Cost Changes
- Legislative Risk
  - Law Changes, Voluntary Termination, Contractor Default

Refer to the Risk Management Manual for detailed framework and processes.

Best Practice

Major projects require defined processes to help ensure predictable and consistent outcomes. Best practice for project delivery processes is defined by knowledge areas and methodologies contained in:

- PMBoK (Project Management Book of Knowledge, PMI)
- PRINCE2 (Projects IN Controlled Environments 2)

These are global standards applied for managing risk and ensuring successful project outcomes for stakeholders.

The following extracts summarise key references and elements incorporated in developing the Major Project Delivery Model:

Project Knowledge Areas

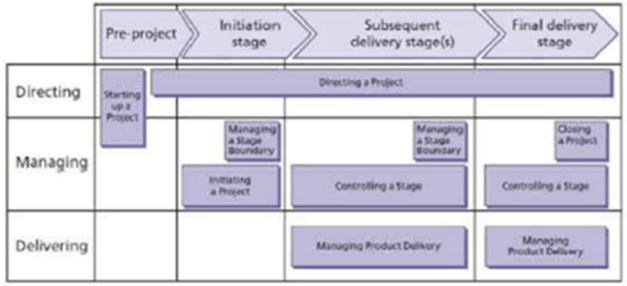
- Reference – PMBoK, www.pmi.org/pmbok-guide-standards

Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work	4.4 Monitor and Control Project Work 4.5 Perform Integrated Change Control	4.6 Close Project or Phase
5. Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
6. Project Time Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Resources 6.5 Estimate Activity Durations 6.6 Develop Schedule		6.7 Control Schedule	
7. Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
8. Project Quality Management		8.1 Plan Quality Management	8.2 Perform Quality Assurance	8.3 Control Quality	
9. Project Human Resource Management		9.1 Plan Human Resource Management	9.2 Acquire Project Team 9.3 Develop Project Team 9.4 Manage Project Team		
10. Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Control Communications	
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses		11.6 Control Risks	
12. Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	12.4 Close Procurements
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Management	13.3 Manage Stakeholder Engagement	13.4 Control Stakeholder Engagement	

Table 3-1. Project Management Process Group and Knowledge Area Mapping

Project Methodology

- Reference – PRINCE2, www.prince2.com/nzd/what-is-prince2



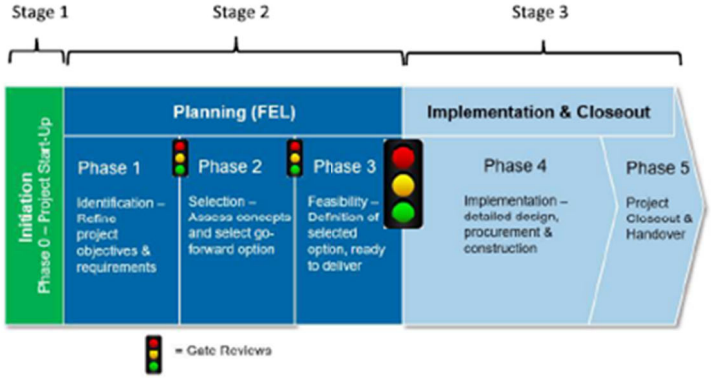
Further Reading

- KPMG – Portfolio, Programme and Project Management (P3M) Capabilities in Government – Increasing Success Rates and Reducing Costs - March 2011 – 10. Appendix A – P3M Practices
- www.treasury.govt.nz/publications/informationreleases/p3m/p3m-kpmg-mar12.pdf

Infrastructure Services Model

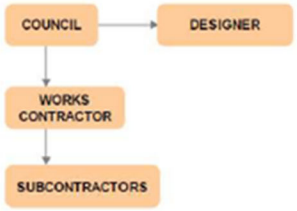
The Infrastructure Services Model consolidates the knowledge areas of PMBoK and the methodology of PRINCE2 to provide a full project lifecycle process organised into three distinct stages, with intermediate gate approvals to ensure readiness to proceed to the next phase:

- Stage 1 – Initiation (Project Start-Up)
- Stage 2 – Planning (Identification, Selection, Feasibility)
- Stage 3 – Implementation (Design, Procurement, Construction) & Closeout

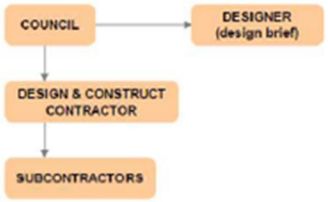


Implementation Strategies

- Construct Only:
  - Council directly engages the Designer and the Works Contractor under separate contracts
  - In the contract between Council and the Works Contractor, Council is responsible for the design
  - The Works Contractor is paid a lump sum, subject to adjustments permitted under the contract

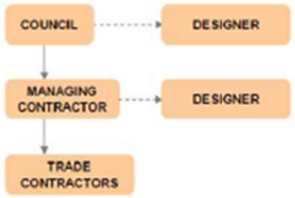


- Design & Construct:
  - Council prepares a detailed design brief
  - Council engages one party for both the design and construction of the project under a single contract
  - Contractor is primarily responsible for the design and construction risks



- Construction Management:
  - Council engages the Designer and Construction Manager separately
  - Construction Manager engages Trade Contractors as an agent of Council
  - Council retains overall project delivery risk
  - Construction Manager provides project management services, but bears no delivery risk

- Managing Contractor:
  - Council engages a Managing Contractor who enters into contracts directly with the Trade Contractors
  - High level of Managing Contractor responsibility with performance based incentives for achieving cost and schedule benefits
  - Managing Contractor shares some of the project risks with Council



- Advanced Procurement Strategies:
  - EPC (Engineering, Procurement, Construction) – suits complex asset projects
  - Alliance (Target Out-turn Cost) – high collaboration, shared risk/reward
  - Early Contractor Involvement – two-phase alliance/design & construct model

Procurement Processes

Council is responsible for acquiring or procuring goods, services and works for the benefit of the community we serve. An effective and transparent procurement process that achieves value for money is in the interest of all project stakeholders.

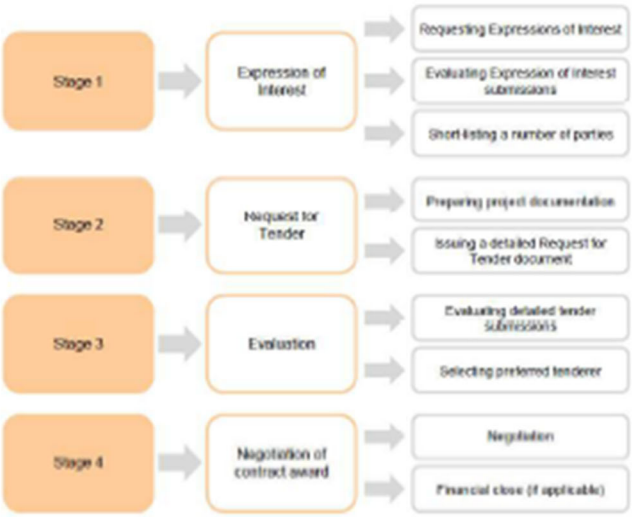
The process must comply with the procurement framework for local government. This framework imposes a number of controls within which Council's own Procurement Policy are undertaken, in addition to:

- Legislation
- Regulations
- Best practice

These controls are designed to ensure that the process is carried out in accordance with probity principles, and in a competitive environment conducive to Council achieving best value and certainty in the award of public contracts for major project works.

The key objectives when developing an effective staged procurement process include:

- Structured to facilitate competitive tendering
- Transparent in order to withstand public and private scrutiny
- Clearly defined with specified timeframes
- Developed planning to increase certainty and value for money
- Effectively manage risks
- Compliant with statutory requirements
- In accordance with best practice and probity principles
- Appointment to the tenderer most capable of delivering the works and/or services
- Produce a binding contract serving Council's best interests



Refer to the Procurement Policy (and Procurement Strategy where applicable) for detailed framework and processes.

Project Governance Model

Refer to the following typical governance model applied to major projects: