

Mackenzie District Council

Water

Activity Management Plan

2021 - 2031



**Quality Record Sheet** 

**Mackenzie District Council** 

Water Activity Management Plan

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1	2000	Amp produced by Waugh Consulting	
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3	2006	Revision of AMP by MDC	
4	2013	Full update by MDC	
5	2015	Revision by MDC to incorporate 30 Year Strategy and Ecans Land and Water Plan	
6	2017	General review using Waugh Template to incorporate recommendations from the 2015 IIMM Manual – MDC and Waugh's	
7	2018	MDC staff with assistance from Waugh IML	
8	2021	MDC staff with assistance from Waugh IML	
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# TABLE OF CONTENTS

1.0	OVERVI	EW	12
2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7	<ul> <li>EXECUTIVE SUMMARY</li> <li>What are we doing</li> <li>Why are we doing it?</li> <li>Where are we headed?</li> <li>How will we get there?</li> <li>How well are we doing and how well do we measure progress?</li> <li>What resources do we have and what resources do we need?</li> <li>Who pays for it?</li> </ul>		<b>13</b> 13 13 13 14 15 16 16
<b>3.0</b>	INTROD Purpose	UCTION	<b>18</b>
5.1	3.1.1	Purpose of this Asset Management Plan	18
	3.1.2	Purpose of Asset Management	18
3.2	Goals ar 3.2.1	nd Objectives of asset ownership Purpose of Ownership	18 18
	3.2.2	Review of Activities and Funding	18
	3.2.3	Legal Authority for Council Action	18
3.3 3.4	Links to Asset Ma 3.4.1	MDC Vision, Mission, Goals and Objectives anagement Drivers Customer Service	20 21 21
	3.4.2	Financial Responsibility	21
	3.4.3	Environmental Responsibility	22
	3.4.4	Safety	22
	3.4.5	Economic Efficiency	22
	3.4.6	Achieve Strategic Goals	22
3.5 3.6	Plan Fra Appropri	mework ate Level of Asset Management	22 23
<b>4.0</b> 4.1 4.2 4.3 4.4	<ul> <li>4.0 DESCRIPTION OF SERVICE</li> <li>4.1 Overview of the Activity</li> <li>4.2 Description of Assets</li> <li>4.3 Key Issues</li> <li>4.4 Water Reticulation</li> <li>4.4 Fire Fighting</li> </ul>		<b>25</b> 25 26 27 29
4.5 4.6	Water Se Water Tr 4.6.1	ervice Lines and Water Points reatment Plants Water Quality	30 30 30
4.7 4.8 4.9 4.10	Pump St Reservo Buildings Critical A	ations irs s ssets	30 31 31 31
<b>5.0</b> 5.1 5.2	ASSET I Introduct Systems	MANAGEMENT PROCESSES & PRACTICES	<b>33</b> 33 34
	5.2.1		35
	523	Network Modelling	37
5.3 5.4	Data Ma Data Co	nagement nfidence	37 37

Water

December 2020

5		Mackenzie DC Activity Management Plan	
5.4.1	Condition Assessments	38	
5 Inforr	nation Technology	38	
6 AMP	Preparation	38	
5.7.1	Audits	38	
5.7.2	Knowledge of assets	39	
5.7.3	Accounting/Economics	39	
5.7.4	Risk Management	39	
5.7.5	Operations	39	
5.7.6	Maintenance	39	
5.7.7	Optimised Lifecycle Strategy	39	
5.7.8	Design & Project Management	40	
579	Suitably Qualified and Trained Staff	40	
5710	Skills	40	
Susta	ainable Practices	41	
5.8.1	Overview	41	
5.8.2	Sustainability and Lifecycle	42	
5.8.3	Significant Negative Effects	43	
Envir	onmental Management	43	
5.9.1	Schedule of Resource Consents	43	
5.9.2	Consent Monitoring and Reporting	44	
0 Clim	ate Change	44	
LEVE	LS OF SERVICE	47	
Defin Activi	ing the Levels of Service ty Goals and Objectives	47 47	
6.2.1	Organisation Mission, Goals and Objectives	47	
6.2.2	Water Supply Activity Goal and Principal Objectives	48	
Curre	ent Levels of Service	49	
6.3.1	Changes to Levels of Service	50	
6.3.2	Levels of Service	50	
6.3.3	Secondary Levels of Service	51	
Level	s of Service Development	52	
6.4.1	Levels of Service Definition	52	
Affor	rmance Measures Jability and Willingness to Pay	53 56	Deleted: 55
Repo	rting	<u>56</u> ,	Deleted: 55
Cons	ultation & Communication	<u>57</u>	Deleted: 56
682		57 57	Deleted: 56
6.8.3	Kov Stakeholders	58	Deleted: 56
	lativo Poquiromonte	50 50	Deleted: 57
6.9.1	National Strategies & Plans	<u>26</u> 62	Deleted: 57
6.9.2	Key Legislation	64_	Deleted: 61
6.9.3	Standards, Codes of Practice & Guidelines	70	Deleted: 63
6.9.4	Regional Strategies & Plans	71	Deleted: 69
6.9.5	Council Strategies, Plans Bylaws and Policies	71	Deleted: 70
0.0.0			Deleted 70

December 2020

Water

Page 7 of 212

	6.9.6	Bylaws
	6.9.7	Policies
	6.9.8	Procedures
<b>7.0</b> 7.1 7.2 7.3	E <b>DEMAND</b> v Drivers D FORECASTS Growth Trends	
	7.3.2	Response to Projected Growth
	7.3.3	Improvements to Levels of Service
7.4 7.5 7.6	Demand Current I Demand 7.6.1	Impacts on Assets Demand Management Plan Asset Based Demand Management
	7.6.2	Non - Asset Based Demand Management
7.7	Future C	apital Programme
<ul> <li>8.0 RISK MANAGEMENT</li> <li>8.1 Overview</li> <li>8.2 Risk Events</li> <li>8.3 Current Approach</li> <li>8.3 1 Picks Assessed and Mitigated</li> </ul>		
	8.3.2	Water Safety Plans
	8.3.3	Integration of risk management approach
	8.3.4	Health and Safety
	8.3.5	Business Continuity Plan
	8.3.6	Civil Defence & Lifelines
	8.3.7	Emergency Management
	8.3.8	Earthquake Damage Assessment
	8.3.9	Alpine Fault 8
	8.3.10	Divestment
	8.3.11	Pandemic Response – COVID-19
8.4 8.5 8.6	Resilienc Insuranc Assumpt	ce e ions and Uncertainties
<b>9.0</b> 9.1 9.2 9.3	LIFECYO Overview Manager Operatio 9.3.1	CLE MANAGEMENT v ment ns and Maintenance Service Delivery
	9.3.2	Management & Maintenance History
	9.3.3	Maintenance and Operational Strategies
	9.3.4	Current Condition
	9.3.5	Current Performance
	9.3.6	Operation and Maintenance Costs
	9.3.7	Manuals and procedures
9.4	Renewal 9.4.1	/Replacement Renewal Strategy

ESTICIA	Deleted: 73
	Deleted: 74
Internation of the second	Deleted: 75
<u>74</u>	Deleted: 76
<u>75</u>	Deleted: 76
76, /	Deleted: 76
77_ /	Deleted: 76
77,	Deleted: 77
77	Deleted: 79
78	Deleted: 79
80,	Deleted: 80
80.	Deleted: 80
81.	Deleted: 82
81,	Deleted: 82
83	Deleted: 84
85	Deleted: 85
86	Deleted: 87
<u>00</u>	Deleted: 87
88.	Deleted: 87
88	Deleted: 87
88,	Deleted: 88
80	Deleted: 88
00	Deleted: 89
<u>90</u>	Deleted: 89
<u>90</u>	Deleted: 89
<u>90</u>	Deleted: 90
<u>91</u>	Deleted: 90
<u>91</u>	Deleted: 90
<u>91</u>	Deleted: 94
<u>95</u>	Deleted: 94
<u>95</u>	Deleted: 95
<u>96</u>	Deleted: 96
<u>97.</u> 98.	Deleted: 97
98	Deleted: 97
<u>114</u>	Deleted: 115
114	Deleted: 115
115	Deleted: 115
<u>116</u>	Deleted: 110
<u>117</u>	Deleted: 117
<u>117</u>	Deleted: 119
<u>119</u>	Deleted: 120
<u>119</u>	Deleted: 120
121	Deleted: 120
<u>121</u>	Deleted: 122
<u>121</u>	Deleted: 122
122	Deleted: 123
	Deleteu. 120

Page 8 of 212

Water

100	- AL
1.0	-7
	332
(Intel A	1001
	2
-	

ę	9.4.2	Projected Renewals	122	Deleted: 123
ę	9.4.3	Deferred Renewals	123	Deleted: 124
9	9.4.4	Planned Renewals	124	
9.5 9.6	Asset De Asset Dis	evelopment sposal	126 126	
<b>10.0</b> 10.1	FINANC Funding 10.1.1	I <b>AL</b> Details Financial Strategy	<b>128</b> 128 128	
	10.1.2	Rating	128	
	10.1.3	Harmonisation	129	
	10.1.4	Price Level Changes & Forecast Financial Statements	129	
	10.1.5	Vested Assets	129	Deleted: 130
	10.1.6	Funding Strategy	129,	Deleted: 130
10.2	Asset Va 10.2.1	luation Depreciation	<u>130</u> 131	Deleted: 131
	10.2.2	Valuation methodology	132	Deleted: 132
	10.2.3	Asset Lives and Assumptions	132	Deleted: 133
	10.2.4	Resource Consents	133	
10.3	Financial	Summary	133	
<b>11.0</b> 11.1 11.2 11.3 11.4 11.5 11.6	IMPROV Improver Improver Current I Project Io Reporting AM Prep	EMENT PLANNING ment Plan Achievements ment Plan Focus mprovement Plan dentification and Assignment g on Projects aration, Monitoring & Review	<b>138</b> 138 140 141 143 143 143	
<b>APP</b> A1 A2 A3 A4 A5 A6	ENDIX A Fairlie W Lake Tel Twizel W Burkes F Allandale Albury W	INDIVIDUAL SUPPLIES DESCRIPTION ater Supply capo Water Supply fater Supply Pass Water Supply e Water Supply fater Supply	<b>145</b> 145 158 169 184 194 206	

December 2020

Water

#### TABLE OF TABLES Table 9-1: Lifecycle Management Categories ..... 114 Table 9-2: Management Activities...... Table 9-3: Current Contract ...... Table 9-4: Historical data ...... Table 9-5: Asset Strategies...... Table 11-1: Improvement Plan Achievements 138 Table 11-2: Water Safety Plans Improvement Plan Achievements 139 Table 11-3: Water Safety Plans Improvement Plan......140 Table 11-4: Current Improvement Plan...... 142

# TABLE OF FIGURES

Figure 3-1: AMP Framework	23	
Figure 4-1: All water supplies materials	28	
Figure 4-2: All water supplies water main sizes	28	
Figure 4-3: All water supplies population distribution	29	
Figure 5-1: MDC Organisation Structure	33	
Figure 5-2: Operations Group Structure	33	
Figure 5-3: MDC Systems	34	
Figure 5-4: WaterNZ Competency Framework	41	
Figure 6-1: Water Service – Overall Satisfaction Rates	<u>56</u>	Deleted: 55
Figure 6-2: Water Service - Satisfaction Rates	<u>57</u>	Deleted: 56
Figure 6-3: Corporate links to AMPs	<u>74</u>	Deleted. 50
Figure 7-1: Average Daily Demand per Water Supply	<u>81</u>	Deleted: 73
Figure 7-2: Demand – Average Daily per Person	<u>82</u>	Deleted: 80
Figure 7-3: Demand – Average Daily per Connection	<u>82</u>	Deleted: 81
Figure 9-1: Balancing Proactive and Reactive Maintenance	116	Deleted. 01
Figure 9-2: District Wide Reactive Maintenance	. <u>120</u>	Deleted: 81
Figure 9-3: District Wide Reactive Maintenance	120	Deleted: 11
Figure 9-4: Historical O&M Expenditure	121	Deleted: 12
Figure 9-5: District Wide Projected Renewals	122	Deleted. 12
Figure 10-1: Asset Valuation.	131	Deleted: 12
Figure 10-2. S Waters Asset Value Distribution	146	Deleted: 12
Figure 11-1. Famile Water Supply Source & make Structure	140	Deleted: 12
Figure 11-2. Fairle WS Heathent Flant	147	Deleted. 12.
Figure 11-0: Fame wo be finance for Retignation	151	Deleted: 13
Figure 11-5: Water Main Diameters	151	
Figure 11-6: Pine Age Group Replacement Cost	152	
Figure 11-7: Water Main Material	152	
Figure 11-8: Reactive Maintenance	153	Deleted: 16
Figure 11-9: Lake Tekapo Water Supply Intake	159	
Figure 11-10: Lake Tekapo WS Cl/ building & UV treatment	160	Deleted: 16
Figure 11-11: Lake Tekapo WS Reservoir.	. 160	(Deleted: 16
Figure 11-12: Replacement Costs for Reticulation	. 163	Deleted: 16
Figure 11-13: Water Main Diameters	164	
Figure 11-14: Pipe Age Group Replacement Cost	164	Deleted: 16
		Deleted: 16

(	Deleted: 86
(	Deleted: 98
(	Deleted: 115
(	Deleted: 116
~(	Deleted: 117
(	Deleted: 118
(	Deleted: 118
X	Deleted: 119
(	Deleted: 131

Deleted: 55	
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Deleted: 80	
Deleted: 81	
Deleted: 81	
Deleted: 117	
Deleted: 121	
Deleted: 121	
Deleted: 122	
Deleted: 123	
Deleted: 132	

1	Deleted: 160
1	Deleted: 161
-	Deleted: 161
	Deleted: 164
	Deleted: 165
	Deleted: 165

Page 10 of 212

Water



Figure 11-15:	Water Main Material	16	5
Figure 11-16:	Reactive Maintenance	16	5
Figure 11-17:	Twizel Water Supply Intake	17	þ,
Figure 11-18:	Twizel WS Treatment Plant	17	I,
Figure 11-19:	Twizel WS Raw Water Reservoir	17:	Σ
Figure 11-20:	Replacement Costs for Reticulation	17	Ē,
Figure 11-21:	Water Main Diameters	17	Ż,
Figure 11-22:	Pipe Age Group Replacement Cost	17	B
Figure 11-23:	Water Main Material	17	B,
Figure 11-24:	Reactive Maintenance	179	þ
Figure 11-25:	Burkes Pass Water Supply Source & Intake Structure	18	5
Figure 11-26:	Replacement Costs for Reticulation	18	Ż,
Figure 11-27:	Water Main Diameters	18	B,
Figure 11-28:	Pipe Age Group Replacement Cost	18	B,
Figure 11-29:	Water Main Material	18	þ
Figure 11-30:	Reactive Maintenance	18	þ
Figure 11-31:	Allandale Water Supply Source & Intake Structure	19	5
Figure 11-32:	Allandale WS Treatment Plant	19	Ô,
Figure 11-33:	Replacement Costs for Reticulation	19	B,
Figure 11-34:	Water Main Diameters	19	þ,
Figure 11-35:	Pipe Age Group Replacement Cost	19	þ
Figure 11-36:	Water Main Material	20	þ,
Figure 11-37:	Reactive Maintenance	20	þ,
Figure 11-38:	Albury Water Supply Source & Intake Structure	20	Ľ,
Figure 11-39:	Albury WS Treatment Plant	20	B,
Figure 11-40:	Albury WS Storage Tanks	20	B,

Deleted: 166	
Deleted: 166	
Deleted: 171	
Deleted: 172	
Deleted: 173	
Deleted: 178	
Deleted: 178	
Deleted: 179	
Deleted: 179	
Deleted: 180	
Deleted: 187	
Deleted: 189	
Deleted: 190	
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Deleted: 191	
Deleted: 191	
Deleted: 197	
Deleted: 198	
Deleted: 200	
Deleted: 201	
Deleted: 201	
Deleted: 202	
Deleted: 202	
Deleted: 209	
Deleted: 210	
Deleted: 210	

December 2020

Water

Page 11 of 212

# 1.0 OVERVIEW

WATER	The water activity is a core Council activity that contributes towards the provision of good quality infrastructure and helps ensure public health and safeguards the environment. The water system comprises treatment facilities, pipes, pump stations and other assets that represent a significant council investment over many years.
	<b>New Capital and Growth</b> – Continue compliance with the Health Act and investment to meet Drinking Water Standards for New Zealand
	-to provide capacity to meet future demand and support the expansion of development areas as identified by Council.
FOCUS	<b>Renewals</b> – implement renewals strategy; including condition and criticality assessments. Ensure appropriate budgets are available to replace aging and/or deteriorating assets.
	<b>3 Waters Regulatory Framework</b> – Continue to monitor and respond to the Government's new Water Regulatory Framework including but not limited to:
	<ul> <li>Strengthened water safety plans</li> <li>Multi-barrier approach</li> <li>Maintaining disinfection residuals in the reticulation.</li> <li>Identifying and managing risks</li> <li>Training &amp; qualification requirements</li> </ul>
	<b>COVID 19</b> - Central Government's programme and funding package to provide immediate post COVID 19 stimulus to maintain and improve three waters infrastructure
COMPLIANCE	<b>Resource Consents</b> - Council has a number of Water related resource consents and aims to achieve compliance with all resource consent conditions. Regular compliance monitoring and reporting is undertaken
SERVICE DELIVERY	Service Delivery - the Water activity is delivered via a combination of in-house resources and contracted services including a major contract; for the operation and maintenance activities of water reticulation and facilities
	Operation and maintenance costs will increase to ensure compliance with resource consents and DWSNZ.
PERFORMANCE	<b>Performance</b> - a comprehensive performance monitoring and reporting framework ensures that legislative requirements and other KPIs are regularly assessed and reported on.
<b>RISK &amp;</b>	Understand our communities, the hazards and risks and acknowledge that failure will occur.
RESILIENCE	Ensure early detection and recovery through connecting communities, supporting community organisations and robust infrastructure assets
	The ability to deliver capital projects on time may be affected by the increased consultation processes under <b>Te Mana o te</b> <b>Wai</b> requirements

Water

December 2020



# 2.0 EXECUTIVE SUMMARY

#### 2.1 What are we doing

We protect public health and the environment by supplying water to the District's population through the operation of six individual water supplies. These water supplies are located at:

- Fairlie
- Lake Tekapo
- Twizel
- Burkes Pass
- Allandale
- Albury (managed by Albury Rural Water Supply Society Inc.)

Council supports this service by:

- Providing, operating and maintaining of water infrastructure in compliance with New Zealand legislation and standards
- Responding to call outs and service disruptions quickly and efficiently
- Planning for future development and needs

# 2.2 Why are we doing it?

Council has a legal obligation under the Health Act 1956 to improve, promote, and protect public health within the District. The Health (Drinking Water) Amendment Act 2007 places a further obligation on Council to comply with the Drinking Water Standards for New Zealand. In terms of the Local Government Act 2002 the continued operation of Water Supplies is required unless specific approval is sought to withdraw from the activity (in whole or part). The Council sees the provision of reliable and safe drinking water to the community as a major contribution to the District's economy and to resident's wellbeing.

Council's water supply activity contributes primarily to the following community outcomes:

Community outcome	How it contributes
Resilient, successful communities	Providing quality potable water to agreed areas and protecting communities from water related health issues
Resilient, successful communities	Providing a sustainable, efficient and effective water service
A treasured environment	Providing a water service that acknowledge and incorporates the natural environment in design, construction, operation and maintenance
Strong and innovative economy	Demand management Timely response to system failures Maintaining quality and continuity of supply

Council has not found any significant negative effect that the water activity may have on the well being of the community. However, Council is aware that the demand for greater volumes of water has the potential to deplete water resources in the district. Council will continue to identify and implement methods of making water supply services more efficient and sustainable.

# 2.3 Where are we headed?

Council's principal goal for water over the next ten years is:

To ensure that adequate potable supplies of water are provided (by public means) for all
residential, commercial and industrial buildings (other than single buildings on a single property).

The main focus for Council over the past number of years has been to improve water treatment throughout the district to comply with the Health (Drinking Water) Amendment Act 2007. There are a number of key issues facing Council over the next ten years and beyond:

December 2020

Water

Page 13 of 212

- Continue compliance with the Health Act and investment in to meet Drinking Water Standards for New Zealand
- Compliance with new drinking water regulatory framework. The extent is still to be confirmed but will include:
  - registration of all drinking water supplies with only single household self-suppliers excluded
  - o strengthened Water Safety Plans
  - o multi-barrier approach to ensuring drinking water safety:
  - o identifying and managing risks, source protection, treatment and reticulation
  - maintaining disinfection residuals in the reticulation
  - increased accountability
  - competency framework
- Central Government's 3 Waters Reform Programme and funding package to provide immediate post COVID 19 stimulus to local authorities to maintain and improve three waters infrastructure.
  - Increased costs as a result of:
    - operation and maintenance costs associated with more sophisticated treatment systems
      - increased monitoring and reporting
      - training and qualification requirements
  - Understanding network capacity and performance
- Increased focus on ageing and failing infrastructure
- Maintaining appropriate data and monitoring systems
- Ensure adequate in-house staff resource capacity and capability
- Progressively increase resilience of the water supply service
- Investigating and implementing improved efficiencies
- Ongoing affordability of the water supply
- Managing water demand

The water system represents a significant community investment. With age, asset condition and service potential reduces and an important aspect of asset management is determining the right time and right level of renewals investment in order to maintain the agreed levels of service over the long term. Council will continue implementing the appropriate intervention strategies i.e. a combination of maintenance, repair and renewal activities to maintain the service.

Generally, the water network is in good condition and is maintained and renewed regularly, the service can be expected to last indefinitely, without any significant abnormal costs having to be incurred.

# 2.4 How will we get there?

Water treatment will improve in all parts of the District to meet the requirements of the Health (Drinking Water) Amendment Act 2007. Council has been upgrading numerous treatment plants over the last number of years to meet the requirements of the Act.

Over the next ten years Council plans to:

- Maintain consumer's access to water,
- Comply with the Health Act,
- Continue to monitor and respond to the Government's new Water Regulatory Framework, and
   Continue maintenance and renewal of the water network to meet the needs of current and future consumers.

This vision is supported by a detailed water asset management plan.

Significant projects and their funding sources are summarised in the following table:

Water



Project	Priority Type	Year	Amount (uninflate d)	Amount (inflated)	Description
Service Connections - new	Renewal	2021/31	\$3,024,000	\$3,532,714	Existing service connections to water supply which are being upgraded
Reticulation – new	LOS	2021/31	\$13,021,928	\$13,764,718	Renewals – refurbishment, replacement of pipes and facilities equipment for water supplies is estimated to be \$13.8 mover the next 10 years. All water supply renewal work will be funded either by stimulus package funding or by the annual depreciation provision where funds are available. This includes the planned renewal the AC pipes in Twizel (completion programmed for end of 2022). This will replace all the small diameter mains that require replacing.
Treatment - new	LOS	2021/31	\$7,214,080	\$7,390,514	Fairlie Water Treatment Plant Upgrade and storage.
Allandale/Spu r Road water supply - Reticulation extension	LOS	2024/25	\$554,660	\$599,960	Installation of connection of Allandale to Fairlie water supply
Water Supply Renewals <sup>1</sup>	LOS	2020/21	\$0	\$0	Renewal works to Water supply infrastructure (this has since been completed in 2020/21)
Water Metering Trial - Twizel Install <sup>1</sup>	LOS	2021/22	\$322,753	\$322,753	Installation of water meters in Twizel.
Potable Water Supply Remote Properties - install <sup>1</sup>	LOS	2021/22	\$175,000	\$175,000	Remote supply of potable water investigation and implementation
Total			\$24,257,761	\$25,785,659	

<sup>1</sup>Three Waters Reform Projects

Key projects:

- Fairlie Water Treatment Plant Upgrade and storage
- Supplies to remote properties
- renewals refurbishment, replacement of pipes and facilities equipment for water supplies is
  estimated to be \$13.8m over the next 10 years. All water supply renewal work will be funded
  either by stimulus package funding or by the annual depreciation provision where funds are
  available
- Installation of water meters in Twizel.

To ensure on-going affordability of the water supply service Council will continue to consider options in delivering the service, including collaboration with other local authorities as we did with the SCADA and Timaru District Council.

### 2.5 How well are we doing and how well do we measure progress?

Council plans to take all practicable steps to comply with the Health (Drinking Water) Amendment Act 2007 and the associated Drinking Water Standards for New Zealand, and will also renew resource consents prior to expiry and report on the following performance measures.

In accordance with 261B of the Local Government Act 2002, Non Financial Performance Measures were adopted on 12 November 2013. These Performance Measures require Local Authorities to report on the performance of the key activities of water supply, wastewater, stormwater, flood protection and roads annually from 2015/16.

Council will continue to report on the non financial performance measures as this covers the key expectations in terms of the delivery of the service.

December 2020

Water

Page 15 of 212



Council have reviewed and updated its systems and processes to ensure alignment and compliance with these rules.

The linkage between community outcomes, how the activity contributes, levels of service and performance measurement is shown in the following table.

Community outcome	How it contributes	Level of Service	Performance Measure	
Resilient, successful communities	Providing quality potable water to agreed areas and protecting communities from water related health issues	Water is safe to drink	DWSNZ compliance	
	Providing a sustainable, efficient and effective water service	Water services are available and reliable	Response & resolution	
A treasured environment	Providing a water service that acknowledge and incorporates the natural environment in design, construction, operation and maintenance	Water quality is maintained or improved	DWSNZ compliance Response & resolution	
Strong and innovative economy	Demand management Timely response to system failures Maintaining quality and continuity of supply		Real water losses Response & resolution Average consumption	

# 2.6 What resources do we have and what resources do we need?

#### People -

The Essential Services Group has seven full time equivalent staff. The Essential Services Group provides management and engineering expertise to the Water, Wastewater, Stormwater, and Roading activities. The 3Waters reform is likely to increase the work within the 3Waters area. The Unit utilises contractors to maintain, renew, and construct assets through various contractual agreements. The Unit augments its skill base through the engagement of specialist consultants as required to undertake specific projects and works.

It is likely that a shortage of technically skilled people to design, construct and manage water assets will continue to have an impact on this activity in future years. This is a global issue which is also affecting other local authorities.

#### Physical Assets -

Council manages five water supply systems. The supplies consist of water treatment plants, pumping stations, reservoirs and reticulation systems. The reticulation systems consist of pipes, valves, fire hydrants and service connections.

- Length of water mains 373km
- Number of pump stations 4
- Number of valves 1,059
- Number of fire hydrants 532.

The latest valuation, July 2019, estimates the replacement value of the Treatment Plants, Pump Stations and Reticulation to be \$44.8m.

# 2.7 Who pays for it?

This activity is funded by targeted rates from properties that have access to water supply systems.

The New Zealand Government is undertaking a reform programme for "Three Waters" (drinking water, wastewater and stormwater) service delivery for communities (Three Waters Reform Programme). In conjunction with the Three Waters Reform Programme, the New Zealand Government is investing in water service delivery. The investment's objectives are to:

Water



- improve the safety and quality of drinking water services, and the environmental performance
  of drinking water and wastewater systems, by maintaining, increasing or accelerating
  investment in core water infrastructure renewals and maintenance; and
- support New Zealand's economic recovery from the COVID-19 pandemic through job creation, by enabling investment to continue at a time when council revenues are uncertain and they face immediate cashflow challenges.

The Council has accepted crown stimulus grant funding for projects as part of the Three Waters Services Reform. The crown has committed approximately \$500m nationwide in tranche 1, and the MDC allocation is \$5.11m, of which \$2.56m has already been received by MDC as an advance payment. These stimulus projects are in addition to current LTP projects already underway.

In year one a number of projects will be funded from this fund.

Page 17 of 212

# 3.0 INTRODUCTION

This section sets out the purpose of this Asset Management Plan (AMP) and shows the plan framework.

# 3.1 Purpose

#### 3.1.1 Purpose of this Asset Management Plan

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

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

#### 3.1.2 Purpose of Asset Management

The International Infrastructure Management Manual 2015 (IIMM) states the purpose and scope of AM as:

- The objective of asset management is to meet the required level of service, in the most cost effective manner, through the management of assets for present and future customers. As highlighted by ISO 55000, good AM is about achieving best value through the right balance between cost, risk and performance
- Lifecycle asset management encompasses all practices associated with considering management strategies as part of the asset lifecycle. The objective is to look at lowest longterm cost (rather than short term savings) when making decisions

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

# 3.2 Goals and Objectives of asset ownership

### 3.2.1 Purpose of Ownership

Council provides a safe, effective and sustainable Water Supply system:

- to ensure that adequate potable public supplies are provided for all residential, commercial and industrial buildings
- to ensure that adequate water supplies are available for fire fighting purposes.

The Council's overriding goal is:

•

"The outcome desired by the community is to have safe, effective and sustainable water, communication, energy and transport systems in place when required, through sound long term planning and funding".

# 3.2.2 Review of Activities and Funding

The LTP identifies planned activities, defines the rationale for justifying these activities, and identifies the appropriate funding source.

#### 3.2.3 Legal Authority for Council Action

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

Page 18 of 212

Water





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

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

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

Section 6.9.5 Council Strategies, Plans, Bylaws and Policies discuss the links with other planning documents and processes such as the Long Term Plan (LTP).

December 2020

Water

Page 19 of 212

B

# 3.3 Links to MDC Vision, Mission, Goals and Objectives



MDC's outcomes and objectives for the water supply network are stated in the LTP 2021 - 2031.

Page 20 of 212

Water



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

The principle goal is to provide an effective, efficient, accountable and sustainable range of services that meet the actual needs of the residents. The water supply provides ratepayers with access to wholesome water to each residence and commercial properties in those communities served and provides for fire fighting in those communities as well (except Burkes Pass).

The over-riding management strategy is that the Water Supply infrastructure as it presently exists will be maintained in the same state in perpetuity.

The Community Outcomes, Levels of Service and Performance Measures are discussed in Section 6.0 Levels of Service.

# 3.4 Asset Management Drivers

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

#### 3.4.1 Customer Service

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

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

#### 3.4.2 Financial Responsibility

The Local Government Act requires Local Authorities to:

- prepare and adopt, every three years, a long term (10 years plus) financial strategy for all infrastructural assets which takes into account asset creation, realisation, and loss of asset service potential
- determine their long term financial strategy, consider all relevant information and assess the cost/benefit of alternatives
- adopt a financial system consistent with generally accepted accounting practices
- manage assets prudently in the interests of the district and its inhabitants
- fund or otherwise provide for loss of service potential (deferred maintenance or depreciation) from July 1999

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

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

Changes to the Local Government Act 2002 during 2014 requires that a local authority must prepare and adopt, as part of its long term plan, an Infrastructure Strategy for a period of at least 30 consecutive financial years to guide decision-making for the next 30 years. This is detailed in Section 6.9.5 Council Strategies.

December 2020

Water

Page 21 of 212

#### 3.4.3 Environmental Responsibility

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

### 3.4.4 Safety

AM planning addresses MDC's safety obligations through:

- adoption of appropriate design standards for the creation of new assets
- development of risk management practices

### 3.4.5 Economic Efficiency

The techniques incorporated into this AMP support economic efficiency by:

- providing a basis for monitoring asset performance and utilisation
- enabling asset managers to anticipate, plan and prioritise asset maintenance and renewal expenditure
- identifying under-funding of asset maintenance and renewal
- quantifying risk, leading to minimisation of high impact (financial and service level) failures and environmental effects and resulting in savings where asset renovation is less than the cost of replacement
- extending the life of an asset by optimising maintenance programmes and demand management

### 3.4.6 Achieve Strategic Goals

MDC has a strategic intent to "achieve sustainable development" and other goals relating to growth, building communities, protecting the environment, supporting the economy and providing quality customer service.

# 3.5 Plan Framework

The AMP structure is graphically represented below:

Water







# 3.6 Appropriate Level of Asset Management

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

- The costs and benefits to the organisation
- Legislative and other mandated requirements
- The size, condition and complexity of the assets
- The risks associated with failures

December 2020

Water

Page 23 of 212



A core Activity Management Plan will meet minimum legislative and organisational requirements for financial planning and reporting. It provides basic technical management outputs such as statements of current levels of service, forward replacement programmes and associated financial projections.

MDC considers the required sophistication of their plan in the short to medium term need not progress beyond a "Core" planning level, as:

- the cost at this time to move to an advanced plan would provide little significant benefit to Council • or its' customers
- the size, complexity and use of the assets is consistent with a rural sparsely populated district • the risks associated with failure are low •

The current Activity Management Plan generally meets "Core" requirements. By implementing improvement planning Council can assess the asset management performance and identify gaps to drive the improvement actions.

Water



# 4.0 DESCRIPTION OF SERVICE

This section of the Plan covers the overview of the activity and the description of assets covered under it.

#### 4.1 Overview of the Activity

The Mackenzie District Council (hereafter council) is a local authority located in the middle of the New Zealand South Island and covers 7,339 square kilometres.

Council is in many ways a typical example of the majority of its namesakes as a provider of "core" activities. Core activities are considered to be delivery of water (urban and rural), wastewater (sewerage), water races and stormwater services.

How and where water for human, agricultural, cultural and recreational uses is sustainably managed is of considerable importance. Council has consistently regarded the provision of the water services as vital to maintaining the community's health and well-being.

Council owns 6 separate urban and rural water supply systems consisting of Fairlie, Tekapo, Twizel, Burkes Pass, Allandale and Albury. The Albury Water Supply is managed by the Albury Rural Water Supply Society Inc.

### 4.2 Description of Assets

Overall there are 6 water intakes, 7 storage facilities and 4 pump stations. Total length of reticulation is 373 km that varies from 15 mm to 355 mm in diameter.

Replacement value of treatment plants, pump stations and reticulation is approximately \$45,986,000 as at July 2019 asset valuation.

Supply	Population (UR)	Type of Supply	Source	Treatment	Storage (m³)	Pump Stations	Reticulation (km)	Valves	Hydrants	Replaceme nt Value
Fairlie/Kimbell	1,000	U	S	Cl <sub>2</sub>	190	1	43.1	196	122	
Tekapo	552	U	G	Cl <sub>2</sub> & UV	1,100	2	27.7	235	100	
Twizel	1,500	U/R	BG	F & Cl <sub>2</sub> & UV	7,500	1	71.4	563	312	
Burkes Pass	30	Ut	CG	Cl <sub>2</sub>	22	-	3.3	2	1	
Allandale	291	R	R	Cl <sub>2</sub>	NA	-	117,7	64	2	
Albury	200 (est)	R	С		180	-	107.9	2	-	
Stockwater (As	hwick, Scho	ool Rd)				114km of op				
Water Total	3,343					4	373	1,059	532	\$45,986,000
Type of Supply     Source       U = Urban (on demand)     B = Bore       Ut = Urban (tank)     C = Creek       R = Restricted     G = Gallery       S = Spring     R = River       WR = Water Race     WR = Water Race						<b>Treatme</b> $Cl_2 = ChlF = FiltraN = No tiUV = Ulti$	nt lorine tion reatment/di ra Violet Irr	isinfection adiation		

The Downlands Water Supply extends across three districts, Timaru, Waimate and Mackenzie districts. The Downlands Water Supply is the responsibility of the Downlands Joint Standing Committee, and managed by the Drainage and Water Unit staff of the Timaru District Council. The village of Albury is

December 2020

Water

Page 25 of 212



connected to the Downlands Water Supply, while the Albury Water Supply supplies water to the surrounding rural area.

#### 4.3 **Key Issues**

There are a number of key issues facing Council over the next ten years and beyond:

- Continue compliance with the Health Act and investment in to meet Drinking Water Standards for New Zealand
  - Compliance with new drinking water regulatory framework. The extent is still to be confirmed but will include:
    - registration of all drinking water supplies with only single household self-suppliers 0 excluded
    - strengthened Water Safety Plans 0
    - multi-barrier approach to ensuring drinking water safety: 0
    - identifying and managing risks, source protection, treatment and reticulation 0
    - maintaining disinfection residuals in the reticulation 0
    - increased accountability 0
    - competency framework 0
- Central Government's 3 Waters Reform Programme and funding package to provide immediate post COVID 19 stimulus to local authorities to maintain and improve three waters infrastructure.
  - Increased costs as a result of:
    - operation and maintenance costs associated with more sophisticated treatment 0 systems
      - increased monitoring and reporting training and qualification requirements 0
      - 0
  - Understanding network capacity and performance
- Increased focus on ageing and failing infrastructure
- Maintaining appropriate data and monitoring systems
- Ensure adequate in-house staff resource capacity and capability
- Progressively increase resilience of the water supply service
- Investigating and implementing improved efficiencies
- Ongoing affordability of the water supply
- Managing water demand

The following table lists the key issues associated with each individual water supply.

Resolution
Collaborate with the Government and other local authorities in the region to consider future 3Waters service delivery arrangements
Backflow prevention
Universal (smart) metering in urban on demand supplies
Install FAC monitoring at pump stations and connect to SCADA
Gap analysis to align with regulatory changes
Treatment Plant upgrade (2021-23)
Build additional reservoir (2021-23)
Planned renewals (to be completed as part of the 3 waters stimulus package)
Planned renewals
Double trunk main
Provide storage on east and west side of the Tekapo River

Water

Issues	Resolution
Twizel	
AC pipe	Planned renewal (completion programmed for end of 2022). This will replace all the small diameter mains that require replacing.
Trunk main capacity	Modelling to ascertain trunk main capacity
Resilience – trunk main from treatment plant to reticulation	Double trunk main
Burkes Pass	
Manage demand within consent limits	Consider changing from on demand to restricted supply
Equal access to water supply	
Allandale	
Poor workmanship on PE pipes	Investigate resolution
DWSNZ Compliance -	Potentially connect to Fairlie
Protozoa compliance	
Power to treatment plant	
Didymo clogging up filter	
Albury	·
Locally managed (Risk)	Water Safety Plan in place and implemented

# 4.4 Water Reticulation

Council owns and is therefore responsible for the management of the water supplies in the District. The urban supplies in most areas provide an "on demand" service to consumers and have provision for some fire fighting from water supply mains. The rural supplies are intended to supply water for stock and domestic use on a continuous but restricted supply basis. The restricted supplies relies on small diameter pipes providing a continuous supply to consumer's boundaries and rely on the consumer's storage provision to satisfy peak domestic and stock water demand. Normal fire fighting is not possible from rural water scheme mains, but storage tanks are required to have a firefighting fitting available.

A water reticulation network can be divided into three separate groups namely:

- Trunk mains –connect the water source to treatment plants, treatment plants to reservoirs, and
  reservoirs to demand areas. Trunk mains rarely have customer connections on them and often
  do not have fire hydrants. Trunk mains are part of the supply and primary distribution
- Reticulation mains are mains, fire and rider mains, which distribute the water from the
  reticulation, trunk mains and in some cases, service reservoirs, to the consumer. Fire mains are
  fitted with fire hydrants and a minimum 100mm diameter. Rider mains are usually 50mm or
  80mm diameter and normally serve less than twenty (20) properties
- Service connections are the pipes connecting the consumer to the reticulation mains. Service connections are residential connections, commercial/industrial connections and fire connections. Residential connections are mainly 15-25mm in diameter, with commercial/industrial connections ranging from 25/50mm to large, depending on the requirements from the consumer. Fire connections provide fire flows to automatic sprinkler systems or similar fire protection systems

Water





- PE make up most of the reticulation material (51%) due to the extensive PE mains in rural networks
- In the urban supplies PVC make up 47% of the reticulation material
- District wide PVC make up 32% of the reticulation material
- PE, PVC and AC are the main material types

# Figure 4-2: All water supplies water main sizes



- 41% of the reticulation is 50mm diameter and smaller
- 25% of the reticulation is 100mm diameter and greater

Water



Figure 4-3: All water supplies population distribution



(Drinking Water Online Population Figures)

#### 4.4.1 Fire Fighting

The Fire and Emergency New Zealand Act 2017 repeals the 2 Acts governing fire services, the Fire Service Act 1975 and the Forest and Rural Fires Act 1977, to give effect to a single, unified fire services organisation for New Zealand. The Act establishes Fire and Emergency New Zealand (FENZ) and combines urban and rural fire services.

The Local Government Act 1974 requires the Council to fit fire hydrants to water mains, maintain the fire hydrants and requires the Council to keep the fire hydrants charged.

The Local Government Act 2002 defines the purpose of local authorities as enabling local decision making by and on behalf of the community, and allows local authorities the power of general competence. This Act specifically requires Councils to continue to provide and maintain water and wastewater services if they do so already.

**The Building Act 2004** requires under Sections 46 and 47 that copies of certain building consents must be provided to the New Zealand Fire Service Commission (NZFSC) and the NZFSC then may give advice in relation to fire escape and the needs of lawful fire fighters.

The Fire Fighting Code of Practice is prepared and issued by the NZ Fire Service pursuant to The Fire Service Act 1975. It defines various water supply classifications from FW1 – FW7 (ranging from single family dwellings to hotels/businesses to supermarkets/industrial areas) by the fire hazards present and then states minimum water flows, storage volumes and pressures required. The water supply classification can change within a town between the residential properties (FW2), industrial areas (FW6/7) and depending on the floor area (fire cell) of commercial/public properties. Therefore, the demands on the water supply differ between these areas.

#### Current Approach

Mackenzie District Council is guided by SNZ PAS 4509:2008 New Zealand Fire Service Fire Fighting Water Supplies Code of Practice for all Urban Fire Districts. Adoption of the Code of Practice is not mandatory, but Mackenzie District Council use the Code of Practice as a best practice guide and will identify and promote where applicable improvements to comply with the Code of Practice.

December 2020

Water

Page 29 of 212



Typically, the Fire and Emergency New Zealand (FENZ) tests the flows at fire hydrants. However, traffic management requirements have resulted in the FENZ no longer undertaking this activity. Council will conduct mains flushing and hydrant testing through the operation and maintenance contract (IP 14).

#### 4.5 Water Service Lines and Water Points

**Urban** - In the urban water supplies the water service line is the sum of the tapping band to the main; the service line and the toby/manifold or meter.

**Restricted** - There are no water service lines in the restricted water supplies. The water main is connected directly to the restrictor.

# 4.6 Water Treatment Plants

The HAA 2007 and DWSNZ 2008 is having a considerable effect on the treatment plants of the water supplies. Compliance with the DWSNZ 2008 requires all of the treatment facilities to be upgraded. The DWSNZ 2008 requires the following barriers to prevent contamination of the public water supply:

- Protection of source water
- Filtering to remove particulate matter
- Disinfection to inactivate pathogenic organisms still present after filtration
- Protection of treated water from subsequent contamination

The DWSNZ 2008 states that until source water categories have been established the log credit requirement for the supply will be assumed to be 4 logs.

# 4.6.1 Water Quality

There are six intakes consisting of a range of water supply sources i.e. spring/creek/bore/river. These sources provide unsecure water e.g. with bacteria, protozoa and silt from time to time to the customers. Treatment Plant upgrades and associated Water Safety Plans (WSP) aim to address potential water quality issues.

Acceptance of risk through the WSP is an acknowledgement by the community and Council that they will carry some risks and deal with others through financial and Council resources. In effect the WSP prioritises work by the level of risk it poses to human health. Supply layout, operation and management all determine the risks, therefore this process while being much more focussed on supplies, also requires more staff and community involvement.

Intake and reticulation water is regularly tested for the presence of bacteria in compliance with the DWSNZ 2008.

### 4.7 Pump Stations

In general, the water supplies rely on gravity systems to take ground/surface water either direct into the network and/or to surface reservoirs. Pumping capacity is limited to the rate (litres per second) specific in the water supply resource consent (take and use).

**Fairlie** - There is a booster pump station lifting water from Nixon's reservoir to the 25m<sup>3</sup> reservoir on School Road and a booster pump station supplying a recent subdivision at Kimbell. The planned upgrade of the Fairlie Water Treatment Plant will require a booster pump station.

**Lake Tekapo** – Water is gravity fed from the infiltration gallery through the treatment to the reservoir. There is a booster pump on Lochinver Avenue lifting water to the higher elevations in the Lochinver subdivision.

Page 30 of 212

Water



**Twizel** – water is pumped from bores to the raw water storage pond, then pumped through the treatment to the treated water wetwell, then pumped into the reticulation. There is a booster pump at North West Arch that boost supply to The Drive subdivision.

### 4.8 Reservoirs

Reservoirs provide water capacity to even out peak demand from consumers, and where possible ensures sufficient head of water in the water distribution system. Water storage facilities include large reinforced concrete structures, bunded reservoir and small concrete/plastic tanks.

# 4.9 Buildings

Buildings are often an intrinsic part of the public perception of its Council. Maintenance of public buildings to a good standard throughout their lifecycle is essential to demonstrating a responsible and acceptable level of service.

Treatment facilities and larger pump stations are contained within above ground buildings. These range from timber framed to concrete block structures. The buildings usually house pump/treatment/disinfection equipment, control gear, telemetry and treatment equipment.

The buildings are recorded in the AssetFinda IMS with the building's age and replacement value. Buildings are treated as a component of the facility i.e. similar to a pump at a pump station.

Housekeeping of buildings forms part of the O&M Contract and O&M Manuals where these are available.

# 4.10 Critical Assets

Council engineers have not performed a documented formal criticality assessment of the infrastructure assets, but Council engineers use practical experience and skilled application of staff and service providers in consideration of critical assets. Development of a formal documented criticality assessment is included as an improvement item (IP 1).

In the absence of a formal criticality assessment Council's approach in the water activity is based on the following methodology:

Table 1 Critical asset assessment approach

Criticality Category	Condition Assessments	Renewal				
Critical Assets						
Trunk mains, rising mains and large diameter mains supplying significant areas or key industries or businesses/customers.	Condition assessments performed during connections and pipe repairs. Detailed analysis obtained as deemed necessary	Renewal timing based on conservative base live and actual condition assessments of asset and estimated future deterioration				
Treatment plants are also considered to be critical assets						
	Sample inspections of material types and age bands during					
Non-Critical Assets –	connections and pipe repairs.					
distribution network of smaller	Greater proportion for assets	Generally "run to failure" with				
diameter mains and property	nearing end of base life.	renewals on a reactive basis.				
laterals	Inspections of assets associated					
	with major roading asset					
	renewals to confirm condition.					

A number of aspects could be considered in identifying those assets that are critical including but not limited to:

Page 31 of 212



- Location of asset, e.g. State Highway
- ٠
- Asset type, e.g. pump stations and detention dams Flood hazard assessments and areas without adequate existing secondary flow paths ٠
- ٠ Network configuration, e.g. single main servicing large area
- Customer type, e.g. Central Business District, Medical Facilities, Rest Homes. ٠

Page 32 of 212

Water



# 5.0 ASSET MANAGEMENT PROCESSES & PRACTICES

This Section covers the organisation structure, information systems used, data confidence and processes used to manage the asset.

# 5.1 Introduction

The MDC organisation structure and Group structure is shown below.

Figure 5-1: MDC Organisation Structure







MDC has an Engineering Manager, 3 Waters Manager and an Asset Management Engineer responsible for the maintenance management of the Utilities network. Occasionally some elements of the work are tendered to consultancy services to manage (e.g. Pipeline replacements etc). The 3 Waters Manager and the Maintenance Contractors regularly inspect and monitor the network. Any work identified is directly tasked to the incumbent maintenance contractor or, if it is beyond the scope of the maintenance contract, tendered using Competitive Pricing Procedure guidelines. This may or may not need the involvement of consultants depending on the nature or extent of the work.

December 2020

Water

Page 33 of 212

F

MDC accounts for revenue and expenditure on an accrual basis. All work under the Works Programme is identified through a job cost ledger with a significant level of breakdown using analysis codes. The costs are summarised into the general ledger where operational/maintenance costs are identified separately to capital/renewal items.

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

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

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

# 5.2 Systems

Information and Data Systems provide Council staff with the ability to obtain, store, analyse and report on the significant quantities of data that is associated with the 3 Waters. The information and data systems available to MDC staff are shown below and discussed within this section.

Figure 5-3: MDC Systems



Page 34 of 212

Water



Council uses Asset Finda which is a complete system for designing and managing solutions through the application of geographic knowledge. Data can be manipulated within AssetFinda, ArcGIS or exported to excel to assist in the decision making process for Water Supply network issues.

#### 5.2.1 AssetFinda

AssetFinda is an advanced Assets Management System designed to assist Councils in whole of life management of their assets. AssetFinda is designed to meet Council's long term and statutory asset management requirements.

It is has three main components:

- Asset Register: An accurate asset register is critical to any asset management system. It controls a database that utilizes GIS, Web and iPad to view, edit, analyse and add data – faster, easier and more accurately than ever before.
- Asset Maintenance: Maximizes the useful lifespan of assets by managing past, present and future maintenance requirements of your assets.
- Asset Reporting: There is wide variety of reports, including Asset Revaluations, Monthly & Annual Depreciation Calculations, and Predictive Modelling.

AssetFinda utilizes a Web front end, GIS interfaces and iPad apps, thus creates a flexible and user friendly interface that even the newest of users can navigate quickly. The iPad App is designed to give real-time access to data in the field. View, analyse, edit & add data, capture images, run inspections, complete works requests from anywhere in the field with in either Online or Offline mode.

Council uses AssetFinda to manage the following:

- Water
- Stormwater
- Wastewater
- Parks (to be added)
- Buildings (to be added)

The Asset Register contained within AssetFinda/ArcGIS is contained within separate databases. Each database records the attribute of each asset to component level including age, condition, performance etc.

Depending on what type of asset is identified there are varying amounts of information recorded for that asset. There are gaps in the information for each asset, but we are continually gathering information on these to complete the Asset Register.

# 5.2.2 SCADA

SCADA (supervisory control and data acquisition) is a system operating with coded signals over communication channels so as to provide control of remote equipment. The control system may be combined with a data acquisition system.

The term SCADA (Supervisory Control and Data Acquisition) usually refers to centralized systems which monitor and control entire sites, or complexes of systems spread out over large areas. Most control actions are performed automatically by RTUs or by PLCs. Host control functions are usually restricted to basic overriding or supervisory level intervention.

Council has progressively rolled out SCADA to all its remote sites across the district. This will not only control the operation of the site but actively monitor and send the operational data back to the Fairlie in real time via telemetry.

December 2020

Water

Page 35 of 212



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# Table 5-1: SCADA

SCHEME	FACILITY		METER		SCADA REPORT							ALARM	ЛIN			
				Pressure	Pump Start /Stop	Pump Hours	Level	Flow	Turbidity	FAC Residual	Energy Consumptio	Hq	UV Intensity	Intruder	Outgoing Alarms	
	Intake & Treatment		<ul> <li>✓</li> </ul>	<b>√</b>				-	<ul> <li>✓</li> </ul>	<ul> <li>✓</li> </ul>		<ul> <li>Image: A second s</li></ul>			<ul> <li>Image: A start of the start of</li></ul>	
Fairlio	Reservoir		<ul> <li>✓</li> </ul>	<b>√</b>			<ul> <li>✓</li> </ul>	<ul> <li>✓</li> </ul>							<ul> <li>Image: A start of the start of</li></ul>	
	Seigerts Rd		<ul> <li>✓</li> </ul>	<b>√</b>	<ul> <li>✓</li> </ul>		<ul> <li>✓</li> </ul>									
N	Nixon Rd	Nixon Rd		<b>√</b>	<b>√</b>											
	Intake		<ul> <li>✓</li> </ul>					<ul> <li>✓</li> </ul>								
Lake Tekapo	Treatment & Reservoir Lochinvar		<ul> <li>✓</li> </ul>	<ul> <li>Image: A start of the start of</li></ul>			<ul> <li>✓</li> </ul>	-	<ul> <li>✓</li> </ul>	<ul> <li>Image: A start of the start of</li></ul>		<ul> <li>Image: A start of the start of</li></ul>	<ul> <li>✓</li> </ul>			
				<ul> <li>Image: A second s</li></ul>	<ul> <li>✓</li> </ul>	-									<ul> <li>Image: A set of the set of the</li></ul>	
	Twizel Intake Treatment & Reservoir				<ul> <li>✓</li> </ul>		<ul> <li>✓</li> </ul>		<ul> <li>✓</li> </ul>						<ul> <li>Image: A start of the start of</li></ul>	
Twizel			<ul> <li>✓</li> </ul>	<b>√</b>	<ul> <li>✓</li> </ul>	<ul> <li>Image: A start of the start of</li></ul>	<ul> <li>✓</li> </ul>	<ul> <li>✓</li> </ul>	<ul> <li>✓</li> </ul>				<ul> <li>✓</li> </ul>			
	The Drive			1	<ul> <li>✓</li> </ul>	1									<ul> <li>Image: A start of the start of</li></ul>	
	Intake & Treatment	0 0	<ul> <li>✓</li> </ul>				1	<ul> <li>Image: A start of the start of</li></ul>	<ul> <li>✓</li> </ul>			1	1		<ul> <li>Image: A start of the start of</li></ul>	
Burkes Pass	Reservoir	si o					<ul> <li>✓</li> </ul>									
A.I	Intake & Treatment		<ul> <li>✓</li> </ul>	<b>√</b>				<ul> <li>✓</li> </ul>	<ul> <li>✓</li> </ul>			1			<ul> <li>Image: A start of the start of</li></ul>	
Allandale	Spur Rd Pumps/Reser	voir		1	<ul> <li>✓</li> </ul>		<ul> <li>✓</li> </ul>									
Albury	Intake		1	1				1	1	<ul> <li>Image: A start of the start of</li></ul>		1			1	

Page 36 of 212

Water


#### 5.2.3 Network Modelling

Network modelling is an effective tool to assist in the secure and sustainable supply of water to consumers. Network modelling software aids Council staff in effectively managing the water network distribution system through simulation of the existing and future networks.

Council uses the Infoworks network model simulation programme for managing the network and identifying network inefficiencies. There are currently models for Fairlie, Tekapo and Twizel. These models have been in place for sometime and it proposed that new models be developed for each of the these supplies as part of the 3 waters Stimulus package.

# 5.3 Data Management

Key information comes into the Essential Services Group through work reports, as-builts, SCADA, consumers and contractors. Other information comes into the Unit via emails, journals, Government publications and the media.

Decisions on activity management, renewals and acquisitions are made in consultation with staff, council and the public as appropriate. Staff meetings are held regularly to discuss current and future plans and decisions.

Asset data integrity audits is an ongoing process and data is checked on a continual basis. As service requests are completed and submitted to be captured within the asset register the data recorded on site is compared with the asset register data. This is an ongoing process of ensuring a high level of data integrity.

General maintenance work is continuous throughout the year and responds to the needs of the network. The data from the repairs carried out is reported to Council and recorded in MDCs systems on a regular basis.

New subdivisions in the District result in additions to the pipeline infrastructure. Processes are in place to ensure that this data is provided electronically so that it can easily recorded in the Asset Register and available for ongoing effective Asset management. Developers and consultants are required to supply accurate as-built information in appropriate form prior to a Section 224 Certificate being issued.

# 5.4 Data Confidence

Data confidence grades are held against each individual asset within the AssetFinda asset register. These grades indicate the type of data source and the confidence in the specific data source. Since the last independent data confidence review there has been a significant improvement in base asset information. An independent assessment was recently undertaken to reassess the data confidence grades of the AssetFinda register would be of value to determine the improvement opportunities prior to the next LTP. An in-house assessment showed an improvement to the data confidence review (2019). A summary of the confidence levels in the attributes of the assets are detailed in the following table.

#### Table 5-2: Data Confidence

Valuation element	Water
Asset register or database	G
Attribute details	G
Asset category	н
Optimisation information	А
Useful lives information	G
Unit rates	G

December 2020

Water

Page 37 of 212

Valuation element	Water
Where	
VH	Very High confidence
н	High confidence
G	Good confidence
А	Average confidence
Р	Poor confidence

#### 5.4.1 Condition Assessments

Pipeline failures are inspected and reported to the 3 Waters Manager for assessment of the likely remaining life of the asset. In some cases the section of pipe removed during the repair process maybe sent away for detailed analysis of the remaining life of the asset, as Council engineers have done for AC pipe in the past.

By taking this information on selected pipelines the data can be used to infer the condition of similar aged and type pipes to give a complete picture of the network.

# 5.5 Information Technology

The responsibility for asset information security rests with the IT department administrators. The data is held in the 'cloud', remote data servers.

# 5.6 AMP Preparation

In preparation of the 2018- 28 LTP period Council engaged Waugh Infrastructure Management Ltd (WIML) to assist with the review and update of the 3 Waters AMPs. This resulted in significant changes to the 3Waters AMP documents. The 2020 updates, a collaborative effort by MDC staff and WIML staff, did not result in significant changes to document templates and content, but mainly focussed on aligning the content with:

- Government and industry direction
- general industry practice
- all 3 Waters asset based activities of Council are supported through the AMP
- 3 Waters AMPs are easy to read, and follow the same agreed format
- the underlying asset management planning processes occurring for each activity
- levels of service, and show linkages to other Council planning documents
- a robust reflection of the future intentions of Council with respect to 3 Waters activities
- the financials arising from the plans reliably forecast the lowest lifecycle cost to deliver agreed levels of service for a period of no less than 10 years.

# 5.7 Quality Assurance

#### 5.7.1 Audits

To establish and ensure the ongoing improvement of the quality of this Plan a series of audits are planned and includes Financial, Systems, Technical and Performance Audits.

 Financial audits - the Local Government Act requires that independent annual financial audits be undertaken on the operations of Council; such audits may include all significant activities such as asset management planning. The auditor's opinions will be included in the Annual Report. All

Page 38 of 212

Water

December 2020

P



recommendations are for improvement are adopted and implemented as appropriate and resources  $\ensuremath{\mathsf{permit}}$ 

- System audits are continuous and ongoing and incorporated in operational practices. However, as part of the LTP process, systems are discussed and reviewed every 3 years. This audit identifies the current status of asset management processes, systems and data and produce targets for Asset Management practices to be achieved in following years.
- Technical audits include peer reviews undertaken at regular intervals to assess and identify compliance with statutory accounting requirements.
  - The quality of the Plan in terms of completeness, objectivity, logic, technical content and presentation
  - o Perceived strengths and weaknesses for Plan improvement
  - Recommended specific areas for Plan improvement
  - o Technical Audits may be undertaken using external or internal reviewers
- Performance audits establish whether the stated objectives for the operation of the asset have been achieved. Measurement of the success of the operation of the asset will be assessed using the results of:
  - Customer satisfaction surveys
    - Key Service Criteria objectives compliance

#### 5.7.2 Knowledge of assets

The process of capturing as-built records for the on-going enhancement of asset registers is included as a requirement of the maintenance contracts. The information is supplied to Council staff for them to upgrade the relevant registers. Projects undertaken outside the maintenance contracts have a requirement within their contract for the relevant information to be collected and forwarded to Council for them to upgrade the registers. Council needs to be diligent in obtaining as built data (e.g. new subdivisions) to ensure infrastructural asset data is up to date enabling informed decision making. The Contractors staff capture data on site and submit hard copy records to the 3 Waters Manager for updating the asset registers. Only two staff members have the ability to change asset data, the 3 Waters Manager and the GIS officer.

#### 5.7.3 Accounting/Economics

Maintenance and renewal costs are recorded against broad activities in the general ledger. Valuations are currently based on straight line depreciation and assumed effective lives.

#### 5.7.4 Risk Management

Although processes are in place for the monitoring of some critical assets (e.g. reservoirs), risk management is generally practised informally based on the knowledge of experienced staff.

#### 5.7.5 Operations

Operational processes are documented in service delivery contracts and are subjected to regular review.

#### 5.7.6 Maintenance

During 2020 Council tendered and awarded the operation and maintenance works with contract term of 5-years plus a 5-years right of renewal. Major new pipeline construction or replacement is tendered individually for larger budget items.

#### 5.7.7 Optimised Lifecycle Strategy

Work optimisation for other assets is based on the judgement of experienced staff, internal inspection of pipelines and renewal projections are based on assumed economic lives.

Water

Page 39 of 212

#### 5.7.8 Design & Project Management

Although there are no documented project management procedures for MDC and consultants, there is confidence that suitable procedures are used during the project evaluation and design phase. Council and consultants use appropriate project management manuals such as NZTA Project Management Manual and other appropriate guidelines. Sound contract management procedures are in place. The supervision of assets constructed within sub-divisional development and subsequently taken over by MDC is considered to be adequate.

#### 5.7.9 Suitably Qualified and Trained Staff

An important measure of this Plan's quality is the ability, experience and qualifications of the individuals and companies involved in its preparation. The Mackenzie District Council employs staff appropriately qualified to carry out the asset management function.

On-going training is available for staff involved in infrastructure asset management and includes attendance of:

- IPWEA sponsored workshops on Asset Management
- NAMS seminars
- Annual WaterNZ conference
- Asset Management conferences
- Water Managers (NZ wide) quarterly meeting.

Council staff has a reasonable record of attendance at these seminars, conferences and workshops. Council engineering staff has the qualifications, skills and experience that are adequate and appropriate for carrying out the asset management function of the MDC, provided specialised external support is available as the need arises.

# 5.7.10 Skills

The Havelock North Water Inquiry observed that there should be a fundamental review of training in the water industry, with the recognition that the current content of existing qualifications needing to be updated but concluded that curricula and content of training courses were beyond the scope of the Inquiry and will need to be considered in detail by Government in due course.

Training programs should encourage employees to communicate and think critically about the operational aspects of their work.

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 which will include stormwater.

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 identifies nine areas as shown below.

Water





# Figure 5-4: WaterNZ Competency Framework

1. Governance	Determination of purpose Holding to account Setting the culture Ensuring compliance
2. Policy development	Develop policies — Analyse strategic requirements Analyse policy requirements
3. Strategy development	Forecast & analyse future user requirements and demands Develop strategies Plan the implementation of strategies
4. Asset Management planning	Appraise investment options Apply whole of life costing principles Produce business case for creation/acquisition of assets Plan for contingencies Develop and communicate asset management plans
5. Implement Asset Management plans	Create and acquire assets Control operations Maintain assets Optimise and rationalise assets Review or dispose of assets
6. Capability development	Develop and deploy teams Develop and deploy suppliers Develop and manage organisational change Shape the culture
7. Risk management & performance improvement	Appraise and manage risks Assure the quality of the process Monitor and review progress and performance Review and audit compliance with legal, regularity, ethical and social requirements Learn from mistakes
8. Asset knowledge management	Define asset information standards Specify, select and integrate information systems Make appropriate data available for decision making
9. Sector regulation	Setting standards Monitor performance and compliance Enforce standards and undertake enforcement action

(Source: Water NZ - Competency Framework)

Council will monitor the development in this area and envisage that any future competency requirements may be part of the future regulatory framework.

# 5.8 Sustainable Practices

# 5.8.1 Overview

Sustainability can be defined as meeting the needs of the current generation without compromising the ability of future generations to meet their own needs.

There are increasing signals from Central Government that the focus on more efficient use of water, including better management of its demand, will intensify. Regional Councils are increasing water take consent conditions to encompass sustainable use of water. Increasing demand will lead to a need for investment in additional infrastructure. The Havelock North Water incident provided the catalyst for the Three Waters Review which resulted in the establishment of a Water Regulator and a Water Services Act. Regulatory coverage will extend to all water suppliers, except individual household self-suppliers. It will also include a multi-barrier approach to drinking water safety, including mandatory disinfection of

Page 41 of 212



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. Furthermore, Central Government have also signalled through its 'Action for Healthy Waterways' discussion document improved stewardship of wastewater and stormwater services, with Risk Management Plans for wastewater and stormwater networks a likely outcome. This has renewed the focus on the very high standard of care and diligence required to supply drinking water and collect, treat and discharge wastewater and stormwater. A significantly more holistic approach to 3 Waters management is dawning.

The LGA 2002 requires Local Authorities to take a sustainable development approach while conducting its business. In doing this Council is required to take into account the following:

- The social, economic, and cultural well-being of people and communities
- The need to maintain and enhance the quality of the environment
- The reasonable foreseeable needs of future generations

#### 5.8.2 Sustainability and Lifecycle

Asset management is designed to improve decision-making about assets to enable the better management of existing and future assets. Effective asset management ensures that agreed levels of service are met and risks, including public health, financial and environmental are minimised, while costs are optimised. Evidence based decision-making is crucial to achieve asset management and sustainability goals. Having the correct asset information available is important to support the decisionmaking process. It is thus clear that lifecycle costs are part of and supports asset management and sustainability.

Asset management practices include action that recognise the need for environmental, economic, social and cultural sustainability, that is -

- The natural environment needs to be preserved for future generations and not degraded as a
  result of Council's asset management operations and development projects
- Financially, there is a limit to what ratepayers, developers, and therefore Council, can afford. Expenditure needs to remain within this limit and the costs need to fall equitably on the generations which derive the benefits
- Social relationships between individuals, interest groups and local government are valuable, and Council needs to facilitate and encourage this by providing infrastructure
- Our history, customs and creativity are valuable to us. Their preservation and enhancement over time is facilitated by providing venues where they can be practiced, preserved and displayed

Sustainability is considered in all tasks performed by Council. In managing, operating and maintaining water supplies Council would like to do this to a level of excellence. However, this is not sustainable and all water supplies are managed, operated and maintained to an optimum level appropriate for that specific water supply and task. Council endeavours to always act in the best interest of the community.

Council considers the following under sustainability:

- Efficient use of energy within facilities
- Water takes are consented
- Discharges are consented
- Efficient operation of facilities
- Improving effluent quality and/or improved disposal methods
- Collaboration with other Councils

Council also considers collaboration with other Council as sustainable practice. Sharing services/resources/systems/information is key to providing a sustainable service to the community, while maintain a district's own identity. Council collaborated with neighbouring district councils in response to the Government 3 Waters Review.

Water



# 5.8.3 Significant Negative Effects

The negative effects that the water supply activity may have on the social, economic, environmental or cultural well-being of the community is tabled below. It indicates how the existing approach or proposed action to address these in the future.

Table 5-3: Significant Negative Effects

Negative Effect	Impact on well-being		Comment		
	Economic	Social	Environmental	Cultural	
Water Treatment Plants					
Noise	None	None	None	None	
Discharge of odour	None	None	None	None	Generally, odours not generated at Water Supplies. In some cases, chlorine is detected by consumers in drinking water
Pump Stations					
Noise	Minor	None	Minor	None	All pumps are contained within structures with appropriate sound proofing where required
Reticulation					
Overflows	Moderate	Minor	Minor	Minor	Overflows from mains breaks are infrequent and cause mainly short term disruption to consumer supplies
Storage/Reservoirs					
Visual	Minor	Minor	Minor	None	The size and location of reservoirs have a visual impact
Water takes					
Increased demand	Moderate	Minor	Moderate	Minor	With positive growth the demand for water will increase, but will be managed through monitoring demand, water reduction strategies and securing water sources
Competing demand	Moderate	Moderate	Moderate	Moderate	Water allocation is becoming more of an issue. Council take is determined through its resource consents.

There are no significant negative effects shown to occur for the water activity.

## 5.9 Environmental Management

A very important aspect of the Water Supply scheme's function is to ensure that the District's natural water sources are managed responsibly. Resource consents are held for various activities relating to the water activity such as abstraction, treatment and the disposal of treated water at the water treatment plants.

The Mackenzie district is under the authorisation of Environment Canterbury (ECan).

# 5.9.1 Schedule of Resource Consents

The following table lists the water resource consents that are presently held for the taking of water and land use:

December 2020

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Suctom	Concept #	Decorintion	Expire Data	Allowable take
System	Consent #	Description	Expiry Date	Allowable take
Fairlie	CRC176495	Take and use water	19 August 2044	28 litres/s 2,420m³/day 725,000m³/year
Lake Tekapo	CRC971414	To take groundwater	13 August 2033	40 litres/s
Twizel	CRC042741	Take and use water	20 August 2047	130 litres/s 3,942m³/day (annual average) 1,440,000m³/year
Burkes Pass	CRC971594	to divert water for Burkes Pass community supply	29 October 2032	6 litres/s 520m³/day
	CRC971595	to discharge by-wash water to Paddy's Market Stream	29 October 2032	6 litres/s 520m³/day
Allandale	CRC020124.1	Take and use water	19 October 2030	12 litres/s
Albury	CRC990685	To divert water	20 January 2034	Not applicable
	CRC990686	To take water for community water supply	20 January 2034	12.6 litres/second
	CRC991431	To disturb, and place and maintain structures	20 January 2034	Not applicable
	CRC991418	to discharge water	20 January 2034	Not applicable

Resource consents are required for the abstraction of all natural water that is used for public supplies. These usually stipulate the quantity of the water that can be taken, and a maximum rate for its extraction. When water is treated and backwash is part of the process, consents are also required for discharge of the backwash water. The Allandale resource consent (CRC020124.1) expires during 2030 and is within the term of this Plan. The new Fairlie Water Treatment Process will require a consent for disposal of the backwash water from the treatment process.

#### 5.9.2 Consent Monitoring and Reporting

Consent reporting within MDC for Water, Wastewater and Stormwater is the responsibility of the 3 Waters Manager. The 3 Waters Manager collate all relevant information aligned with resource consent conditions and report annually to Environment Canterbury.

The resource consent compliance for water supplies is considered to be good with no abatement notices.

# 5.10 Climate Change

Climate change is an important consideration in the Council's long-term planning. Guidance from the New Zealand government, based on the best available climate science is used to support the planning. The Ministry for the Environment information on <a href="https://www.mfe.govt.nz/climate-change/likely-impacts-of-climate-change/likely-impacts-of-climate-change/likely-impacts-of-climate-change/likely-impacts-of-climate-change-affect-my-region/Canterbury">https://www.mfe.govt.nz/climate-change/likely-impacts-of-climate-change/likely-impacts-of-climate-change/likely-impacts-of-climate-change/likely-impacts-of-climate-change-affect-my-region/Canterbury">https://www.mfe.govt.nz/climate-change/likely-impacts-of-climate-change/likely-impacts-of-climate-change/likely-impacts-of-climate-change-affect-my-region/Canterbury">https://www.mfe.govt.nz/climate-change/likely-impacts-of-climate-change/likely-impacts-of-climate-change-affect-my-region/Canterbury</a> provides a summary of projected climate changes over the period 2031-2050 and 2081-2100, compared with 1986-2005 and the key impacts this is likely to have.

**Temperature** - Compared to 1995, temperatures are likely to be 0.7°C to 1.0°C warmer by 2040 and 0.7°C to 3.0°C warmer by 2090.

By 2090, Canterbury is projected to have from 6 to 35 extra days per year where maximum temperatures exceed 25°C and the number of frosts could decrease by around 13 to 38 per year.

Water



**Rainfall** will vary locally within the region. The largest changes in rainfall are likely to be for particular seasons rather than annually.

By 2090, winter rainfall is projected to decrease by up to 12 per cent in Christchurch and up to 10 per cent in Hanmer, but increase by 6 to 28 per cent in Tekapo.

According to these latest projections, the frequency of extreme rainy days in the Canterbury region is not projected to significantly change as a result of climate change. Under the highest emissions scenario, there is likely to be a small increase in frequency by 2090.

**Snowfall** - The Canterbury region will likely experience significant decreases in seasonal snow. By 2090 the number of snow days is projected to decrease by up to 30 days per year. The duration of snow cover is also likely to decrease, particularly at lower elevations.

Less winter snowfall and an earlier spring melt may cause marked changes in the annual cycle of river flow in the regions. Places that currently receive snow are likely to see increasing rainfall as snowlines rise to higher elevations due to rising temperatures. So for rivers where the winter precipitation currently falls mainly as snow and is stored until the snowmelt season, there is the possibility of larger winter floods.

Wind - The frequency of extremely windy days in Canterbury by 2090 is likely to increase by between 2 and 10 per cent. Changes in wind direction may lead to an increase in the frequency of westerly winds over the South Island, particularly in winter and spring.

Water shortages – Higher temperatures, less rainfall and greater evapotranspiration are likely to cause increasing pressure on water resources, particularly in North Canterbury. Droughts are likely to become more frequent and more extreme.

Fire risk – Strong winds, combined with high temperatures, low humidity and seasonal drought may result in an increased fire risk in some areas (such as Christchurch, Kaikoura, and Darfield). The length of the fire season is expected to increase.

 $\ensuremath{\textbf{Biosecurity}}$  – Climate change could increase the spread of pests and weeds.

Agriculture – Warmer temperatures, a longer growing season and fewer frosts could provide opportunities to grow new crops. Farmers might also benefit from faster growth of pasture and better crop growing conditions. However, these benefits may be limited by negative effects of climate change such as prolonged drought, increased flood risk, and greater frequency and intensity of storms. There is also likely to be increasing pressure on water resources.

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.	Extreme

December 2020

Water

Page 45 of 212



B

# What this means for water systems

Demand for potable water is likely to increase as temperatures rise, together with a likely increase in urban development across the region. Increased competition for access to freshwater systems and current water supply capacities (quantity and quality). 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.

It is assumed that climate change will impact on the district in ways similar to that noted in the Ministry for the Environment guidance. The Council will factor these key likely impacts into the planning for our infrastructure assets. It is expected that more information will be provided by Central Government to assist and guide local government in its decision making

Page 46 of 212



# 6.0 LEVELS OF SERVICE

## 6.1 Defining the Levels of Service

Asset management planning requires a clear understanding of customer needs and preferences and the minimum obligations that must be met. A key objective of this activity plan is to match the level of service provided by the asset with the expectations of the customers given legislative, financial, technical and safety constraints. Service standards, set to meet this objective, provide the basis for the life cycle management strategies and work programmes identified in Section 7.

The service standards defined in this section will be used:

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

The MDC levels of service for Water Supply reflect current industry standards and are based on:

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

# 6.2 Activity Goals and Objectives

The Water Supply network must be operated to meet Council policy, objectives and various Environment Canterbury requirements. Council's goals and the community's expectations are stated in the LTP which provides the framework for the operation and development of the Water Supply infrastructural assets.

#### 6.2.1 Organisation Mission, Goals and Objectives

During 2020 Council developed a new vision statement, mission statement, supporting value statements and community outcomes. These are shown in the diagram below:

December 2020

# Mackenzie District Council

Vision: Empower our communities and treasure our environment

Mission: Strengthening our communities

- Be fair to everyone
- Strive for a better future
   Dare to be different

VALUES

Act with respect and trust

o Protect our peace and serenity

# **COMMUNITY OUTCOMES**

# A TREASURED ENVIRONMENT

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

# STRONG AND INNOVATIVE ECONOMY

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

## RESILIENT, SUCCESSFUL COMMUNITIES

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

# EMBRACE HERITAGE AND DIVERSITY

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

# 6.2.2 Water Supply Activity Goal and Principal Objectives

As outlined in Council's Long Term Plan (LTP), the water supply contribution to achieving Council's governance goal and the community outcomes identified in Section 2 is through the Water Supply Activity Goal:





To ensure that adequate potable supplies of water are provided (by either private or public means) for all residential, commercial and industrial buildings (other than single buildings on a single property).

The specific Objectives of the Water Supply activity are as follows:

- To ensure all of the public systems provide a high quality water treatment and distribution service;
  To anticipate the time when it may be necessary to extend, upgrade or renew the various existing public water supply schemes, and to plan accordingly;
- To anticipate the time when it may be necessary to provide public water supply schemes in communities at present not serviced, and to plan accordingly;
- To ensure the maintenance of the public infrastructural assets in perpetuity, so that there is no diminution in value, and to forecast the estimated future cost of so doing; and
- To put in place a sound management regime for all matters relating to the supply of potable water

#### 6.3 Current Levels of Service

Levels of Service:

- Define explicitly the standards required from the water supply system
- Are an expansion of the corporate objective, as previously stated
- Will largely shape Council's detailed planning

In providing water services to the community Council must balance the standard of service desired with the cost of providing the service. The Levels of Service are designed by Council to represent the best level of service possible for a cost that the community can afford and is willing to pay.

Supply Type	Definition	Application
On demand	A supply of water which is available on demand directly from the point of supply subject to an agreed level of service	Urban supplies
	Water is supplied at pressure to the property boundary and is sufficient for domestic and industrial use	
	Water is supplied at pressure and flows sufficient for fire fighting	
	Supply is for domestic, business and industrial purposes	
Restricted	A small continuous flow of water supplied by a flow control device/restrictor across an air gap separation	Mainly Rural Supplies, but also zones within or on the fringes of Urban Supplies
	Supply is an agreed volume of water over a 24 hour period to a storage facility	
	Supply is for domestic and stock purposes	

The following table explains the difference between Urban and Rural Water Supply types:

The Levels of Service that Council is aiming to achieve in future are shown Table 6-1: Community Outcomes & Levels of Service linkage.

 It should be noted that the target Levels of Service are not intended as a formal customer contract. Rather Council's responsibility is initially to aim to achieve these levels and then to achieve them more cost effectively through a process of continual improvement

In 2010 the LGA 2002 was amended, requiring local authorities to use non financial performance measures when reporting to their communities. The aim is to encourage greater public participation in decision-making processes. The performance measures will do this through providing better information about the levels of service. The non financial performance measures came into force on 30 July 2014. Local authorities were required to incorporate the performance measures in the development of their 2015-2025 long-term plans. Reporting against these non financial performance measures started in the 2015/2016 annual reports.

December 2020

Water

Page 49 of 212



The Table 6-1: Community Outcomes & Levels of Service linkage provides the linkages between the Community outcomes, Levels of Service and Performance Measurement.

#### 6.3.1 Changes to Levels of Service

In accordance with 261B of the Local Government Act 2002, Non Financial Performance Measures were adopted on 12 November 2013. These Performance Measures require Local Authorities to report on the performance of the key activities of water supply, wastewater, stormwater, flood protection and roads annually from 2015/16.

Council have developed their own Levels of Service and associated Performance Measures in the past, but in light of the Non-Financial Performance Measures Rules 2013 Council will only use the Levels of Service statements aligned with these new performance measures.

Council will only report on the mandatory measures as this covers the key expectations in terms of the delivery of the service.

### 6.3.2 Levels of Service

# Table 6-1: Community Outcomes & Levels of Service linkage

Community outcome	How it contributes	Level of Service	Performance Measure	
Resilient, successful	Providing quality potable water to agreed areas and protecting communities from water related health issues	Water is safe to drink	DWSNZ compliance	
communities	Providing a sustainable, efficient and effective water service	Water services are available and reliable	Response & resolution	
A treasured environment	Providing a water service that acknowledge and incorporates the natural environment in design, construction, operation and maintenance	Water quality is maintained or improved	DWSNZ compliance Response & resolution	
Strong and innovative economy	Demand management Timely response to system failures Maintaining quality and continuity of supply		Real water losses Response & resolution Average consumption	

Section 10 of the Local Government Act restores the four aspects of community well-being by requiring local authorities to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future. The reinstatement of the four well-beings acknowledges that the Council has a broader role in looking after our communities, than simply providing core services.

The figure below demonstrates the water activity contribution to the four well-beings.

This is a preliminary assessment and Council will further develop these contributions to the four wellbeings in alignment with national guidance.



# 6.3.3 Secondary Levels of Service

These are technical measures included in the Infrastructural Services Contract

MDC Event	Service Standard	
Response	Provide a 24 hour, 365 day per year call out service	
Response Time	As per NFPM 3 – Refer to <u>Table 6-2</u> Median response times: Urgent – response = ≤2 hours; resolution = ≤12 hours Non – urgent – response = ≤72hours; resolution = ≤120hours	Formatted: Font: 8 pt Deleted: Table 6-2
Availability/Disruption to Service	No disruption exceeds 8 hours. Percentage of disruptions where service is out for less than 6 hours. (It should be noted the above duration would not apply for an extraordinary event such as a major earthquake or flood)	
Quantity	Flow at point of supply: Flow at point of supply: Fairlie – 15 l/min Lake Tekapo – 25 l/min Pressure Fairlie – 70 kpa Lake Tekapo –200 kpa Tank Supply All – 1800 l/day	

December 2020

Water

Page 51 of 212

MDC is committed to maintaining and improving the network where current levels of service may not be being met. Analysis of the network condition over time provides an indication of asset behaviour and performance achievement. The following table outlines the measures that will be used to determine the network condition and performance.

Measure	Explanation	Method of Measurement	Target values	Response times
All water supply facilities function satisfactorily	Water supply facilities, such as: -Pipelines -Valves -Hydrants -Restricted supplies -Treatment Facilities	Visual inspection Operation Measurement	Dead end pipelines flushed. Valves operated to ensure operation annually. Hydrants operated to ensure operation annually. Occasional monitoring of tank and other restricted supplies. Treatment facilities regularly checked for correct operation	As required Annually Annually Inspected at least annually Weekly

# 6.4 Levels of Service Development

The current LOS being provided has been established through Council's LTP process. This would suggest there is approval with the current regime, although this could also be interpreted as an over provision of service in the context of Council's broader service profile.

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

- a) Monitor and interpret customer feedback through customer feedback and complaints. This information can be analysed for any trends or common factors related to current service levels (e.g. number of complaints received)
- b) Engage customers in a formal process. There are a number of mechanisms to achieve this from public meetings to surveys to focus groups. This may include the use of documented feedback processes. In all methods the clear description of different LOS options, fully costed, is a prerequisite to meaningful feedback
- c) Engagement with key stakeholders. These include the Regional Council, and others. Again good input information to these engagements will produce valuable feedback.

#### 6.4.1 Levels of Service Definition

The current LOS are documented as a combination of:

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

This can be improved by:

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

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

Page 52 of 212

Water



# 6.5 **Performance Measures**

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

These mandatory performance measures have been adopted by Council for inclusion in the 2021-31 Long Term Plan and no other measures will be used.

December 2020

Water

Page 53 of 212

# 

#### Mackenzie DC Activity Management Plan

# Table 6-2: Levels of Service, Performance Measures, Targets

What you can expect	What we will measure	Il measure Latest result	Targets:			
from us		(2019/20)	2021/22	2022/23	2023/24	By 2030/31
Water supply						
	Compliance with Drinking Water Standards (part 4) – Bacterial Compliance*	75%	≥ 95%	≥ 95%	≥ 95%	≥ 95%
Provide safe drinking water.	Compliance with Drinking Water Standards (part 5) – Protozoal Compliance <sup>1**</sup>	0%	2 out of 5 suppliers are compliant	2 out of 5 suppliers are compliant	3 out of 5 suppliers are compliant	3 out of 5 suppliers are compliant
Maintain excellent water supply network services.	The percentage of real water loss from the networked reticulation system*	21%	≤ 25%	≤ 25%	≤ 25%	≤ 25%
	The median response times to attend a call-out in response to a fault or unplanned interruption to the network reticulation system:*					
	a) attendance for urgent call- outs	1hr 21m	≤ 2h	≤ 2h	≤ 2h	≤ 2h
	b) resolution of urgent call-outs	1h 21m	≤ 12h	≤ 12h	≤ 12h	≤ 12h
	c) attendance for non-urgent call-outs	25h	≤ 72h	≤ 72h	≤ 72h	≤ 72h
	d) resolution of non-urgent call- outs	26h	≤ 120h	≤ 120h	≤ 120h	≤ 120h
Maintain excellent customer services	The total number of complaints received about any of the following:* a) drinking water clarity b) drinking water taste c) drinking water odour d) drinking water pressure or flow e) continuity of supply f) MDC response to any of the above	1.4 per 1,000 connected properties	≤ 5 per 1,000 connected properties	≤ 5 per 1,000 connected properties	≤ 5 per 1,000 connected properties	≤ 5 per 1,000 connected properties
	The percentage of ratepayers satisfied with the water supply service	80%	≥ 80%	≥ 80%	≥ 80%	≥ 80%
Provide demand management of water supply services	Average consumption of drinking water per day per resident with the district*	1.6m <sup>3</sup>	≤ 1.2m <sup>3</sup>	≤ 1.2m <sup>3</sup>	≤ 1.2m <sup>3</sup>	≤ 1.2m³

<sup>1</sup> This measures the water quality of Tekapo, Twizel, Fairlie, Allendale and Albury water supplies. It is expected that Twizel and Tekapo will be compliant by 2021/22 and Fairlie will be compliant by 2023/24. There is the potential for Allendale to be compliant within this LTP period if it is found that it is feasible to connect it to Fairlie. Albury will not be compliant. Council is currently working on understanding the status of the Albury Rural water supply.

Page 54 of 212



December 2020

Page 55 of 212

# 6.6 Affordability and Willingness to Pay

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

- a) Cost for different Levels of Service options within the Water Supply Activity
- b) Cost of the Water Supply activity within the total Council programme.

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

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

# 6.7 Reporting

Measurement and reporting of Customer Levels of Service shall be achieved through the customer satisfaction survey. With the use of everyday language in the Customer Levels of Service residents can fairly gauge their opinion on each issue.

The customer satisfaction survey is undertaken annually and this can be used as a benchmark for the next year, and the trend across the results of each year's survey provides a long term view of Council's performance.

The Ratepayers Opinion Survey 2019 provides useful commentary on issues that concern residents. Figure 6-1: Water Service – Overall Satisfaction Rates



The survey identified that 81% of the respondents were satisfied with the overall water supply activity. This is an 9% increase in satisfaction levels from the 2018 survey. Concerns causing dissatisfaction highlighted the poor taste/appearance/quality, chlorine content and water supply issues. However, the number of responses for reason for dissatisfaction was low and that findings should be treated as indicative only.

As shown below the satisfaction levels vary across water supplies. It is clear that the customers outside the urban water supply boundaries have a significant effect on the overall satisfaction levels.

Page 56 of 212

Water







Measurement and reporting of Technical Service Standards is essential for the prudent management of the water activity. With regard to water quality in particular, frequent monitoring and reporting is integral to meeting the Drinking Water Standards for New Zealand.

# 6.8 Consultation & Communication

#### 6.8.1 Consultation

There are a number of instances where Council will undertake consultation at a District wide or comprehensive level. This generally occurs when there is a requirement to use the Special Consultative Procedure as prescribed in the LGA2002. This occurs in the following situations:

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

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

#### 6.8.2 Communication

In operating and maintaining the Water service Council consults and communicates with the community in various ways.

- Significant projects are notified in the printed media by means of a formal media release in the local papers
- For the duration of significant projects a weekly/fortnightly/monthly advertisement maybe placed in the local papers. This may include a short update on progress, an accompanying map showing the work area
- all consumers associated with the supply interruption maybe notified through a letter drop

December 2020

Water

Page 57 of 212



critical and key customers may be identified and notified 72 hours prior work affecting their supply
the Fire Service may be notified of work/large scale interruptions

This ensure customers stay informed of the project, its progress and how and when they will be affected.

#### 6.8.3 Key Stakeholders

Mackenzie District Council has a history of actively communicating with the public via:

- Extensive public consultation
- Annual Plan Submissions
- Customer surveys
- Project teams for specific significant community projects
- Community Noticeboard (Council website)

# This Plan recognises the following stakeholders:

# Key stakeholders

The Council as the ultimate owner of assets. Other key stakeholders of the Water Supply network include:

#### Regional Council

Owners and operators of inter-connecting or separate Water Supply networks

#### **Funding Partners**

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

Ratepayers - Rates provide funding for maintenance and operation of the networks

Developers – By constructing infrastructure and vesting it in the Council plus providing the required financial contributions

Customer Groups	Description	Customers
Associated service providers	These are other service providers who rely on the Water Supply network	Contractors Commercial operators
Users	Those who directly benefit from the service	Ratepayers Residents and holiday home owners Commercial properties Industrial users
The Wider Community	Non-users that are affected if the service is not provided	Ratepayers and residents Tourists Local businesses

# 6.9 Legislative Requirements

In providing the 3 Waters Services the Mackenzie 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.

Water





3 Waters - Government & Industry Direction

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 has had significant impact on the economy and the ability to implement and progress the abovementioned Government initiatives.

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. Mackenzie 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.

December 2020

Water

Page 59 of 212







# The following themes are also signalled:

Theme	Source
<ul> <li>Among a range of observations the OAG states "I remain concerned that Council's might not be adequately reinvesting in their critical assets".</li> <li>To do this well, councils need to improve their asset management information. In particular, they need: <ul> <li>good data about their critical assets in order to value, depreciate, and plan renewals;</li> <li>good processes and sufficient resources to maintain and update their critical asset data;</li> <li>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</li> <li>timely engagement with, and involvement by, elected members.</li> </ul> </li> </ul>	Insights into local government: 2019 OAG June 2020
Common challenges  Working with iwi Completeness and reliability of data Staff capability and capacity Under-delivery of planned capital spending	Managing the supply of and demand for drinking water OAG Sept 2018
<ul> <li>A more strategic and integrated approach to water management is needed</li> <li>The Government is responding to the need for a more strategic and integrated approach to water management</li> <li>A strategic and integrated approach would support targeting of investment decisions</li> <li>A stronger focus on implementation is needed when setting strategy</li> <li>Long-term thinking is needed when setting a strategic and integrated approach</li> </ul>	Reflecting on our work about water management OAG Feb 2020
<ul> <li>Understanding of water resources needs to improve</li> <li>A national picture of the state of freshwater quality would support a more strategic and integrated approach</li> <li>Information gaps can limit the ability to make well-informed decisions</li> <li>Information needs to be understandable both to decision-makers and to those holding them to account</li> <li>Good information depends on collecting quality data</li> <li>There will always be some uncertainty</li> </ul>	
<ul> <li>Water management challenges require adaptive ways of working</li> <li>Balancing different views and values requires flexible frameworks</li> <li>Collaboration needs to translate into action</li> <li>More can be done to involve Mãori in water management</li> <li>Water management challenges require both central and local government response</li> </ul>	
Recommendations <ul> <li>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;</li> </ul>	Matters arising from our audits of the 2018-28 long-term plans OAG Feb 2019

Page 60 of 212

Theme		
		Source
•	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.	
LGNZ an Change;	a working on four significant projects with the sector at present: Water 2050; Climate Housing 2030 and the Localism Project.	Local Government NZ
Water 20 by centra Review, a	50 - The Water 2050 project promotes discussion and contribute to policy development I and local government, particularly in regards to the Government's Three Waters across five key areas:	
•	Allocation	
•	Water Quality	
•	Infrastructure	
•	Cost and funding	
•	Governance	
and mitig Housing i housing i social we needs an appropria	ating the impacts of climate change is a new priority focus for councils. is a significant issue for our communities' social and economic futures. Unaffordable s having a negative impact on local economies, discretionary household expenditure and II-being. This means addressing matters of supply, how social and community housing a met and the importance of healthy homes. Underpinning the issue is the need for the funding and financing. LGNZ efforts are focussed in three general areas:	
•	Supply;	
•	Social and community housing; and	
•	Healthy homes.	
Localisn advocatir decentra	I - Local government is calling for a shift in the way public decisions are made by ig for greater self-government at the local and an active programme of devolution and isation.	
Localisn advocatir decentral This proje	<ul> <li>Local government is calling for a shift in the way public decisions are made by g for greater self-government at the local and an active programme of devolution and action.         <ul> <li>rct has two intended outputs.</li> </ul> </li> </ul>	Vulnerable: the quantum of
Localisn advocatir decentra This proje	<ul> <li>Local government is calling for a shift in the way public decisions are made by g for greater self-government at the local and an active programme of devolution and isation.</li> <li>The trast two intended outputs.</li> <li>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.</li> </ul>	Vulnerable: the quantum of local government infrastructure exposed to sea level rise
Localisn advocatir decentral This proje	<ul> <li>Local government is calling for a shift in the way public decisions are made by g for greater self-government at the local and an active programme of devolution and isation.</li> <li>act has two intended outputs.</li> <li>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.</li> <li>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.</li> </ul>	Vulnerable: the quantum of local government infrastructure exposed to sea level rise Local Government NZ January 2019
Localisn advocatir decentral This proje • • This doct and resili and what	<ul> <li>Local government is calling for a shift in the way public decisions are made by g for greater self-government at the local and an active programme of devolution and isation.</li> <li>act has two intended outputs.</li> <li>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.</li> <li>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.</li> <li>ment explores the workforce skills and capabilities for an effective, efficient, accountable and three waters sector in New Zealand. It describes what people should be able to do they need to know to competently undertake their work. It is a work in progress and he following roles.</li> </ul>	Vulnerable: the quantum of local government infrastructure exposed to sea level rise Local Government NZ January 2019 Water NZ Competency Framework Water NZ
Localisn advocatir decentral This proje • • This doct and resili and what includes •	<ul> <li>Local government is calling for a shift in the way public decisions are made by g for greater self-government at the local and an active programme of devolution and isation.</li> <li>act has two intended outputs.</li> <li>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.</li> <li>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.</li> <li>Imment explores the workforce skills and capabilities for an effective, efficient, accountable and they need to know to competently undertake their work. It is a work in progress and he following roles.</li> <li>Drinking Water Treatment Operators</li> </ul>	Vulnerable: the quantum of local government infrastructure exposed to sea level rise Local Government NZ January 2019 Water NZ Competency Framework Water NZ
Localisn advocatir decentral This proje	<ul> <li>Local government is calling for a shift in the way public decisions are made by g for greater self-government at the local and an active programme of devolution and isation.</li> <li>act has two intended outputs.</li> <li>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.</li> <li>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.</li> <li>ment explores the workforce skills and capabilities for an effective, efficient, accountable and three waters sector in New Zealand. It describes what people should be able to do they need to know to competently undertake their work. It is a work in progress and he following roles.</li> <li>Drinking Water Treatment Operators</li> <li>Wastewater Treatment Operators</li> </ul>	Vulnerable: the quantum of local government infrastructure exposed to sea level rise Local Government NZ January 2019 Water NZ Competency Framework Water NZ
Localisn advocatir decentral This proje	<ul> <li>Local government is calling for a shift in the way public decisions are made by g for greater self-government at the local and an active programme of devolution and isation.</li> <li>act has two intended outputs.</li> <li>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.</li> <li>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.</li> <li>ment explores the workforce skills and capabilities for an effective, efficient, accountable and they need to know to competently undertake their work. It is a work in progress and he following roles.</li> <li>Drinking Water Treatment Operators</li> <li>Wastewater Treatment Operators</li> <li>Drinking Water Distribution Operators (to be developed)</li> </ul>	Vulnerable: the quantum of local government infrastructure exposed to sea level rise Local Government NZ January 2019 Water NZ Competency Framework Water NZ

December 2020

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Water

Page 61 of 212

#### 6.9.1 National Strategies & Plans

National policy statements are issued by the government to provide direction to local government about matters of national significance which contribute to meeting the purpose of the Resource Management Act 1991.

#### Infrastructure Commission, Te Waihanga

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.

The first plan will be reported to government by the end of 2021 and thereafter at least every 5 years . 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.

# National Policy Statement for Freshwater

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:

- first, the health and well-being of water bodies and freshwater ecosystems
- second, the health needs of people (such as drinking water)
- 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.

This strengthens and upholds Te Mana o te Wai and 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.

Page 62 of 212

Water



	Mackenzie DC Activity Management Plan
Mana Atua – Mana Tangata – Mana Whenua <b>Te Mana o te Wai</b> The health of our Wai: The health of our Nation	
The first bis bis water. bis bis water. bis maximum of the handlat and bis bis water. bis maximum of the handlat and bis bis water of the handlat and bis bis bis water of the handlat bis	NGÁ RITENGA To Tuiti to Walitangi te tähuliku o te Kaupapa te twal Te Mans: to te wal - Te Mans: to te wal Te Mans: to te wal te fam. Motuhale o is sveti o is herio is happi kit te wal
LADDESSER         Ivri/Hapui/Mäori Landowners/Whānau/Hapori         Crown / Community Certeina & local governance         Community	Te Katakalangso ngik hapik me ngi terk te wat Te Mana Windaharen ongi hapit me ngik lovi kit te wat

(Source - Te Mana o te Wai - Kãhui Wai Mãori Report to Hon Minister David Parker - April 2019)

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

## National Policy Statement on Urban Development 2020

The National Policy Statement on Urban Development 2020 (NPSUD) sets out the objectives and policies for providing development capacity under the Resource Management Act 1991.

The NPSUD came into effect on 20 August 2020

The NPSUD 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).

Sufficient development capacity is necessary for urban land and development markets to function efficiently in order to meet community needs. In well-functioning markets, the supply of land, housing and business space matches demand at efficient (more affordable) prices.

The NPSUD contains objectives and policies that local authorities must give effect to in their resource management decisions. These objectives include the following:

- Objective 1: New Zealand has well-functioning urban environments that enable all people and • communities to provide for their social, economic, and cultural wellbeing, and for their health and safety, now and into the future.
- Objective 2: Planning decisions improve housing affordability by supporting competitive land and development markets.
- Objective 3: Regional policy statements and district plans enable more people to live in, and more businesses and community services to be located in, areas of an urban environment in which one or more of the following apply:
  - the area is in or near a centre zone or other area with many employment opportunities 0 0
  - the area is well-serviced by existing or planned public transport
  - there is high demand for housing or for business land in the area, relative to other areas 0 within the urban environment.

Water

Page 63 of 212

- **Objective 4:** New Zealand's urban environments, including their amenity values, develop and change over time in response to the diverse and changing needs of people, communities, and future generations.
- Objective 5: Planning decisions relating to urban environments, and FDSs, take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).
- **Objective 6:** Local authority decisions on urban development that affect urban environments are:
  - $\circ$  integrated with infrastructure planning and funding decisions; and
  - o strategic over the medium term and long term; and
  - responsive, particularly in relation to proposals that would supply significant development capacity.
- Objective 7: Local authorities have robust and frequently updated information about their urban environments and use it to inform planning decisions.
- Objective 8: New Zealand's urban environments:
  - o support reductions in greenhouse gas emissions; and
  - o are resilient to the current and future effects of climate change

#### **Productivity Commission**

The New Zealand Productivity Commission (NZPC) is an independent Crown entity that provides advice to the Government on improving productivity in New Zealand. The NZPC conduct inquiries and productivity research to expand knowledge about productivity and identify areas for improvement.

In their Local Government Insights report (February 2020) the NZPC identified the following significant and challenging work facing local government.

- Councils will need to do better in advancing Māori interests,
- protecting the natural environment,
- tackling housing affordability
- lifting the performance of essential infrastructure such as three-waters services.
- adapting to climate change is a major new challenge facing councils

It is important for Council to stay abreast of any local government related inquiries conducted by the Productivity Commission as Central Government may use the NZPC's reports and findings as a catalyst to initiate proposed change.

# 6.9.2 Key Legislation

Council must comply with any relevant legislation enacted by Parliament. Significant legislation and regulations affecting the Water activities are provided in the table below.

Key Legislation
Biosecurity Act 1993
Building Act 2004
Civil Defence Emergency Management Act 2002
Climate Change Response Act 2002
Energy Efficiency and Conservation Act 2000
Environmental Protection Authority Act 2011
Epidemic Preparedness Act 2006
Fire and Emergency New Zealand Act 2017
Hazardous Substances and New Organisms Act 1996

Page 64 of 212

Water



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Key Legislation
Health Act 1956
Health and Safety at Work Act 2015
Heritage New Zealand Pouhere Taonga Act 2014
Infrastructure (Amendments Relating to Utilities Access) Act 2010
Land Drainage Act 1908
Local Government Act 2002
Local Government Act 1974
Local Government Rating Act 2002
Local Government Rating Act 1979
Local Government (Financial Reporting) Regulations 2011.
Renamed to Local Government (Financial Reporting and Prudence) Regulations 2014 Marine and Coastel Area Art 2011
Marine and Coastal Area Act 2011
Ngai Tahu Claims Settlement Act 1998
Public Works Act 1981
Resource Management Act 1991
Telecommunications Act 1987
Utilities Access Act 2010
WorkSafe New Zealand Act 2013

The legislation that has or is expected to have the most effect is described below:

#### **Building Act 2004**

Provides a regulatory framework for building work, establishes a licensing regime and sets performance standards to ensure buildings have attributes that contribute to the health, safety, physical independence and well-being of people. All Council buildings have to meet the requirements of the Building Act.

# Civil Defence Emergency Management Act 2002

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

Water supply and wastewater are regarded as critical services requiring attention during adverse events and are given special consideration within Council emergency management procedures. Every effort will be given to restore services immediately after an event to at least provide adequate water for sanitation and health needs. Supply quantity and quality may be limited.

# Fire and Emergency New Zealand Act 2017

The Fire and Emergency New Zealand Act repeals the 2 Acts governing fire services, the Fire Service Act 1975 and the Forest and Rural Fires Act 1977, to give effect to a single, unified fire services organisation for New Zealand.

The Act establishes Fire and Emergency New Zealand (FENZ) and combines urban and rural fire services.

Water

Page 65 of 212



The Act introduces a range of changes and new measures for the detailed design and operational policy of FENZ, including the following:

- an updated offences and penalties regime, including a new infringement offence scheme
- removal of powers to recover the cost of rural fires
- new powers for managing hazardous substances incidents
- new measures to encourage compliance among levy-payers and to protect the integrity of the levy
- new powers for firefighters to enter premises to investigate the causes of fires and to take a sample or samples of objects for analysis.

#### Health Act 1956

Places an obligation on Council to improve, promote and protect public health within the District. The provision of water services conserves public health and helps to protect land and waterways from contamination.

The Health Act requires Council to provide the Medical Officer of Health with reports on the level, rate and mitigation measures of diseases, and quality of water.

The Health Act 1956 was amended by the Health (Drinking Water) Amendment Act (HAA 2007) in October 2007 and aims to protect public health by improving the quality of drinking-water provided to communities. The main duties in the Act only apply to supplies above a certain size. Drinking-water suppliers must comply with Sections 69S to 69ZC of the Act by the dates listed in the table.

As a consequence of this Act, Council were required to take all practicable steps to comply with the Drinking-Water Standards for New Zealand 2005 (Amended 2008) implementing this through water safety plans (WSP).

Council engineers amended the compliance timetable to smooth the works over multiple years. The amended timetable took into account the timetable requirements of the HAA 2007, while allowing appropriate investigations to ensure the community receives the most effective and best cost option addressing associated risks.

Water Supply	DWSNZ Supply Category	Year of TP Upgrade
Fairlie	Minor	2021-23
Lake Tekapo	Small	2012/13
Twizel	Minor	2015/16
Burkes Pass	Neighbourhood	To be confirmed
Allandale	Small/Rural Agricultural	To be confirmed
Albury	Small/Rural Agricultural	To be confirmed

# The resulting upgrades of each water supply is shown in the table below:

#### Health Act 1956 - Fluoride

During 2016 proposed legislative changes were announced which will allow district health boards (DHBs), rather than local authorities, to decide on which community water supplies are fluoridated in their areas. The Health (Fluoridation of Drinking Water) Amendment Bill passed its first reading in Parliament on during December 2016.

The bill as it stands proposes decision-making on fluoridation be shifted from local authorities to District Health Boards.

The government will however be introducing a Supplementary Order Paper that changes the bill and gives responsibility for decision making to the Director-General of Health.



It is expected that the bill to pass by the end of 2021.

The Bill describes the:

- powers and duties of Director-General of Health in relation to making decisions about water fluoridation
- powers and duties of water suppliers (including local authorities) in relation to implementing Director-General of Health directives about water fluoridation
- information that Director-General of Health must consider when determining whether to fluoridate a water supply.

The Director-General of Health will be required to:

- collect and review local data on community oral health
- apply national tools developed by the Ministry of Health to generate information about water supplies and affected population groups and communities, and
- consider this information and direct water suppliers to fluoridate or not to fluoridate community water supplies as appropriate.

Local authorities will still be responsible for supplying drinking water. A local authority would be required to fluoridate a water supply if it is directed to do so by the Director-General of Health.

Local authorities will continue to be responsible for meeting the direct costs of fluoridation. Council engineers commissioned an assessment of the implications for MDC water supplies. The Code of Practice for Fluoridation of Water Supplies (Water NZ) identifies a range of requirements including a comprehensive design report. Of note is the Safety in Design process requirements under the Health and Safety at Work Act now in force. These place additional resource requirements during the design phase.

Preliminary cost estimates for the Fairlie, Tekapo and Twizel Water Supplies are as follows:

Costs I	Fairlie	Tekapo	Twizel
Capital	\$280,000	\$300,000	\$352,000
Annual Operating	\$4,000	\$7,000	\$22,000

(based on existing water demand and saturator systems dosing sodium fluoride)

The Bill will follow the normal Parliamentary processes, but have not progressed past the second reading in May 2017.

#### Health and Safety at Work Act 2015

The Health and Safety at Work Act 2015 (HSWA)was enacted on 4 April 2016 and is part of "Working Safer: a blueprint for health and safety at work" and reforms New Zealand's health and safety system following the recommendations of the Independent Taskforce on Workplace Health and Safety. Working Safer is aimed at reducing New Zealand's workplace injury and death toll by 25 per cent by 2020.

The HSWA:

- reinforces proportionality what a business needs to do depends on its level of risk and what it can control
- shifts from hazard spotting to managing critical risks actions that reduce workplace harm rather than trivial hazards
- introduces the "reasonably practicable" concept focusing attention on what's reasonable for a business to do
- changes the focus from the physical workplace to the conduct of work what the business
  actually does and so what it can control
- supports more effective worker engagement and participation promoting flexibility to suit business size and need.

Water

Page 67 of 212



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

#### The HSWA identifies four duty holders:

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

A range Regulations will be developed as part of this HSWA. The HSWA requires identifying the risks associated with hazards and associated mitigation to reduce those risks.

# Heritage New Zealand Pouhere Taonga Act 2014

- Describes an archaeological site as "Any place in New Zealand that:
  - Was associated with human activity that occurred before 1900
  - Is the site of the wreck of any vessel where that wreck occurred before 1900
  - Is or may be able through investigation by archaeological methods to provide evidence relating to the history of New Zealand"

It is unlawful to modify, damage or destroy any archaeological site – recorded or not – without an authority from the New Zealand Historic Place Trust.

#### Local Government Act 2002

Defines the purpose of local authorities as enabling local decision-making by and on behalf of the community, and allows local authorities the power of general competence. This Act specifically requires Councils to continue to provide water and wastewater services if they do so already.

In addition to the general requirements of the Local Government Act there are some specific clauses that apply to water services.

Page 68 of 212



Section	Details	Applies to
S 10	Restores the four aspects of community well-being by requiring local authorities to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future	Water and Waste Services
S 17A	Requires that Councils review the cost effectiveness of the way they deliver their services to ensure they meet the needs of communities	All services
S 101B	Requires a 30 Year Infrastructure Strategy	Core Services
S125	Places a requirement to assess water and other sanitary services from time to time	Water and Sanitary Services Assessment
S130	Imposes an obligation to maintain water services and places limitations on the transfer or selling of assets	Divestment of services
S136	Empowers Councils to enter into Contracts relating to provision of water services for periods not exceeding 35 years whilst maintaining control over the pricing of the service, retain legal responsibility for the service and being responsible for the development of policy related to the water services	Utilities Contract
S137	Empowers Councils to enter joint local government arrangements and joint arrangements with other entities for the provision of water services, with the same constraints as \$136	Utilities and Professional Services provision and procurement
Pt 1 - 2 Pt 3 - 23	Council provides groups of activities for financial, performance and negative effects reporting purposes. The Water and Waste unit will provide Group summaries for water (urban & rural), sewerage and stormwater	Water and Waste Services

#### Local Government Act 1974

Part XXIII Water Supply, sections 375-397 applied to water supplies, but have been repealed.

#### Local Government Rating Act 2002

Provides Council with flexible powers to set, assess, and collect rates to fund Council activities while ensuring that rates are set in accordance with decisions that are made in a transparent and consultative manner and providing for processes and information to enable ratepayers to identify and understand their liability for rates.

#### **Resource Management Act 1991**

Governs all water takes and discharges. Water takes and discharges to waterways and land occur through the extraction of water from waterways and land. Resource consents obtained for water takes and discharge activities require parameters such as volume and quality to be monitored as well as taking steps to mitigate any adverse effects that may occur through the activity.

There have been numerous amendments to the Resource Management Act (RMA) over the years with reform a key priority. During 2019 the Government appointed the Resource Management Review Panel to undertake a comprehensive review of the RMA. The Review Panel recommended:

- The RMA to be repealed and replaced with two new pieces of legislation
  - The Natural and Built Environments Act to strengthen the current system by not only seeking to protect the environment, but improve it.
  - The Strategic Planning Act to give statutory weight to strategic spatial plans and, critically, force reconciliation and alignment across central and local government to ensure implementation.

# Taumata Arowai - the Water Services Regulator Bill

Taumata Arowai – the Water Services Regulator Bill received Royal Assent on 6 August 2020. The Bill will establish Taumata Arowai–the Water Services Regulator and provide for its objectives, functions, and governance arrangements.

Taumata Arowai – the Water Services Regulator Bill will create 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.

December 2020

Water

Page 69 of 212

It is anticipated this Bill will be enacted during 2021.

A separate Bill, the Water Services Bill, 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.

#### **Utilities Access Act 2010**

The Act establishes a framework for the National Code of Practice to govern how corridor managers and utility operators coordinate their activities within transport corridors. The purpose of the Code is to:

- Maximise the benefit to the Public while ensuring that all Utility Operators are treated fairly;
- Ensures that disruptions to Roads, Motorways, and railways caused by Work by Utility Operators are kept to a minimum, while maintaining safety; and
- Provides a nationally consistent approach to managing access to Transport Corridors.

The Code is a mandatory requirement for all road and rail controlling authorities and utility network operators under the Utilities Access Act 2010, and came into effect on the 1st January 2012. The Code was reviewed during 2016.

#### 6.9.3 Standards, Codes of Practice & Guidelines

#### National Environmental Standards

National environmental standards are regulations issued under the Resource Management Act 1991 (RMA). They prescribe technical standards, methods and other requirements for environmental matters. Region and local councils must enforce these standards (or they can enforce stricter standards where the standard provides for this). In this way, national environmental standards ensure consistent minimum standards are maintained throughout all New Zealand's regions and districts.

#### National Environmental Standards for Sources of Human Drinking Water (2008)

The National Environmental Standard for Sources of Human Drinking Water came into effect on 20 June 2008 and is intended to reduce the risk of contaminating drinking water sources such as rivers and groundwater. It does this by requiring regional councils to consider the effects of activities on drinking water sources in their decision making. Specifically the NES require Councils to:

- Decline discharge or water permits that are likely to result in community drinking water becoming unsafe for human consumption following existing treatment
- Be satisfied that permitted activities in regional plans will not result in community drinking water supplies being unsafe for human consumption following existing treatment
- Place conditions on relevant resource consents requiring notification of drinking water suppliers
  if significant unintended events occur (e.g. spills) that may adversely affect sources of human
  drinking water
- work with Regional Council to place conditions on applicable new consents for the protection of its public supply sources

#### AS/NZ Standards

Where possible, relevant AS/NZS standards are used as the basis for determining standards of design and construction. The Code for Subdivision and Development AS/NZS: 4404 is the principal document defining design requirements. New works within the urban areas are constructed in general accordance with NZS4404 Land Development and Subdivision Infrastructure which sets minimum standards for reticulation construction, including the provision of firefighting water.

#### Asset Management Standards

NAMS International Infrastructure Management Manual 2006

NAMS International Infrastructure Management Manual 2011

Page 70 of 212

Water



Asset	Manageme	ent Sta	ndards

ISO 55000 International Standards for Asset Management 2014

PAS 55-1:2008 Asset Management (British Standards)

NAMS Developing Levels of Service and Performance Measures Guidelines 2007

NAMS Optimised Decision Making Guidelines 2004

NAMS Infrastructure Asset Valuation and Depreciation Guidelines 2006

Water NZ - New Zealand Gravity Pipe Inspection Manual 2019

NZWWA The New Zealand Infrastructural Asset Grading Guidelines 1999

# 6.9.4 Regional Strategies & Plans

Under Section 30 of the Resource Management Act of 1991 Regional Councils are required to provide policies and methods to achieve integrated and sustainable management of the regions natural and physical resources. The Canterbury Land and Water Regional Plan provides a framework for the sustainable management of the regions water resources. These resources include groundwater, rivers, lakes and wetlands.

The **Canterbury Land and Water Regional Plan** (LWRP) identifies the resource management objectives for managing land and water resources in Canterbury to achieve the purpose of the Resource Management Act 1991. It identifies the policies and rules needed to achieve the objectives, and provides direction in terms of the processing of resource consent applications.

This LWRP is made up of 16 sections and a map volume:

- the first describes Canterbury's land and water resources, interrelated issues that need to be managed, the key partnerships, relationships and processes already underway, including the Canterbury Water Management Strategy (CWMS).
- The second section describes how the Plan works and contains the definitions used in the Plan.
- The subsequent three sections cover the region-wide objectives, policies, and rules.
- Sections 6 to 15 inclusive contain sub-region catchment specific policies and rules, and
- Section 16 contains the schedules.
- The maps referred to in the rules are in a separate map volume.

## 6.9.5 Council Strategies, Plans, Bylaws and Policies

#### Mackenzie District Council Long Term Plan

The Local Government Act 2002 requires local authorities in New Zealand to prepare a Long Term Plan that sets out Council's intentions over a ten-year period. The Act is very clear on how Councils should prepare their plans and what should be included in the final document. Consultation with the community is a very important part of this process. This is to ensure the people who effectively pay for the services delivered in the plan have the opportunity to feedback on what they want to see and how much they are prepared to pay. Land Transport/Water/Wastewater/Stormwater is considered to be a significant/core activity.

The Long Term Plan sets out the direction for Mackenzie District Council over the following ten years. The LTP is reviewed by Council every three years.

The Long Term Plan provides information on all Council activities, how these will be delivered, how much they will cost and how they will be paid for. The first year of the Long Term Plan is also the Annual



Plan for the first year of the ten year LTP period and as a result there is no separate Annual Plan process for that year.

#### Annual Plan

In accordance with the Local Government Act 2002 local authorities in New Zealand must prepare and adopt and Annual Plan for each financial year. The Annual Plan must support the long-term plan in providing integrated decision-making and co-ordination of the resources of the local authority; and contribute to the accountability of the local authority to the community. The Annual Plan process provides an opportunity to adjust the direction of Council and the community for the twelve months following. It also provides an opportunity for Council to highlight the key issues it faces and update the community on achievements and plans for the following year.

#### Mackenzie District Plan

Section 73 of the Resource Management Act 1991 requires the Mackenzie District Council to have at all times a District Plan for its District.

The District Plan sets out in a systematic way the manner in which the Council intends to deal with its functions under the Act. In doing this, the District Plan specifies objectives, policies and methods, in relation to resource management issues in the District, to achieve the integrated and sustainable management of the District's resources.

The District Plan must reflect and provide for the principle resource management issues pertaining to the District. The District Plan identifies and discusses the issues that have been identified by the Council and sets out the objectives and policies of the District Plan in regard to those issues. The District Plan also specifies the environmental results anticipated to be achieved by the implementation of the objectives and policies.

To achieve the objectives and policies of the Plan, rules are included which prohibit, regulate or allow activities.

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

#### 30 Year Infrastructure Strategy

Changes to the Local Government Act 2002 during 2014 requires that a local authority must prepare and adopt, as part of its long term plan, an Infrastructure Strategy for a period of at least 30 consecutive financial years.

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

- Demographic changes
- Environmental impacts
- New technologies
- Continually changing legislative environment (Central & Regional Government)
- Infrastructure resilience
- Aging of infrastructure

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

# **Delivery of Services Review**

Section 17A of the Local Government Amendment Act 2014 requires that a local authority must review the cost-effectiveness of current arrangements for meeting the needs of communities within its district or region for good-quality local infrastructure, local public services, and performance of regulatory functions.

Water


Section 17A has a number of triggers that apply to the application of the Section:

- Significant change in service levels
- Within two years of the completion of a relevant contract (before renewal of contract)
- At Councils discretion with a maximum time between reviews of six years
- The first review is required within three years (clause 1A of new Schedule 1AA)

#### Exceptions for review are:

- Circumstances where the services cannot be reasonably altered within the two years
- The local authority is satisfied that the potential benefits of undertaking the review do not justify the costs of undertaking the review

The review:

1. Must consider options for

- a. Governance
  - b. Funding
  - c. Delivery
- 2. Options for the responsibility for governance, funding and delivery is exercised by a. The local authority
  - b. A Council controlled organisation of the local authority
  - c. A Council controlled organisation where the local authority is one of several shareholders
  - d. Another local authority
  - e. Another person or agency

The Section 17A Review was completed and found no driver for change in the current arrangements for service delivery in the 3 Waters.

#### Asset Management Plans

Asset Management has been described as applied common sense. Therefore, documenting applied common sense results in an Asset Management Plan (AMP). In essence there is limited funding and competing priorities. The Asset Management Plan helps staff/Council decide where and how to spend the limited funds to achieve the desired results.

Changes to the Local Government Act 2002 further emphasised the need for asset management planning and the development of Asset Management Plans.

AMPs are a key component of Council's planning process. They are prepared within the context and framework of the LTP, District Plan, Annual Plan and Funding Policy. Figure 6-3: Corporate links to AMPs depicts the links and information flows with the Asset Management Plan, other corporate plans and public consultation.

As part of the Local Government Act 2002 requirements (Schedule 10) the LTP must, for the ten years of the Plan, identify for each group of assets the costs for any additional asset capacity required and the maintenance, renewal, and replacement costs for the assets.

This statement of cost for the 10-year period includes the accounting for asset depreciation in accordance with The New Zealand Equivalents to International Financial Reporting Standards, and the recording of all significant assumptions in preparing the financials.

This AMP will provide the basis for identifying service potential and any losses, and determining the long-term financial strategies for Council's water network assets. This AMP is part of a suite of AMPs and forms part of Council's LTP for the period 2021-2031.

December 2020

Water

Page 73 of 212

Figure 6-3: Corporate links to AMPs



This AMP is intended to be read in conjunction with the Long Term Plan (LTP) and fulfils requirements of the Local Government Act 2002 (and amendments) – Schedule 10, which states:

- 1) The purpose of local government is
  - a. to enable democratic local decision-making and action by, and on behalf of, communities; and
  - b. to meet the current and future needs of communities for good-quality local infrastructure, local public services, and performance of regulatory functions in a way that is most cost-effective for households and businesses.
- 2) 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; and
  - b. effective; and
  - c. appropriate to present and anticipated future circumstances.

In order to demonstrate that the delivery of services are efficient, effective and appropriate; Mackenzie District Council has developed a suite of Activity Management Plans (AMP) for its Core Infrastructural Services as part of this Long Term Plan process. These AMPs provide comprehensive account of the efficiency, effectiveness and appropriateness of Council's Core Infrastructural Assets, asset management practices and knowledge.

#### 6.9.6 Bylaws

Bylaws are Council rules to regulate its own affairs and an enforcement tool and policies to guide decision making. Council requires a number of Bylaws and Policies to enable staff to perform their functions to the best of their ability across the full range of Councils responsibilities.

There are two bylaws that apply to the Water Supply service.

• The Water Supply Bylaw 2014

Page 74 of 212

Water



 The Timaru Consolidated Bylaw 2018 – Chapter 15 Water Services applies to the Downlands Water Supply

## 6.9.7 Policies

#### Significance and Engagement Policy 2014

During 2014 Council adopted the Mackenzie DC Significance and Engagement Policy:

- To enable Council and its communities to identify the degree of significance attached to proposals relating to issues, assets, and other matters
- To provide clarity about how and when communities can expect to be engaged in decisions made by Council
- To inform Council from the beginning of a decision-making process about the appropriate extent, form and type of engagement that may be required

This Policy identifies the following Strategic assets:

- The entire urban and rural roading network of the Mackenzie District.
- The urban water supplies of Burkes Pass, Fairlie, Lake Tekapo and Twizel.
- The piped rural water supplies of Albury, Allandale, and Downlands (Albury to Cave section).
- The stock water race systems at Ashwick/Opuha, Punaroa/Eversley and School Road
- The wastewater reticulation and treatment systems at Burkes Pass, Fairlie, Lake Tekapo and Twizel.
- The stormwater reticulation systems at Fairlie, Lake Tekapo and Twizel.
- The Council cemeteries at Albury, Burkes Pass, Fairlie, Tekapo and Twizel.
- All Council's parks, recreation reserves, sports fields and facilities held under the Reserves Act 1977 or otherwise.
- Council's swimming pools at Fairlie and Twizel.
- Council's stock of tenanted pensioner housing.
- The Fairlie Medical Centre.
- The Twizel Events Centre and the community hall at Lake Tekapo.
- The Mackenzie Community Centre at Fairlie.
- Council's administration buildings in Fairlie and Twizel.
- Council's shareholding in Alpine Energy Limited.

The Significance and Engagement Policy provides a procedure to determine significance and a community engagement guide.

## Earthquake Prone Buildings Policy

In accordance with Section 132 of the Building Act 2004 Council is required to adopt a policy on earthquake prone buildings. The Mackenzie District Council Policy on Earthquake Prone Buildings was consulted on and adopted during 2006.

This Policy reflects Council's determination to reduce risk over time in a way that is acceptable in social and economic terms to the community. A flow chart in the Policy details the process for assessing Earthquake prone buildings.

Council's 3 Waters buildings are located at sites such as treatment plants, pump stations and storage facilities. Generally, the existing 3 Waters facility buildings will not trigger any of the above assessments. • Buildings are usually located on the edge or outside of urban boundaries

- Buildings are mainly timber framed buildings
- Equipment (pumps etc.) are usually fixed to the floor where possible
- Reservoir & storage structures are usually reinforced concrete materials
- Nost were constructed post 1976, when unreinforced masonry buildings were prohibited.
- Buildings are only visited for short periods at a time

In view of the above, seismic assessments are not deemed necessary for any of the 3 Waters buildings.

December 2020

Water

Page 75 of 212



## 6.9.8 Procedures

Procedures include legislation, regulation, standards and guidelines. There are numerous standards and guidelines which Council refers to. These include Standard Operating Procedures and Operation and Maintenance/Management Manuals/Plans. The following details the Key Standards and Guidelines that are used in the management and operation of the Mackenzie District Council 3 Waters Systems.

Standards and Guides
Legislation as listed in Section 4.9.2 – Key Legislation
Drinking Water Standards for New Zealand
NZS/AS3725: 1989 – Loads on buried pipes
NZS 7643: 1979 – Code of Practice for the installation of unplasticised PVC pipe systems
The New Zealand Building Code
New Zealand Fire Service Fire Fighting Water Supplies Code of Practice – SNZ PAS 4509:2008
NZS 1477 7602, 7643 – PVC Pipes
NZS 4765:2007 m PVC pipes
NZS 4441: 2008 o PVC pipes
NZS 4442 – "Welded Steel Pipes and Fittings for Water, Sewerage and Medium Pressure Gas"
BS 5163 – Cast iron fittings (valves)
NZS 3910: 2003 – "Conditions of Contract for Building and Civil Engineering Construction"
Worksafe - Good Practice Guidelines Excavation Safety
Worksafe - Good Practice Guidelines Working at Height
Worksafe - Good Practice Guidelines Electrical Safety on Small Construction Sites
Worksafe - Good Practice Guidelines Conducting Asbestos Surveys
Worksafe - Good Practice Guidelines ACOP – Management and Removal of Asbestos
International Infrastructure Management manual – 2002
Creating Customer Value from Community Assets Manual – 2002
Water NZ - New Zealand Gravity Pipe Inspection Manual 2019
New Zealand Infrastructural Asset Grading Guidelines" – 1999
New Zealand Infrastructure Asset Valuation and Depreciation Guidelines 2001

Water



## 7.0 FUTURE DEMAND

This section provides details of growth forecasts, which affect the management and utilisation of all water assets and details demand management strategies.

## 7.1 Overview

The future demand for services will change over time in response to a wide range of influences, including:

- Local population trends
- Accuracy of predicted future populations
- Local economic trends
- Changing technology
- Changing legislation requirements
- Land use changes
- Resource issues
- Climate change

## 7.2 Demand Drivers

The future demand for reticulated water services in the Mackenzie District will be driven by:

- Growth in the District
  - $\circ$   $\,$  Trends in population growth or decline give a good indication of future growth and in turn demand on the network
- Economic changes
  - Changes in land use, industry, economic climate and tourism can all affect the demand on the Water Supply asset.
  - E.g. developments such as motels/hotels and subdivisions where the properties are purchased as holiday homes do not increase the resident population but have a significant effect on the peak tourist population capacity.
- Improvement to Levels of Service
  - Advances in available technology
    - o A greater understanding of customers' perceptions and expectations
    - o A higher level of public expectations
    - o Changing legislative requirements
    - Government organisations setting higher standards

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

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

## 7.3 DEMAND FORECASTS

The Mackenzie District Growth Projections- 2020 (Rationale) report provides a projection of the population growth for the Mackenzie District over the next 30 years. The report provides growth projection outputs for usually resident population, employment, dwellings, rating units and visitors.

December 2020

Water

Page 77 of 212



Typically, MDC used the growth projections prepared by Statistics New Zealand (StatsNZ). However, growth in the district has far exceeded even the most ambitious predictions, as this was driven by growth in the tourism industry, attracting both visitors and residents.

Due to the delayed release of the StatsNZ growth projections based on the 2018 Census and their typically conservative nature, MDC commissioned the latest growth projections to provide a single source of the truth for council and understand the future growth in their district.

Four growth scenarios have been modelled for each parameter representing different levels of ambition in terms of the district's growth over the next thirty years.

The report considered four growth scenarios i.e.

- Scenario 1 Business as Usual (Pre COVID 19)
- No impact from COVID 19 and no limit on dwellings that can be constructed
   Scenario 2 High
- minimal COVID 19 impact and currently zones land reaching capacity
   Scenario 3 Medium
- $_{\odot}$   $\,$  Expected COVID 19 impact, business as usual by 2025 Scenario 4 Low
  - Higher than expected COVID 19 impact

Scenario 3 is considered to be the most appropriate for MDC's long term planning as there will be short term effects due to COVID-19. However, it is not yet known what, if any, long term effects there will be. Due to this uncertainty it is recommend that annual "check-ins" are completed with the most up-to-date data to monitor the impact of COVID-19 and the progress of recovery {Rationale}.

### 7.3.1 Growth Trends

#### Population Projections

The key characteristics of Mackenzie's population are:

- A relatively recent an influx of younger people to the area for the employment opportunities provided by the tourism industry.
- · People later in their working lives or early retirement are moving to the area for the lifestyle.
- Older people (over 70) tend to leave the area, likely in search of better healthcare.

MDC's population is predicted to continue to grow in all areas, at differing rates. Fairlie's population is predicted to decline through to 2045. This is due to the age profile of the district and low migration. However, after 2045 a slight increase in population is predicted this is due to Tekapo reaching capacity and 'spilling-over' into Fairlie.



Page 78 of 212

Water



Consequently the following graph predicts a relatively static population growth over the period of this asset management plan. As a result there will not be any significant increase or decrease in demand for Council services based on change in population.

## **Tourism Projections**

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

Based on current assumptions around the reopening of New Zealand's borders and the speed at which tourists are likely to return to New Zealand, the industry is expected to recover by around 2025.



## **Employment Projections**

Due to the importance of the local tourism industry and its dependence on international visitors it is expected that the Mackenzie district will experience a larger impact than other areas around the country in terms of COVID-19 related job losses {Rationale}. However, domestic tourism has performed better than expected and may lessen the forecasted impact.



December 2020

Water

Page 79 of 212



## 7.3.2 Response to Projected Growth

From the above it is evident that the effects of COVID-19 will have a significant impact on especially tourism and employment. This will slow down other areas such as population growth and dwellings etc. The projected deceleration in demand during the first part of this plan period provides Council an opportunity to reassess existing systems capacity and performance and focus on master planning for service provision.

However, Council is also mindful that COVID-19 also invigorated the domestic tourism market as data indicates that there were almost as many domestic visitors to the Mackenzie area at midday on the Saturday of Queens Birthday as there were on the Saturday of Waitangi weekend pre-COVID-19 lockdown.

The influx of domestic holiday-makers into the district, particularly the Mackenzie Basin, has significant impact on the Water Supply network, increasing the demand substantially. As development occurs, the developers are required to install their own systems and connect to existing Council systems to provide for the domestic use and fire suppression requirements of the subdivision.

#### 7.3.3 Improvements to Levels of Service

#### **Changes in Customer Expectations**

In recent years there has been an increasing awareness on the part of owners with respect to Water Supply issues. With rate of growth in the rating base increasing, the following factors may need to be considered:

- Increased level of awareness of water quality
- Increasing demand for better pressure and flow

#### **Changing Levels of Service Demands**

The intended Levels of Service defined in Section 6 are considered to be representative of the service demands of the current and the future community. With the lack of growth in the rating base the following factors may need to be considered:

 reduction in maintenance of some facilities that have little impact on the overall service delivery (if possible)

## **Policy or Management Changes**

Changes to Water Supply policies may be driven from a number of directions. They could be internally driven (e.g. Development Impact Levy policies) or externally driven (e.g. changes driven by regional or national organisations like Environment Canterbury). Monitoring and being aware of possible implications of these changes enables the impacts of such changes to be anticipated and predicted. While there is no certainty, it is important to consider them when developing asset management risk forecasts and strategies.

#### **Financial Contributions**

Financial Contributions are another means of funding network infrastructure, reserves or community infrastructure. Mackenzie District Council has prepared a 'Financial Contribution Policy'. The contribution policy includes a methodology for calculating the cost of the impact a development will have on existing community infrastructure including Water Supply. This ensures that the negative impact of development is in part funded by the developer rather than the ratepayer.

The policy uses the following formula to calculate the level of contribution: (Asset Valuation – Debt Loading)/the number of connectable properties to the Scheme

For 2019/20, the financial contribution payable on each lot created at the time of subdivision is calculated at \$7,621.37. This amount is GST exclusive.

The financial contribution figures are reviewed annually.

Page 80 of 212

Water



## 7.4 Demand Impacts on Assets

Overall implications for the network of continual demand for improvement in levels of service tied to an effectively static population are:

- An increasing level of treatment caused by regulatory and DWS requirements.
- An increasing focus water quality and pressure
- An increased level of expenditure to attain those desired controls/requirements
  A static ratepayer base to fund Mackenzie District Council's contribution to the separate community-based water supply budget. Council has resolved to harmonise the water supply

# budgets across Fairlie, Burkes Pass, Tekapo and Twizel. This will have the benefit of sharing the capital expenditure and target that where most needed.

## 7.5 Current Demand

The average daily demand figures for the water supplies are graphically represented below:





This shows that the Twizel Water Supply (1,300 population) has the greatest demand of all the Water Supplies. The Lake Tekapo demand is greater than the Fairlie demand despite the Lake Tekapo usually resident population figures (500) are well below the Fairlie usually resident population figure (1,000).

It is important to note that the Lake Tekapo and Twizel are tourist destinations. Developments such as motels/hotels and subdivisions where the properties are purchased as holiday homes do not increase the resident population but have a significant effect on the peak tourist population capacity. Add to that the irrigation of sports facilities such as a golf course and sports grounds and the demand for water is significantly increased. This additional demand results in a skewed average daily demand as shown above.

The NZS 4404: 2010 Land Development and Subdivision Infrastructure Standard specifies for design purposes the daily consumption as 250 litres/person/day.

The Ministry of Health published "Household Water Supplies – The selection, operation and maintenance of individual household water supplies (2006)" which provides information about the supply of safe drinking-water to households not connected to town water supplies. However, these figures provide useful guidance as to what the Ministry of Health deems appropriate for personal consumption, cleaning and washing and suggests a requirement of 300 litres/person/day.

December 2020

Water

Page 81 of 212

## Figure 7-2: Demand – Average Daily per Person



From the above graph it is evident that Fairlie and Burkes Pass are the water supplies where the average daily demand/person is nearer to the industry standard of 300l/person/day. It also confirms that the additional tourism and irrigation demands experienced in Lake Tekapo and Twizel Water Supplies as discussed earlier skews the average daily per person representation. However, the district average have reduced by more than 300 litres as pipe renewals have reduced leakage.

The 2013 Census data showed the average occupancy rate of 2.29 people/dwelling for the Mackenzie District. This equates to an average daily household use of 686 litres/dwelling (2.29 x 300litres Industry Standard).





This shows that Fairlie and Lake Tekapo are within the industry standard and reinforces that the additional tourism and irrigation demands experienced in the Twizel Water Supply as discussed earlier skews the average daily per connection representation.

Page 82 of 212

Water

## 7.6 Demand Management Plan

There are two recognised components to a demand management strategy:

#### 7.6.1 Asset Based Demand Management

Asset Based demand management on the system really can only be focused on removing reducing the demand in particular for irrigation water in the urban areas.

In Twizel where the environment is naturally arid there is a high demand for water to make this a green oasis in the region. Of real concern is the larger life style blocks around Twizel that the Council has determined that they be "on-demand" supplies and no real restriction on the volume that can be used.

In Fairlie the maximum water take is determined by limits in the Opihi River Regional Plan and puts severe restrictions on this supply when the un-modified flow in the Opihi as measured at the State Highway One Bridge falls to 8.1 m<sup>3</sup>/sec- first trigger and then second trigger of 2.5 m<sup>3</sup>/sec or less.

There are minimal asset based demand options that do not have a significant cost attached.

#### Upcoming issues during the next ten years

3Waters Reform

The ongoing 3Waters reform will focus on the efficient and safe delivery of water services. Council will continue to collaborate with the Government and other local authorities in the region to consider future 3Waters service delivery arrangements that will improve the safety and quality of drinking water.

#### Drinking Water Standards

Council will progressively work to ensure all public water supplies comply with the Drinking Water Standards for New Zealand.

Water Safety Plans - The Health (Drinking Water) Amendment Act 2007 (S69Z) requires drinking water suppliers to prepare and implement a Water Safety Plan (WSP). Water Safety Plans have been prepared for the following Water Supplies:

- Fairlie
- Lake Tekapo
- Twizel
- Burkes Pass
- Allandale
- Albury

WSPs are required to be reviewed at least every 5 years and all the WSPs are programmed for review in 2021/22.

Fairlie - The Fairlie WSP identified the following improvements to prevent, reduce or eliminate the identified public health risks:

- WTP upgrade planned for 2021-23.
- Storage an additional reservoir is required to improve the security of supply to the Fairlie Water Supply. This is programmed for 2021-23.
- Reticulation renewals concrete and asbestos cement pipe replacement programme

**Burkes Pass** - The Ministry of Health have not assigned a log credit for protozoal treatment as Council has not yet confirmed if it requires the scheme to be assessed under Section 5 or Section 10 of the DWSNZ. It is anticipated that compliance will come under Section 10 'Small Water Supplies, Alternative Compliance Criteria'.

If section 10 compliance is considered then the source best fits the category describing a "Partially protected catchment" and would require three log credit and also bacterial treatment.

Council has assumed that UV disinfection will be added to existing chlorine disinfection. Additional storage is likely to be required to accommodate periods when the source water quality is not suitable

Water



for UV disinfection. Converting the scheme to a fully restricted supply scheme would provide that storage on each property.

Allandale - The Ministry of Health have not assigned a log credit for protozoal treatment as Council has not yet confirmed if it requires the scheme to be assessed under Section 5, 10 or Section 12. Section 12 is of the DWSNZ "Rural Agricultural Drinking Water Supplies" is still in the course of preparation and consultation.

It is anticipated that compliance will come under Section 10 'Rural Agricultural Drinking Water Supply Guidelines – 2015.'

Council has assumed that UV disinfection will be added to the existing chlorine disinfection. Some form of filtration is likely to be required for periods when the source water is not suitable for UV disinfection.

Practical issues include the absence of power at the potential treatment plant site and didymo blocking filters. Potential connection to Fairlie Water Supply may resolve these issues. Investigations are ongoing.

**Twizel** – New gallery controls were completed in 2019. Increasing system resilience would see doubling of the trunk main from the treatment plant to the reticulation.

Lake Tekapo – Increasing system resilience would see doubling of the trunk main from the reservoir to the reticulation and increasing storage through construction of two new reservoirs, one each on the east and west side of the Tekapo River.

**Albury** – The Albury Water Supply can be categorised as either a small supply against Section 10 of the DWSNZ or against Section 5 (the same as larger schemes). Section 5 indicates a protozoal removal requirement of Log 4. This could potentially be reduced to Log 3 if the supplies are designated small supplies and assessed against Section 10. A further option may be Section 12, "Rural Agricultural Drinking Water Supply Guidelines - 2015" which is still in the course of preparation.

**District wide** – The per capita water demand in the Mackenzie district is above industry standards. Refer to Figure 7-2 Demand – Average Daily per Person. Water metering is a fundamental tool in water demand management and conservation. It raises awareness of water use and the value of water among customers. It enables the means of determining where the water is going, who is the high users and other basic information to allow management of a very valuable resource. It provides the property owner with a means of ascertaining private leakage without specialist help.

Metering drives behavioural change. Both supplier and user are more likely to fix leaks if they know how much water is being lost from pipes and where losses are occurring. It encourages both parties to take note of actual consumption.

As a result universal property metering is programmed for 2021/22. It is Council's intention to carry out metering in a trial area such as Twizel initially and then roll it out to the wider area.

**Remote supplies** – Central Government have signalled that the new drinking water regulatory framework will require registration of all drinking water supplies with only single household self-suppliers excluded. Council need to ascertain the extent of private water supplies and wastewater disposal within the district. The 'Remote Supplies' project is programmed for 2021/22.

Page 84 of 212

Water



The Demand Management Plan involves implementing strategies to reduce water losses and promote more efficient network operations. These strategies involve altering or repairing the asset to achieve the target. The water demand reduction strategies used by MDC are outlined in the table below:

Strategy	Description
Response time	Prompt response and rectification of reported leaks
Replacement/Rehabilitation Programme	A Renewal Programme to ensure assets are not utilised beyond their useful life when the risk of unidentified failure is greatly increased in consideration of asset criticality
Codes of Practice	Ensure all maintenance is carried out to the relevant standards by enforcement of appropriate Engineering Codes of Practice
Technical Standards	Ensuring new assets are constructed to the correct standards and tested appropriately before being commissioned
Standard Materials	The use of standard (high quality) materials.
Quality Audits	To ensure all standards above are being met

#### 7.6.2 Non - Asset Based Demand Management

There are some options to affect reduced demand on the water supply networks that are not asset based. Generally, these all limit the amount of irrigation that can be applied to domestic properties or the encouraging consumers to purchase energy efficient appliances in relation to water use.

#### Infrastructure Improvements

Council have completed a significant roll out of SCADA telemetry monitoring system improvements across all water supplies to allow real time monitoring of the facilities from Council's office in Fairlie.

In order to have a more accurate idea of the impacts of demand on the network and managing any growth, Council is updating its hydraulic model of the existing Water Supply network which will provided definitive information on the ability of the existing network to cope with increased development at the top end of the pipe networks. This upgrade will be undertaken as part of the 3 waters stimulus programme of works in 2021/22.

**Fairlie** - embarked on a replacement programme of its old concrete pipe network in 1998 and have generally spent \$100,000 per year on this initiative. The final stage of this replacement programme will be completed by 2022. This will be done in conjunction with the replacement of 6.8km of Asbestos Cement water mains.

**Tekapo** - there is 5.8km of Asbestos Cement, 400 metres of Cast Iron and 300 metres of Galvanised Steel water mains in Tekapo. Replacement of these pipe materials are programmed to be completed by 2022.

**Twizel** - There is 21.9km of Asbestos Cement pipe in the Twizel all installed in early 1970s. Whilst there have been few actual failures yet, the analysis shows that the AC network is at risk of failure and should be replaced. Council started with a renewal programme during 2015 focussed on replacement of the AC mains. As part of the COVID 19 recovery package Council have accelerated this renewal programme and the completion is programmed for 2022.

With the steady growth of Twizel to the west, the impact of Plan change 15 allowing for low density residential areas and the Council policy of only supplying water on a restricted basis may put off the need for a large trunk water main to be laid into this area. However, this will need to be monitored over time as development and demand increases in this area. Reports provided to Council by Opus International Ltd have recommended the construction of a 300mm trunk main to be laid from the headwork's to the Res 4 zoned land west of Twizel. The cost of this is estimated at \$315,000. This work could be funded in part or wholly by developers by way of development contribution. As part of the update of the hydraulic modelling, staff are investigating what other trunk main upgraded are required, especially around Mackenzie Drive to replace the existing 2 x 1500mm mains that are already there. These are AC and have to be replaced shortly.

Water

Page 85 of 212

The area to the west of Twizel known as The Drive is zoned Res 4 and Rural Residential 1, these zones allow for low density sections. Council has determined that this area is to be serviced by an on-demand water supply. In times of high demand, the flow and pressure dropped off markedly to the point where water flow is non-existent. This issue was resolved through the installation of the North West Arch booster pump station boosting flow and pressure to The Drive.

The Demand Management Plan also involves implementing non-asset strategies to manage the demand for a service. Non-asset solutions for current and future use by MDC are outlined in the table below:

Strategy	Description
New technology	Encourage the adoption of new technologies in the home such as low flow showerheads and dual flush toilets
Water conservation/Public education	Encouraging Water Conservation (within the household) and understanding the issues concerning the water system through public education and advertising campaigns
Leak detection	Active leak detection programme
Restrictor checks	Regular checking of restrictors

## 7.7 Future Capital Programme

The following table details proposed capital requirements for the period 2021/22 to 2030/31. It can be seen that a lot of the new capital is primarily driven by compliance with the DWSNZ and replacement of aging pipework.

Water





Table 7-1:	Water	Capital	Pro	jects	Plan
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		2021-31 LTP period									
					F	inancial Year					
Project	Туре	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
32 - Service Connections - New	Renewal	\$100,000	\$103,500	\$374,851	\$384,982	\$396,137	\$407,221	\$420,247	\$434,119	\$448,875	\$462,783
33 - Reticulation	LOS	\$8,321,928	\$621,000	\$637,140	\$545,300	\$561,100	\$576,800	\$595,250	\$614,900	\$635,800	\$655,500
34 - Treatment - New	LOS	\$2,421,080	\$4,919,355	\$0	\$0	\$0	\$17,304	\$0	\$0	\$0	\$32,775
58 - Water Supply Mains Renewals	LOS	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
81 - Water Metering Trial - Twl Install	LOS	\$322,753	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
84 - Potable Water Supply remote properties - install	LOS	\$175,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
53 - Allandale/Spur Road water supply - Reticulation extension	LOS	\$54,660	\$0	\$0	\$545,300	\$0	\$0	\$0	\$0	\$0	\$0
Total		\$11,395,421	\$5,643,855	\$1,011,991	\$1,475,582	\$957,237	\$1,001,32 5	\$1,015,49 7	\$1,049,01 9	\$1,084,6 75	\$1,151,05 8

## 8.0 RISK MANAGEMENT

This Section identifies the risk management processes used to assess and manage risk. This involves the systematic application of management policies, procedures and practices to the tasks of identifying, analysing, evaluating, treating and monitoring those risks that could prevent a Council from achieving its strategic or operational objectives or plans, or from complying with its legal obligations.

## 8.1 Overview

A systematic and consistent approach to risk assessment improves Council's ability to manage its assets within resource limitations and to prioritise expenditure and actions that can avoid or mitigate the effects of an identified event. Risks can be grouped into financial, operational, or organisational categories. Their negative consequences can seriously impact public health and safety, incur financial loss or adversely affect public image. The risks identified might be relevant to many activities and be of concern at corporate level, or they might be localised, at an asset specific level.

This section describes the risk management processes used for the water service. Assessment and management of risk within the Assets Group provides defensible tools for the communities and Council to develop prudent work programmes that support sustainable development.

The risk management processes described here are developed in the absence of a common adopted Council risk management framework.

## 8.2 Risk Events

The risk events that might impact on assets include but are not limited to:

Risk Event	Description	Examples
		Earthquake
Natural overte	Where there is no central over the timing or the extent of the event	Floods
Natural events		Droughts
		Tsunami (lakes)
		Power supply
		Telecommunications
External Impacts	Organisations not providing services, such as material supply failures or transport failures	Fuel
		Vandalism
		Contamination
		Structural
Discusional failures	Where the condition or performance of the asset could lead to	Capacity
Physical failures	failure	Mechanical components
		Electrical components
0 " 1		Training
	Where the management or operational activities might impact	Maintenance
Operational	adversely on an asset	Management
		Pollution during O&M

## 8.3 Current Approach

Various asset risk management tools and techniques, based on practical experience and the skilled application of its staff and service providers, have been used over a number of years at Council. This approach has generally been sufficient. As the value of the built asset increase, levels of service expectations rise, and threshold limits for cultural and environmental impacts tighten, the need for more

Page 88 of 212

Water





formal risk management practices increases. Mitigation strategies need to be put in place and reviewed continuously to achieve improvement to levels of service. A new Risk Management Schedule will be developed as part of project/improvement item (IP 4). This Risk Schedule will include and consider the various mitigation Plans including but not limited to Emergency Management Plan, Contingency Plan, Pandemic Plan, Operational Risk Plan, Business Continuity Plan, etc.

If the levels of service are achieved, in tandem with legislative compliance, prudent investment and good financial management, then minimisation of exposure to public and general liability and risks derived from operation of assets, should also occur.

Risks are considered to arise from many areas of the water service management. They can be derived from the use of physical assets (e.g. a pump or a pipe failure) and management of the services provided (e.g. failure to formalise procedures and reporting of incidents).

#### 8.3.1 Risks Assessed and Mitigated

There are numerous examples where risks have been identified, considered and appropriate mitigation performed. Examples include:

- Fairlie Water Supply trunk main the trunk main used to be suspended across the \*\*\*\*\* Stream. This was a significant risk to the Fairlie Water Supply as flood conditions could cause damage to the trunk main affecting continuity of supply and posing a significant contamination risk to the water supply. During the renewal of the trunk main the pipe was installed below the stream bed ensuring greater security of the water supply
- Twizel WTP did not have a backup power supply. During the WTP upgrade the risk of no alternative power supply was identified and a suitable generator was procured and installed.

This process is ongoing and it is important to note that risk management is not simply about the downside of events such as financial loss or legal proceedings. It also refers to the upside and opportunities that exist for the Council to do things more innovatively, sustainably, and effectively. However, Council engineers acknowledge that this needs to be formalised and documented through the Risk Schedule identified above (IP 4).

#### 8.3.2 Water Safety Plans

The Health (Drinking Water) Amendment Act 2007 requires drinking water suppliers to prepare and implement a Water Safety Plan (WSP) for any water supply serving more than 500 people. For supplies serving less than 500 people WSPs may be prepared and used as an alternative means of compliance with DWSNZ 2005 (amended 2008). These WSPs must be submitted for approval by a Drinking Water Assessor. Initial WSPs were developed for all water supplies and these are now programmed for renewal as the Health Act requires all WSPs to be reviewed, updated and approved every 5 years. The review and update programme of the WSPs are tabled below:

WSP	Review & Update
Fairlie	2021/22
Lake Tekapo	2021/22
Twizel	2021/22
Burkes Pass	2021/22
Allandale	2021/22
Albury	2021/22

In the absence of a council integrated risk management plan, WSP outcomes from a public health risk perspective are viewed in isolation of other Council risks.

Section 11.1 documents the status of the improvement items as recorded within the current WSP for each water supply.

Council will undertake a gap analysis of the Water Safety Plans to ensure it aligns with the regulatory changes (IP 15)

#### Water Quality

Protecting public health by providing safe, high quality drinking water is of the utmost importance. There is a high risk to public health through backflow. Regulatory changes requires 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. Development and adoption of a Backflow Prevention Policy, then implementation through installation of devices at high, medium and low risk sites is an improvement item (IP 6). This will ensure increased barriers to protecting the public water supply and reduce risk to water supply.

#### 8.3.3 Integration of risk management approach

Council risk management is also integrated with other processes, often driven by legislative requirements. However, they are all integrated with the risk management approach that has been outlined above and can be used as sources for the definition of risk events.

**Criticality** - The criticality of an asset reflects the consequence of the asset failing (not the probability). High criticality assets are best defined as assets which have a high consequence of failure (not necessarily a high probability of failure).

Criticality of assets is identified as an improvement item (IP 1) and will allow the assets to be clearly identified and then the asset can be managed more proactively in order to mitigate the risk associated with their failure.

The criticality assessment will aid:

- Prioritising condition assessments
- · Adjusting economic lives with respect to renewal profiles
- Prioritising/deferring renewals
- Prioritising expenditure
- Operation and maintenance planning
- Priorities for collecting asset information to the required level of confidence

#### 8.3.4 Health and Safety

Council is responsible for providing a safe work environment for its staff and public. Council have aligned MDC Health and Safety practices with the Health and Safety at Work Act 2015. A Health and Safety committee meets regularly, and provides information to all council staff on their obligations in this matter. Council provides training in general and specific safety areas as required.

The Council's Utilities staff, by the nature of their work are exposed to risks outside the office environment that are associated with the utilities services (reticulation and facilities). Council provides training in general and specific safety areas as required, examples for the utilities services are:

- Confined space requirements for supervisors and engineering staff that are associated with reticulation
- Traffic control at work sites via the code of practice
- Facilities Health and safety register and associated sign in/out procedures

Council contractors are required to complete all works in accordance with safety guidelines as set out under regulation, MDC Health and Safety Manual and their own Health and Safety Plan.

#### 8.3.5 Business Continuity Plan

No business, financial & operational continuity plan has been developed for the water activity within the Mackenzie District (IP 4).

Water





#### 8.3.6 Civil Defence & Lifelines

The Civil Defence Emergency Management (CDEM) Act 2002 requires Local Authorities to coordinate Plans, Programmes and Activities related to CDEM across the areas of Risk Reduction, Readiness, Response and Recovery. It also encourages cooperation and joint action within regional groups. Management systems for civil defence emergencies are detailed in the Council's CDEM plan.

Council is part of the Canterbury CDEM Group, which involves local authorities, emergency services and major utility operators and others working together to provide Civil Defence for the region..

The Canterbury CDEM Group Plan (June 2014 amended in 2018) is a strategic document for the region that provides direction on how comprehensive, risk-based emergency management will be implemented in the Canterbury region. In implementing this plan, the Canterbury CDEM Group will work towards its vision of "A Resilient Canterbury — Waitaha Tukaha".

The Canterbury CDEM Group Plan is structured around the 4 Rs — the model used for comprehensive risk management in New Zealand. In each chapter of the Plan, the mechanisms for achieving risk reduction, readiness, response and recovery are outlined. These are supported by key principles identified at the beginning of each chapter.

#### 8.3.7 Emergency Management

Operational Risks are those associated with the day to day operation of the District. The most prevalent of these are snow events followed by flooding and serious wind events. Initial response to all these events is managed through the Utilities Services Maintenance Contract, and is covered in our specifications. These specifications covers response times, liaison, notifications, plant and personnel requirements.

Council has held discussions on the "Life Lines" philosophy with the various groups that provide services within the district and is reviewing its "Disaster Resilience Summary". Council has participated in an Engineering Lifelines project, Earthquake Hazard Assessment, and the summary of the assessment is discussed in the following section.

#### 8.3.8 Earthquake Damage Assessment

The Earthquake Hazard Assessment, Report to Environment Canterbury, May 2008, (Ecan Report no. U/08/18) prepared by Geotech Consulting Ltd identifies the following faults in the Mackenzie basin:

- Ostler Fault Zone: This significant fault system crosses through the middle of the Mackenzie
  Basin
- Irishman Creek Fault: This complex and relatively poorly studied fault consists of series of short fault traces that are very close to Lake Tekapo and the Tekapo Canal.
- Fox Peak, Albury and Opawa Faults: These faults are located further to the east & southeast of Mackenzie Basin and along the hills and mountains adjacent to Fairlie and the Opihi Valley

The report further states that there are many other active faults within the district that represent a significant earthquake hazard but also some very large potential earthquake sources that are not very far away. The Alpine Fault in particular has a very high probability of generating a large earthquake and is located only 15km from the north-western boundary of Mackenzie District. A large earthquake (Magnitude 8) on the Alpine Fault would result in serious simultaneous impacts over a wide area of the central South Island and is likely to have a major impact on lifelines and other infrastructure in parts of Waimate, Mackenzie and northern Waitaki districts. It is widely accepted by geologists that it is unlikely that the Alpine Fault can continue to accumulate stress at the current rate without an earthquake rupture in the next 100 years. It is therefore important to consider a large Alpine Fault earthquake in the design and management of all lifelines in the central South Island and this event forms the basis of one of the earthquake scenarios outlined in this report.

**Ground shaking** - The majority of Waimate, Mackenzie and northern Waitaki districts is underlain by harder basement rocks of the foothills and mountains that will not amplify earthquake shaking. Most of the remaining areas are on relatively dense older sediments such as alluvial gravels or glacial moraine. These materials will generally not cause much amplification and will behave as "average" foundation materials during earthquake shaking.

Water

Page 91 of 212



**Tsunami** - The lakes in the study area could all be subject to tsunami (waves created by the displacement of a large volume of water) and seiche (standing waves created by oscillation of lake water following a tsunami or by the earthquake ground shaking). The most likely cause of tsunami and any seiche large enough to be damaging, is a large landslide into a lake, or submarine landslide, particularly in the delta areas at the head of the lakes. The lakes most likely to be subject to these hazards are Ohau, Pukaki and Tekapo.

Liquefaction - overall there is only limited potential for liquefaction occurring in the study area.

The report includes a 'damage assessment chart' (tabled below) based on three shaking zones. The three shaking zones are - areas underlain with strong rock at shallow depth, intermediate ground conditions with a shallow to moderate depth of soil overlying soft rock, and areas underlain with deep soils. The 'damage assessment chart' is intended to assist lifeline engineers in their appraisal of the vulnerability of various lifelines located in these three zones.

Page 92 of 212

Water



Zone	Shaking Intensity	Structures	Fixing designed for seismic loads	Equipment not fixed or fittings not designed for seismic loads				
Structures								
1	MMVI	Slight damage to Type I buildings	Little or no damage	Movement probable, 10% failure				
	MM VII	Minor damage except for poorly constructed weak material Type I buildings	Minor damage	Movement expected, 30% failure				
	MM VIII	Well designed structures serviceable, but with at least minor damage. Many non seismically designed structures damaged and unserviceable. Some settlement damage possible	Considerable damage, 30-40% failure	80% failure				
	MM IX	Damage and distortion to even modern, well designed structures, some may be unserviceable. Non seismically designed structures likely to be seriously damaged and poorly constructed weak material structures collapse. Settlement damage probable	Widespread damage, 50-60% failure	90-100% failure				
2	MMVI	Slight damage to Type I buildings	Little or no damage	Movement probable, 10% failure				
	MM VII	Minor damage except for poorly constructed weak material Type I buildings	Minor damage	Movement expected, 30% failure				
	MM VIII	Well designed structures serviceable, but with at least minor damage. Many non seismically designed structures damaged and unserviceable.	Considerable damage, 25% failure	70% failure				
	MM IX	Damage and distortion to even modern, well designed structures, some may be unserviceable. Non seismically designed structures likely to be seriously damaged and poorly constructed weak material structures collapse.	Widespread damage, 40% failure	90% failure				
3	MMVI	As for Zone 2, with some small reduction in severity possible						
	MM VII							
	MM VIII							
	MM IX							

Zone	Shaking Intensity	Welded Steel, Polyethylene	Moderately ductile pipes Concrete with rubber joints Steel and cast iron with rubber joints	Non ductile pipe Ceramic with cement joints Brick
In ground	pipework			
1	MMVI	Should be okay	Occasional mains damage and entry and junction failure	Minor mains damage 10% entries and junctions fail
	MM VII	Should be okay	Some mains damage, 25% of entries and junctions failure	Mains damage possible 40% entries and junctions fail
	MM VIII	Should be okay, minor damage and permanent distortion	Mains damage probable 60% entries and junctions failure	Mains damage widespread
	MM IX	Distortion to mains, damage possible at entry to structure and at junctions	Mains damage 80% entries and junctions failure	Major mains damage
2	MMVI	Should be okay	Occasional mains damage and entry and junction failure	Minor mains damage 5% entries and junctions fail
	MM VII	Should be okay	Little mains damage, 10% of entries and junctions failure	Mains damage possible 20% entries and junctions fail
	MM VIII	Should be okay, minor damage and permanent distortion	Mains damage likely 40% entries and junctions failure	Mains damage widespread
	MM IX	Distortion to mains, damage possible at entry to structure and at junctions	Mains damage probable 60% entries and junctions failure	Mains damage
3	MMVI	As for Zone 2, with some small reduction in severity possible		
	MM VII			
	MM VIII			
	MM IX	1		

Page 94 of 212

December 2020

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It is important to remember that the Earthquake Hazard Assessment Report was develop din 2008, prior to the 2011 Canterbury earthquakes and 2016 Kaikoura earthquake. More information would be available now after these earthquakes which **may** influence the overall assessment.

### 8.3.9 Alpine Fault 8

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

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- Response assumptions
  - Secondary and compounding risks such as:
    - Aftershocks
    - Ongoing structural failure
    - Cascading landscape effects
    - o Tsunami
    - o Severe weather
    - o 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.

#### 8.3.10 Divestment

From time to time Council receives application from Rural Water Scheme bodies to privatise the water supply. This is possible subject to meeting the conditions under Sections 131 and 135 of the Local Government Act 2002.

Specific management issues related to privatisation of public supplies include but are not limited to:

- Ensuring compliance with the Health Act and the DWSNZ
- Designated properties procedure to terminate/transfer
- Public utilities on private properties have a measure of protection under the LGA 2002. Private utilities may require easements or formal agreements
- Service Level Agreement to manage, regulate and protect private infrastructure (replacing the Council Bylaw)
- Ownership and associated responsibilities



Water

Page 95 of 212



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There has been consideration around ownership and potential divestment of the Albury Water Supply, but in the current climate of the 3 Waters Reform and the above mentioned management issues there are not sufficient drivers to proceed.

#### 8.3.11 Pandemic Response – COVID-19

The 2019–20 coronavirus pandemic is ongoing at the time of writing of this Plan. The timeline of events are as follows:

Date	Event	NZ Government Response	MDC Response
11/02/2020	World Health Organisation declares an official pandemic		
28/02/2020	NZ first reported case		
18/03/2020			
21/03/2020		Alert Levels (1-4) announced	
			EOC activated
24/03/2020		Move to Alert Level 3	
26/03/2020		Move to Alert Level 4	
1/04/2020			
25/04/2020			
27/04/2020		Move to Alert Level 3	
14/05/2020		Move to Alert Level 2	
15/05/2020			Economic & Community Recovery Action Plan
10/06/2020		Move to Alert Level 1	

The impacts will be wide ranging and likely include a significant and protracted recession. This presents an opportunity for Council to collaborate with Central Government to invest and progress infrastructure projects giving the economy the injection it will desperately need.

As an initial response Central Government decided to fast track eligible development and infrastructure through amendments to the Resource Management Act. This will aid in getting much-needed infrastructure programmes underway as soon as possible.

Further response includes the establishment of the Infrastructure Industry Reference Group (IIRG) to seek out infrastructure projects that are ready to start as soon as the construction industry returns to normal to reduce the economic impact of the COVID-19 pandemic. These 'shovel ready' projects include water, transport, clean energy and buildings. They would also have a public or regional benefit, create jobs and be able to get underway in short order.

Council did not apply for Government funding for shovel-ready projects, instead opting to bring forward shovel-ready projects as part of MDC COVID-19 recovery including \$9.5m of water supply projects. Projects include the new Fairlie Water Treatment Plant and associated reservoir, replacing water pipes in Twizel and Fairlie and upgrading the Burkes Pass water supply treatment plant. In roading, prioritising key shovel ready minor and safety improvement projects, maximising available NZTA co-funding and low interest rates for Council's 49% share. The majority of these projects will be footpaths and shared-use paths to promote a fit and healthy community.

The COVID 19 pandemic created a very dynamic environment where circumstances can change on a daily basis. At the time of writing this Plan the assumption is that the Mackenzie district will be able to weather the storm as the districts' primary industries, agriculture and forestry, are less affected than for

Page 96 of 212

Water



example tourism. Domestic tourism numbers appear to hold steady, but international tourism which made a significant contribution to the Mackenzie district economy is severely affected. The Department of Internal Affairs 'Local Government Sector COVID-19 Financial Implications Report 2 – Alert Level Scenarios, Assumptions and Updated Analysis' report projects "The agriculture sector is expected to perform relatively well in the short- and long-term".

Council will first attempt to reduce spending in ways that do not require reductions to service levels. Higher levels of reduction in spending would be more likely to require deferral of larger capital projects which may impact on Council's ability to comply with legislation and environmental standards in the 3Waters area.

Council could defer the replacement of assets for a period and potentially reduce the priority of capital expenditure so they can sustain service levels. The deferral of asset replacement may increase infrastructure resilience risks and increase long term costs.

The response to COVID 19 provided a snapshot of how quickly our environment can change and how quickly we can adapt. People working from home. The uptake of technology. Change in transportation patterns. Online sales and deliveries. Outdoor activities. Socio economic impacts and response. Furthermore, the incidence of a pandemic has the potential flow-on effect of the Council failing some of its non-financial reporting measures.

## 8.4 Resilience

MDC customers have a high expectation of continuing functionality and service delivery. Recent high profile natural disasters have raised public awareness, but there is still a significant need to increase actual preparedness – both in general (e.g. household plans and emergency supplies) and for specific circumstances (e.g. tsunami preparedness in lake communities).

Resilience is based on a design philosophy which acknowledge that failure will occur. Resilience requires early detection and recovery, but not necessarily through re-establishing the failed system.

Resilience is not only applicable to natural hazards, but also needs consideration at an operational level where an asset failure is not necessarily a service failure.

Redundancy (duplication) does not provide Resilience.

Robust systems are designed to prevent failure. Resilience is about early detection and fast recovery. Resilience is defined as the intrinsic ability of a system to adjust its functioning prior to, during, or following changes and disturbances, so that it can sustain required operations under both expected and unexpected conditions.

Resilience is about the ability to plan and prepare for adverse events, the ability to absorb the impact and recover quickly, and the ability as a community to adapt to a new environment.

Council acknowledge that resilience is not only about physical assets. It is about the people. It includes but are not limited to:

- connecting people and communities (neighbour to neighbour; educate; access to household resilience items, etc.)
- supporting community organisations
- the built environment and asset systems which are robust

Adverse events/natural disasters/climate change and the related impacts cannot be avoided and as a result Council have to factor this into long term planning, civil defence planning and determining the infrastructure requirements moving forward to ensure the community's expectations are met with regard to safe and reliable services and general wellbeing.

In order to improve resilience Council approach will be to:

- Actively participate in CDEM planning and activities, at both regional and local levels
- Investigate options for alternative service provision and system redundancy
- Identify critical assets and ensure mitigation methods are developed

December 2020

Water

Page 97 of 212

• Obtain insurance where this is deemed to be the most cost effective approach

## 8.5 Insurance

All above ground infrastructural assets are currently insured by Council. The below ground assets are not insured. Council keep a \$3M cash reserve balance to part fund any repairs and relies on Central Government assistance for repairs as a result of any natural event.

Council is not a member of LAPP, but have considered becoming a financial member but due to the Christchurch earthquake there is a significant buy in cost. Council is also concerned that another event like the Christchurch earthquake in another main centre would fully deplete the fund to the point there would not be enough funds available to repair our assets if they were damaged at the same time.

## 8.6 Assumptions and Uncertainties

The LGA 2002 - Schedule 10, Part 1 (11) requires the Council to clearly define all the significant forecasting assumptions and risks that underlie the financial estimates, assumptions concerning the useful life of significant assets and an estimate of the potential effects of the uncertainty on the financial estimates provided.

Forecasting assumptions and uncertainties are essential in the operation of Council's assets to indicate the levels of risks associated with those assumptions. Where necessary, additional strategies can be implemented to reduce the risk.





Table 8-1: Significant Forecasting Assumptions

## **GROWTH ASSUMPTIONS**

Assumption	Level of Uncertainty <i>(High/Medium/Low)</i> H M L	Risk	Impact of variation to assumption	Management of risk
Population Growth It is assumed that growth in the district's population will generally be consistent with the medium projections developed for Mackenzie District Council in 2020. These indicate a growth rate of around three percent year on year, with population projections of 6,561 in 2030 and 9,050 in 2050.	$\checkmark$	Population change occurs within the district at a higher or lower rate than predicted.	A significant, consistent decline in population may adversely affect Council's ability to set rates at a level affordable to the community. A significant, consistent increase in population could adversely affect Council's ability to meet some service levels.	Council will continue to monitor population measures within the district and respond to meet needs where possible.
Demographic Changes Most population growth within the District is expected to be at older ages (55+ years), with the proportion of over 65s living in the district projected to be slightly higher than the NZ average. Twizel and Fairlie have a higher proportion of older people (65+) than other areas in the district and this is not expected to change over the life of the plan. Younger workers (20-30 years) will make up a considerable portion of the population employed in the tourism market.	✓	Demographic changes occur at a higher or lower rate than expected.	Changes to the projected demographics may place pressure on some Council services due to increasing demand, which may lead to a lower level of service in these areas or a requirement for additional investment.	Council will continue to monitor demographic changes within the district and respond to meet needs where possible.
Household Changes It is anticipated that changes to household numbers and composition will generally reflect population projections and forecast changes to demographics (that is, an ageing population). This is not expected to create any significant	$\checkmark$	Household changes across the district occur at a higher or lower rate than expected.	A slower rate of household growth may mean that some service activities have overinvested in infrastructure (too much capacity too soon).	Council will continue to monitor household changes within the district. Where rapid growth occurs, this is likely to be within existing subdivisions where servicing provision has already been made or, where growth requires



Assumption	Level of Uncertainty <i>(High/Medium/Low)</i> H M L	Risk	Impact of variation to assumption	Management of risk
impact on demand for infrastructure and services, given the relatively small increase in total population projected to occur.				additional infrastructure, developers can be required to meet this demand through the payment of financial contributions.
<b>Dwelling Numbers</b> It is assumed that growth in dwelling numbers will primarily be driven by demand for short-stay visitor and holiday accommodation due to year- on-year increases in both domestic and international visitor numbers to the district. Growth in demand for private holiday accommodation is predicted to have an impact on the availability of residential housing. However, the large proportion of unoccupied dwellings in the district, particularly in Tekapo (60%) and Twizel (52%), is not anticipated to change or increase significantly.	$\checkmark$	Dwelling changes across the district occur at a higher or lower rate than expected.	A higher or lower rate of dwelling growth may impact on provision of services, such as the issue of resource and building consents.	Council will continue to monitor dwelling growth in the district and adjust provision of supporting services as required.



Assumption	Level of Uncertainty <i>(High/Medium/Low)</i> H M L	Risk	Impact of variation to assumption	Management of risk
Distribution of development across the districtThe pattern of growth will be consistent with the spatial planning used to inform the District Plan ReviewThe pattern of growth will be guided by the next generation district plan which will be operative in 2022.Understanding of the growth pattern will be sufficient for infrastructure planning	✓	Development will be more focused in one area than another Growth will occur at a rate that differs from infrastructure planning and provision	Provision of infrastructure will not align with development	Guide development through the district plan, and track development levels
Tourism Numbers It is assumed that visitor numbers will return to pre-COVID-19 numbers around 2022/23, and from that point visitors to Mackenzie District will be at least equivalent to the growth level experienced pre-COVID-19. It is also assumed growth in domestic visitors to Mackenzie District will be significantly higher than pre-COVID-19 while international travel is limited.	✓	Change to tourism numbers and composition occurs at a rate significantly above or below the growth levels assumed.	Increases in projected visitor numbers may place pressure on supporting services and infrastructure. Conversely, a drop in tourism to the district may mean that service activities have overinvested.	Council will continue to monitor tourism numbers to the country and district and respond to meet needs where possible.
COVID-19 Borders will remain closed to tourists/casual travellers for a further twelve months, at which point limited tourism will resume. From 2021 to 2030 tourism activity will progressively return to 2020 levels	✓	Borders will remain closed for a significant period,	Economic activity and international migration will be limited, affecting population and business growth.	Council will continue to track trends and provide for the wellbeing of the community. Investment will be advanced to support employment and prepare infrastructure for the future.

## ECONOMIC AND FINANCIAL ASSUMPTIONS

Assumption	Level of Uncertainty (High/Medium/Low) Risk		Impact of variation to	Management of risk	
	H M	L		assumption	
Economic activity, income levels and affordability It is assumed that there will sufficient economic activity and incomes within the district to support Council activities	$\checkmark$		Service provision becomes unaffordable	If there is insufficient economic activity and incomes of district residents are businesses are strained, it would be difficult for Council to fund the range of activities it is responsible for	Economic activity is tracked and the funding impact strategy is reviewed in line with the economic circumstances
Inflation To develop a consistent approach for local government to account for inflation, the Society of Local Government Managers (SOLGM) contracted Business and Economic Research Limited (BERL) to construct forecasts for inflation. It is assumed that long term inflation will be consistent with BERL's Local Government Cost Index (LGCI) forecasts.	~		Inflationary costs in some areas may increase at a rate different to that forecast. Local Government Cost Adjustor Forecasts Three scenarios	If inflation rates are higher than forecast in the financial model this will mean that either additional money will be required, or planned work is reduced to fit the fiscal envelope. If the work is not reduced this could mean using additional reserves, increasing debt or increasing rates.	In preparing the LTP, Council is required to use best estimates in determining the level of costs to be budgeted and to account for the effect of price changes or inflation expected over the ten year period. Council has endorsed the 'mid- scenario' rates produced by BERL (September 2020) as the assumption for accounting for inflation for the preparation of the LTP. Some types of costs (eg roading and transport costs) have been subject to fluctuations in recent years, so it is inherently difficult to predict trends with accuracy. However, these costs will be mitigated through the annual plan process where the annual adjustment can be made.
Interest Rates and Borrowing Borrowing costs are assumed to be as included in Financial Forecasts.	$\checkmark$		Forecast interest rates are higher or lower than forecast.	The movement in interest rates has a wide ranging effect on the Council. The Council's cash investments have derived interest at the market rates and	Any exposure to borrowing interest movement will be managed by a preference for a higher percentage of fixed term rates.

Page 102 of 212

Water



Assumption	Level of Uncertainty <i>(High/Medium/Low)</i> H M L	Risk	Impact of variation to assumption	Management of risk
Council assumptions on interest rates are based on the Official Cash Rate (OCR) plus an appropriate margin. For the life of the LTP the borrowing rate is assumed to range from 1.7% to 2.4%. That rate will be used for calculating interest rates and will be adjusted annually.			the Council's internal financing policy bases the interest paid to or charged to individual communities on the Official Cash Rate. The level of works and services rates levied is dependent in part on the interest rate used in Council's internal funding policy	
Waka Kotahi (NZTA) Financial Assistance The Long Term Plan assumes that the subsidy from New Zealand Transport Agency will be 51% across all activities for the life of the Long Term Plan, and that these subsidy rates will remain at this level until the Funding Assistance Rate is reviewed.	$\checkmark$	Council's risk is the roading programme may reduce due to a number of factors. These include 1. a further change in subsidy rates and/or size of the programme in years 4-10. This plan assumes Council will maintain or expand its spend through additional unsubsidised work. 2. the NZTA subsidiseable programme may differ from what has been assumed, which may impact the Council's spend in future years.	The roading programme could be reduced from what is shown, due to limitations on the amount of work NZTA is prepared to financially support. Expenditure may differ in any year from that forecast. If Council wanted to continue its roading programme, other funding sources such as rates would need to be utilised.	The Council will consider the impact of any change as part of the annual budget process and consider the funding implications of any cost changes.
<b>Dividends received – Alpine Energy Ltd</b> It has been forecast that the dividend based on Council's shareholding will be \$123,000 per year. This value could change from year to year based on Alpine Energy decisions.	$\checkmark$	The dividend could be less than that anticipated,	A lower dividend would reduce this funding source, meaning greater reliance on other revenue sources or reduction in expenditure.	While a level of funding is expected, the financial strategy will consider if this revenue stream is lost

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Assumption	Level of Uncertainty <i>(High/Medium/Low)</i> H M L	Risk	Impact of variation to assumption	Management of risk
DevelopmentandFinancialContributionsCosts associated with growth will bepartially funded through developmentand/or financial contributions	$\checkmark$	Council does not recoup costs associated with meeting infrastructure costs associated with growth	The ability to fund infrastructure costs will fall on ratepayers alone.	Council will review its Development Contributions and Financial Contributions policy as part of the Long Term Plan/Infrastructure Strategy process.
Waste levy The waste levy will be progressively increased to \$60/tonne, at the same time opportunity to receive funding for waste minimisation education and initiatives will increase	$\checkmark$	That the cost and revenue associated with the change is inappropriate	That increased waste levy costs will discourage responsible disposal of waste, and illegal dumping will increase That funding of programmes will not be available for waste minimisation education and initiatives in Mackenzie district.	Sufficient explanation to the community about the costs and benefits
Sale or Transfer of Assets It is assumed throughout this plan that we will retain ownership of our significant assets and continue with the current Council Departments.	$\checkmark$	That the objectives whether financial or non-financial of holding strategic assets are not achieved.	Should specified returns not be attainable, we would review our investment. Such a review may have a financial impact.	Any decision to sell or partially sell would be significant. A proposal with with options would be provided to the community for feedback as part of a special consultation process.
Sources of Funds for the Future Replacement of Assets It is assumed that funding for the replacement of existing assets will be obtained from the appropriate sources as detailed in Council's Revenue and Financing Policy.	$\checkmark$	A particular funding source is not available.	Depreciation funds renewals funded mainly through rates and user charges. Should other sources of capital funding such as subsidies or development / financial contributions differ from levels forecast in a particular activity, Council is able to access borrowings through its central treasury function.	
Timing & Level of Capital Expenditure The Long Term Plan assumes that the timing and cost of capital projects and associated operating costs are as	$\checkmark$	There is a risk that capital projects may not occur as planned, or actual costs may vary from the forecast	If projects do not occur as planned, capital expenditure may differ from forecast. Delays may change the cost of	The Council will consider the impact of any change as part of the annual budget process and consider the

Page 104 of 212



Assumption	Level of Uncertainty <i>(High/Medium/Low)</i> H M L	Risk	Impact of variation to assumption	Management of risk
determined through the Council's activity management planning process.		therefore may have an impact on the costs. Transport projects seeking subsidy will need a Business Case approach to NZTA which may change originally anticipated outcomes.	individual projects and defer planned borrowing. This will impact on rates increases. Delayed renewals could lead to an increase in maintenance costs. Any significant delay will have a negative Impact on the delivery of future capital programme due to a limited number of resources Council has available to deploy in any one year.	funding implications of any cost changes. High level of vigilance over capital delivery to Executive level, resulting in timely corrective actions if required Regular reporting to Council on the programme so Council has full visibility of programme, milestones, and tracking Programme is prioritized by vulnerability and criticality to ensure projects that would lead to loss of service or additional costs are top of the list Regular market assessments undertaken including critical supply chains to ensure programme is realistic and deliverable Council have the ability to value engineer the project if it exceeds estimates. In addition, the Council has contracted external project managers to oversee the programme and project management and delivery of key 3 Water projects.
Asset Revaluations Council has a policy of revaluing its buildings, land and infrastructural assets on a three yearly basis. The LTP assumes that the book values of the relevant assets as at the revaluation dates will be increased by inflation rates as per the inflation assumption.	$\checkmark$	The condition of the assets may be different from that forecast. The condition of the assets may be different to that assumed and the value of the asset may differ accordingly.	There may be a higher or lower asset value and a lower or higher depreciation charge.	The Council will consider the impact of any change as part of the annual budget process and consider the funding implications of any cost changes.

Assumption	Level of Uncertainty <i>(High/Medium/Low)</i> H M L	Risk	Impact of variation to assumption	Management of risk
<b>Planning Horizons and Asset Lifecycles</b> It is assumed that the planning horizon for growth (30-45 years) and asset lifecycles (30 years plus) are sufficient to inform the ten year forecasts included in the LTP.	$\checkmark$	The planning horizon for growth and asset life services differ from that assumed.	There is insufficient planning to guide decision making and investment	LTP and IS are thoroughly developed relevant to District issues
<b>Useful Lives of Assets</b> The useful lives of assets have been assumed as set out in the following table, which matches the depreciation policy under the Statement of Accounting Policies:	$\checkmark$	Assets last longer than the lives assumed, or assets deteriorate at a faster rate that the lives assumed.	Assets require replacement earlier or later in their life cycle.	Ongoing assessment of the quality of assets means this information is updated regularly and work programmes adjusted to minimise the chance of asset failure. In the event of assets wearing out earlier than anticipated, capital projects could be brought forward. This may affect borrowing and depreciation expenses. Negative impacts are likely to be at least partially offset by some assets lasting longer than estimated. Mitigation may also involve reprioritisation of the capital expenditure programme.

Assets	Depreciation method	Life (years)
Buildings	Straight line	13-80
Computer hardware	Straight line	3-10
Computer network cabling	Straight line	10
Furniture and fittings	Straight line	10
Heritage assets	Straight line	60-150
Land	Not depreciated	-
Motor vehicles	Straight line	5
Office equipment	Straight line	5-10
Light plant and machinery	Straight line	10-25
Plant and machinery	Straight line	10-25
Resource recovery parks	Straight line	10-33
Flood protection and control works	Not applicable	-
Landfills	Straight line	30-50
Village projects	Straight line	5-80

Assets	Depreciation method	Life (years)
Stormwater		
Lines	Straight line	60-150
Manholes	Straight line	150
Open drains	Not depreciated	-
Wastewater		
Mains	Straight line	60-80
Pumps	Straight line	15
Oxidation ponds	Not depreciated	-
Box culverts	Straight line	100
Manholes	Straight line	80

Assets	Depreciation method	Life (years)
Alps 2 Ocean cycleway	Straight line	50
Formation	Not depreciated	-
Surfacing	Straight line	0-17
Land under roads	Not depreciated	-
Roads and footpaths	Straight line	6-80
Formation	Not depreciated	-
Sub-base	Not depreciated	-
Base course	Straight line	75-100
Surfacing	Straight line	0-17
Kerb and channelling	Straight line	10-10
Street signs	Straight line	13
Street lighting	Straight line	20-40
a Bridges	Straight line	80-100
Resource consents	Straight line	10-33

Assets	Depreciation method	Life (years)
Water supplies		
Piping mains	Straight line	60-80
Pumps	Straight line	25
Service lines	Straight line	80-100
Hydrants	Straight line	80
Valves and air valves	Straight line	80
Meters	Straight line	25
Reservoirs	Straight line	80

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## GOVERNMENT, LEGISLATION AND REGULATION ASSUMPTIONS

Assumption	Level of Uncertainty <i>(High/Medium/Low)</i> H M L	Risk	Impact of variation to assumption	Management of risk
Legislative Change and Regulatory Reform As an organisation that is created and derives its powers from statute, changes to legislation have a direct impact on the way we conduct our business. The speed and scale of legislation review depends largely on the policy direction and priorities of the government of the day. Reform of the Resource Management Act 1991 will proceed in 2021-22. A new legislative framework will include the Natural and Built Environments Act, the Climate Change Adaptation Act, and the Strategic Planning Act. The Strategic Planning Act is intended to integrate functions under the RMA, Local Government Act 2002, Land Transport Management Act 2002 and the Climate Change Response Act 2002 so changes are also expected with those Acts. It also assumes the Council will remain an independent unit of local government during the next 10 years.	✓	The impact of government legislation is more or less than expected. New legislation is enacted that alters the activities Council undertakes or provides.	Unrealised impacts of legislative changes may create greater impacts on Council operations, including operating budgets, workloads, time and resource availability. These pressures may lead to additional costs for ratepayers. Where legislative changes require Council to provide additional services or increased levels of services, this may impact fees and charges for cost-recovery activities.	Most changes to legislation are known in advance, giving councils the ability to prepare for implementation. Council will monitor existing and potential legislative changes as they move through parliamentary process. Where appropriate, Council will submit on legislation to encourage reduced or improved impacts on Council operations and limit costs to ratepayers. Historical trends have been for services transferred from central government to local government. The cost and impact on our activities as a result of future legislative changes cannot be quantified at this stage as it would be dependent on the specific services affected by the legislative change. Financial uncertainty in this area would generally impact the cost of introducing changes, and the mechanisms required to fund any new services.
Legislation Reform – Water Services While it is assumed that that there will be change to the ownership and delivery of Three Waters in the next ten years, Council is not able to predict with absolute certainty what those changes will be. It is unlikely that details will be known earlier than mid-to-late	✓	Legislation changes under urgency in parliament that must be implemented and transitioned to over a period of time	Changes are required to be implemented more quickly than anticipated and the changes are mandatory rather than voluntary.	Council closely monitors any and all developments, and responds accordingly

Page 108 of 212

December 2020


Assumption	Level of Uncertainty <i>(High/Medium/Low)</i> H M L	Risk	Impact of variation to assumption	Management of risk
2021. This LTP has been developed on a business-as- usual basis for the delivery of Three Waters; but the change is very likely to occur over the mid-term (3-5 years).				
The replacement value of all Three Waters assets total \$90.7 million (as of 30 June 2020). Planned capital projects will be valued at \$52.6m at the end of the LTP. The major capital projects are the \$4.8m sewerage reticulation upgrade and \$18.1m waste water treatment plant upgrade. In addition currently underway we have \$7.4m water treatment projects underway (20/21 and 21/22). <sup>2</sup>				
Resource Consents It is assumed that the conditions of resource consents held by Council will not be changed significantly and that the Council will be able to renew and obtain the necessary resource consents for its planned projects.	$\checkmark$	Resource consents are changed through reviews, or applications for Council projects are not approved or have significant compliance or monitoring costs.	Projects will cost more if compliance requirements are significant, or may not proceed as planned if consents are not obtained.	The Council will consider the impact of any change as part of the annual budget process and consider the funding implications of any cost changes.

# ENVIRONMENT ASSUMPTIONS

Assumption	Level <i>(High/</i> H	of Unc Medium/ M	ertainty <i>(Low)</i> L	Risk	Impact of variation to assumption	Management of risk
Climate Change Climate change is already impacting how our communities live and function and these		$\checkmark$		There is a risk that climate change effects are not understood and appropriate action taken.	If climate change happens more quickly or in a different way to that projected; Council	Climate change assumptions are factored into Council strategies and plans including the District Plan Review and Infrastructure Strategy.

<sup>2</sup> All values are inflated values

BORDAN	
United as \$137.54	

Assumption	Level of Uncertainty <i>(High/Medium/Low)</i> H M L	Risk	Impact of variation to assumption	Management of risk
impacts are expected to increase in magnitude and extent over time. Impacts include increases to mean temperature, with corresponding reductions in snow and frost days. We anticipate an increase in the frequency and severity of extreme weather events.		There is a risk that Council actions will not be consistent with community opinion.	may need to carry out work on its infrastructure assets. Council's business units may not recognise climate change in the delivery of their services. Decisions made now without this consideration may have intergenerational effects on land use decisions, environmental policy and infrastructure decisions e.g. relying on undersized assets and resources in highly vulnerable areas.	Council activities will build appropriate mitigation responses into resilient infrastructure development including the improved water storage in Fairlie, water metering, the establishment of the emergency operations centre reserve fund and Council's risk management work through the Canterbury Emergency Management Group. Council will continue to monitor climate change science and the response of central government and adapt its response where required.
Natural Hazards / Local Natural Disasters The district is at risk from natural hazards such as flooding, earthquake, and storms. These events can occur at any time, without warning. It assumed that there will be no major adverse events during the period covered by this Long Term Plan beyond Council, Regional and National capabilities. While events may occur at any time, Council's planning will focus on operational resilience and Emergency Management.	<b>√</b>	A major adverse event occurs resulting in a significant impact on the district and Council's services.	A disaster has the potential to cause significant, unbudgeted impact on the Council and the community. In the event of a major disaster, Council has assumed additional central government support will be forthcoming. Council would need to borrow additional funds to make repairs and meet the costs of restoration	Council seeks to mitigate this risk through its Civil Defence, Risk Management and Insurance Policies. Council keeps appropriate levels of cash reserves (\$3.0m) and sufficient head room in its borrowings to enable it to undertake any repairs on its underground assets. Central government has a role in disaster recovery after a natural disaster. Council will progressively build a reserve to fund the local share of Emergency Works applications to NZTA
Management	$\checkmark$	planning are not	ne response to an event would not be suitable	ongoing involvement in CDEM planning and governance

Page 110 of 212



Assumption	Level of Uncertainty <i>(High/Medium/Low)</i> H M L	Risk	Impact of variation to assumption	Management of risk
CDEM functions will continue to be provided across the district, via the Canterbury Regional Group		appropriate for application to Mackenzie		
Insurance Council will hold a reserve fund of at least \$3 million to respond to emergencies and that this will be adequate for immediate requirements	$\checkmark$	A major event will have significant financial implications that are beyond Council's ability to fund	It is assumed this will be adequate to meet the portion Council needs to fund – this is highly variable	A review is proposed on the insurance of assets and the suitability of a reserve fund as 'self-insurance'
Earthquake prone buildings There are no earthquake prone buildings affecting strategic transport routes				
There are no unknown earthquake risks associated with Council owned buildings.	$\checkmark$	Actions required by Council have not been allowed for	Processes are required, that would put additional workload on staff	Actions assigned to staff
Council's building control responsibilities can be delivered through normal				

# LEVELS OF SERVICE AND SERVICE DELIVERY ASSUMPTIONS

Assumption	Level of Uncertainty <i>(High/Medium/Low)</i> H M L	Risk	Impact of variation to assumption	Management of risk
Level of Service It is assumed the level of service expectations of the community will remain similar to current level, or change progressively over time.	$\checkmark$	That there is a rapid change in expectations	Service provision may not be able to be adapted quickly to meet changes	On going customer satisfaction assessment is undertaken and consultation over service levels occurs through the LTP and Annual Plan processes
Service Delivery Modes & Contracts It is assumed that there will be no significant changes to current modes of service delivery for each service area or variations in terms of contract prices (above inflation	$\checkmark$	Maintenance contracts may be re-tendered during the plan period. If maintenance and service contracts are consolidated and/or re-	This would require Council to either increase rates and/or operating revenue if efficiencies cannot be found or	

December 2020

management and operational processes

and inventory adjustments) for current operations and maintenance contracts.

Council will continue to consider collaboration opportunities and assess changes to service delivery on a case by case basis. tendered there is a it may consider reducing levels possibility contract prices of service. will be higher than anticipated.

Page 112 of 212

December 2020

F



# OTHER ASSUMPTIONS

New Technologies         There will be no new technologies deployed         within the period covered by the Long Term         Plan that will significantly change the         demand for or provision of services.         Collaboration and Shared Services         Opportunities for joint initiatives will continue         to be explored (e.g. Waste Management         Service Delivery, Aoraki Roading         Collaboration, Water Services review).         District and Community Board Autonomy         will remain similar to the current level.         Te Rūnanga o Ngãi Tahu and ngã         papatipu rūnanga	
Collaboration and Shared Services         Opportunities for joint initiatives will continue         to be explored (e.g. Waste Management         Service Delivery, Aoraki Roading         Collaboration, Water Services review).         District and Community Board Autonomy         will remain similar to the current level.         Te Rūnanga o Ngãi Tahu and ngã         papatipu rūnanga	/ monitor existing nologies as they /ision.
Te Rūnanga o Ngāi Tahu and ngā papatipu rūnanga	in and commit to for the benefit of
Council has established and enduring relationships with Te Rūnanga o Ngāi Tahu (TRoNT) and the three papatipu rūnanga whose rōhe (area) include the Mackenzie District: Te Rūnanga o Arowhenua, Te Rūnanga o Waihao, and Te Rūnanga o Moeraki.	dialog with Te iu and ngã

#### 9.0 LIFECYCLE MANAGEMENT

This section of the AMP outlines what work is planned to keep the assets operating at the current levels of service defined in Section 5 while optimising lifecycle costs. The overall objective of the Life Cycle Management Plan is:

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

#### 9.1 Overview

Lifecycle asset management focuses on management options and strategies from initial planning through to disposal, while considering all relevant economic and physical consequences. The effective application of asset management principles will ensure the reliable delivery of service and reduce the long-term cost of ownership and in this way reduce service costs. A well-structured lifecycle management plan will reduce the long term costs of ownership and in so doing reduce the service cost.

The Lifecycle Management Programme cover five key categories of work necessary to achieve the required outcomes. These key categories and goals are:

#### Table 9-1: Lifecycle Management Categories

Lifecycle Categories		Aim
Management Plan	Management functions required to support the other Programmes	
Operations and Maintenance Plan	To ensure efficient operation and serviceability of the assets so that they achieve their service potential over their useful lives. This includes the day-to-day work to keep the assets operating	To maintain the assets to ensure that the assets achieve their service potential
Renewal Plan	To provide for the progressive replacement of individual assets that have reached the end of their useful lives (restores the original capacity)	
Development Plan	To improve parts of the system currently performing below target service standards and to allow development to meet future demand requirements	To meet future demand and close any service gaps
Disposal Plan	To better plan for disposal of assets through rationalisation of asset stock or when assets become uneconomic to own and/or operate	To dispose of assets appropriately

#### 9.2 Management

Management and monitoring strategies set out the activities required to support the maintenance, operations, cyclic renewal and asset development programmes. These activities include:

- Strategic planning
- Data management and evaluation
- Business processes
- Monitoring
- Financial management.

The following management activities are used to achieve the desired outcomes.

Page 114 of 212

Water



#### Table 9-2: Management Activities

Activity	Objective
	This AMP supports the achievement of the relevant MDC Community Outcomes and Infrastructure Strategy
Strategic Planning	To develop Levels of Service aligned with strategies and plans
	To develop the professional skills of the staff through adequate training and experiences
	To develop and optimise the asset register and develop functionality in line with business needs
Data Management	Appropriate data collection programmes (condition, performance, asset registers) closely aligned with business needs implemented in accordance with documented quality processes
	To ensure the asset data are subject to defined quality assurance processes
	To ensure the AMP is s strategic 'living' document through regular updating and 3 yearly reviews
Business processes	Risk Management is an essential part of Asset Management and will be managed by the implementation of risk mitigation measures to maintain risk exposure at acceptable levels including but not limited to maintaining emergency response planning, condition monitoring of critical assets, preventative maintenance, development and implementation of operations manuals and standards
	To document, review and implement quality processes
Monitoring	To ensure agreed service levels and appropriate for demand
Financial	To ensure expenditure programmes are in accordance with funding and budget preparation policies and procedures
Financiai	To ensure systems are managed in a financially sustainable manner over the long term

## 9.3 Operations and Maintenance

This covers planning for on-going day to day operation and maintenance to keep assets serviceable and prevent premature deterioration or failure. This plan includes:

- Current trends and issues
- Maintenance decision making process
- Strategies required to meet levels of service
- How tasks are prioritised
- Summary of future costs
- Any deferred work and associated risks

Two categories of maintenance are carried out:

- Unplanned Maintenance: Reactive work carried out in response to reported problems or defects (e.g. repair broken water mains, respond to low chlorine alarms or pump failure alarms)
- Planned Maintenance: Proactive work carried out to a predetermined schedule (e.g. water main replacement, chlorine plant refurbishment, routine pump inspections and refurbishment etc).

A key element of asset management planning is determining the most cost effective blend of planned and unplanned maintenance as illustrated in Figure 9-1.

Water

Figure 9-1: Balancing Proactive and Reactive Maintenance



#### 9.3.1 Service Delivery

Council staff manage the Water Supply network with some assistance from consultants. The maintenance on the network is maintained through a competitively tendered multi-year contract. The current contracts let are included in Table 9-3.

The Utilities Services contracts (3 year + 1 yr + 1 yr) place considerable onus on the contractors to selfmanage all utilities maintenance activities; this involves regular inspection of the various components of the networks, locating maintenance requirements and carrying them out.

### Table 9-3: Current Contract

Contract # and Name	Term	Responsibilities	Contractor
1240 - Utilities Services Contract 2020-2025	5 years plus potential 5 year extension dependent on mutual agreement	Water Supplies         The contract includes the complete operation and maintenance of the following water supplies         • Fairlie         • Lake Tekapo         • Twizel         • Burkes Pass         • Allandale         Wastewater Systems         The contract includes the complete operation and maintenance of the following waste water systems         • Fairlie         • Lake Tekapo         • Twizel         • Burkes Pass         • Mt Cook Lookout         Stormwater System         The contract includes the complete operation and maintenance of the following stormwater system         • Fairlie         • Lake Tekapo	Whitestone Contracting Ltd
		Twizel	

Page 116 of 212

Water



#### 9.3.2 Management & Maintenance History

Historical data is used to make an assessment of past performance and to see if future trends can be applied. At a network level, these trends can indicate if the condition of the network is deteriorating or improving. The different forms of historical data and their location are outlined in Table 9-4.

#### Table 9-4: Historical data

Туре	Location	Comment
Visual Inspection	Asset Register	Pipelines are inspected whenever a pipeline is excavated for repair and rated for condition
Past Maintenance Costs	Contractor's database	Pipelines are inspected by the Contractor whenever a pipeline is excavated for repair and report on the condition of that section of pipe is provided to the 3 Waters Manager
Past History	MDC staff & records	On going review of maintenance cost associated with various sections of pipe are used to predict failure etc.

#### 9.3.3 **Maintenance and Operational Strategies**

Water Supply maintenance work is included under the main utilities services maintenance contract and covers:

- minimum maintenance standards
- frequency of routine inspections • response times to correct defects

Water Supply maintenance is achieved by employing the following asset strategies:

# Table 9-5: Asset Strategies

Asset	Activities	Comment
Headworks/Treatment	Inspection	Weekly and/or as appropriate
Reservoirs and Tanks	Inspection	As appropriate
Pump Stations	Inspection	Weekly and/or as appropriate
Pumps	Tested	Monthly/weekly and/or as appropriate
SCADA	Signal check	Yearly
Turbidity Meters	Calibration	3 monthly
Chlorine Lines	Replacement	As appropriate
Backflow Preventors	Testing	Annually and/or as appropriate
Working Load Limits on Lifting Gear	Certification/Inspection	Annually
Switchboards	Inspection by Electrician	Annual inspection by electrician
Critical Mains	Inspection	Annually or as appropriate
Selected Mains	Condition Assessment by Pipe Sampling	Selected mains targeted by age/material etc. are sampled during repairs
Dead End Mains and Low Points	Flushing	Annually or as appropriate
Valves	Evaluation and exercise	5 yearly
PRV/PSVs	Inspection	Annually
Restrictors	Inspection	3 yearly inspection (to be developed) (IP 5)
All Hydrants	Fire flow testing	3 yearly under the maintenance contract
Unplanned Maintenance	•	·

December 2020

Water

Page 117 of 212

Asset	Activities	Comment					
All	When a defect has been identified, remedial work is programmed before the risk an consequence of failure become unacceptable						
All	Priority is given to defects which are a safety hazard, likely to cause premature failure or severe economic deterioration						
All	Remain alert and prepared for emergency situations						
All	Respond to and repair fail temporary repairs if major re	ures by the most economic method available, making apairs or renewals are required					

#### Maintenance Strategy

Condition inspections: The maintenance contractors are required to report any defects observed during day to day maintenance activity.

Unplanned maintenance includes all reactive maintenance such as repairs and modifications usually following a reported fault or failure by the public or is obvious through a water leak (in the instance of a water supply network).

The Contractors are required to maintain an effective communication system and level of preparedness to ensure emergency works are undertaken within the specified response timeframes.

Planned maintenance includes Preventive Maintenance, Servicing and Condition Monitoring. Planned Maintenance is usually carried out at a given frequency either at fixed intervals or 'on condition' to preserve the required levels of service at a minimum cost. On Condition means that once an asset has degraded to a certain condition (detected through condition monitoring) a decision as to the most appropriate maintenance must be made. This does not mean once an asset has failed.

Damaged and malfunctioning water supply assets, which does not require immediate action and identified by public complaint or contractor reports are programmed for repair according to the following priority:

- Loss of Service
- Environmental impact
- Public safety
- Accelerated deterioration

#### Maintenance Standards

The maintenance standards to be achieved are set out in MDC specifications contained in the utility services maintenance contract.

All critical water supply assets are required to be inspected and maintained regularly.

#### Maintenance Programme

The majority of the water supply maintenance is reactive so budgets have been based on historical expenditure.

The following non asset strategies are employed:

#### Table 9-6: Non-Asset Strategies

Strategy	Description
Alternative Technologies	Alternative technologies are considered as appropriate
Approved Materials	Only approved materials shall be used in the water supply to ensure the quality and longevity of the asset
Backflow Prevention	Backflow prevention policy (IP 6)

Page 118 of 212

Water

Ð

Mackenzie DC Activity Management Plan

Strategy	Description							
Energy Efficiency	Energy savings and management carried out in a logical manner for the facilities							
Health and Safety Audits	Safety Audits undertaken randomly to ensure all work completed by Council and Contract staff complies with the Health and Safety at Work Act and Traffic Managem Regulations							
Leak Detection	To proactively detect and repair leaks within the water supply.							
Monitoring Planned vs Unplanned Maintenance	The mix of Planned vs Unplanned Maintenance will be analysed periodically to allow optimising of the activities							
Network Modelling	Network Modelling is carried out to ensure renewal and capital works are programmed appropriately and assist in the identification of faults in the system when low pressures or flows are identified							
Pressure Monitoring	Pressure Monitoring is carried out by Council staff to measure compliance with Levels Service and calibrate network models							
Supervision of Facilities	Supervision of Facilities to ensure these buildings and critical assets are maintained appropriately							
Telemetry System	The telemetry system will be utilised to assist in monitoring the water demand profile, controlling operations and increase the knowledge of the asset operation therefore enabling efficiencies to be introduced							
Water Meters	Water meters are installed on trunk mains and commercial/industrial connections to provide accurate consumption records. Water meters remain the property of the Council. Universal metering is planned for a roll out in 2021/22.							
Water Quality	Water supply to comply with Health Act 1956 and appropriate Ministry of Health Grading Testing for FAC undertaken by the Contractor as per compliance requirements Testing for ecoli undertaken by Council as per compliance requirements							
Water Supply Shutdown	All shutdowns to be managed by the Maintenance Contractor to protect the quality of the water and the asset							

#### 9.3.4 Current Condition

Council rates the condition of the Water Supply pipelines and other facilities. There is an ongoing inspection and maintenance regime under the routine maintenance contract. Council has a requirement in its maintenance contract, that any pipeline dug up for repair, the size, material location and condition is to be recorded and reported to Council. This information is used to estimate the condition of similar types of pipe in similar ground conditions.

#### 9.3.5 Current Performance

The Water Supply networks are generally performing well with a few leakage problems in Fairlie. These are generally tied to older concrete pipes with perished rubber sealing rings. Specific condition for each asset is not currently measured, but as noted above, representative sections of the network are inspected and the results extrapolated across the network. There is good condition information for Water Supply assets with the majority of assets graded at 2 or better (89%). Only 3% of the network is graded as requiring replacement. However, Fairlie has a programme to replace all the pipework installed in the 1940s as this has defective rubber sealing rings allowing significant leakage.

A significant portion of the Twizel reticulation is Asbestos Cement pipe (21.9km/31%) was installed during the early 1970s. A replacement programme for the AC pipe in Twizel based on a predictive failure model from the various pipe samples started during 2015. As part of the COVID 19 recovery package Council have accelerated this renewal programme and the completion is programmed for the end of 2022.

Overall the performance of water supply assets is adequate. The main concern is compliance with the NZDWS.

Water

Page 119 of 212

#### Figure 9-2: District Wide Reactive Maintenance



The above reactive maintenance records show that toby replacement peaked during 2014, then stabilised and a significant reduction in 2019. Mains leaks spiked in 2015, due to the Fairlie trunk main, which has since been replaced and significantly reduced leakage. Reactive maintenance records are considered during renewal planning.



Figure 9-3: District Wide Reactive Maintenance

Hydrant leaks have reduced over the last few years. New connection spiked in 2013 but remained steady during the last few years.

Page 120 of 212

Water

December 2020

E

#### 9.3.6 Operation and Maintenance Costs

The average annual operation and maintenance costs for the next 10 years is \$1.1 million (inflated). ). The 2021/22 annual operation and maintenance costs is \$732,500. The year by year operation and maintenance costs are shown in the figure below.

Figure 9-4: Historical O&M Expenditure



It is important to note that the outcome of the Havelock North Water Contamination Inquiry and the Government 3 Waters review will have a significant impact on the Water industry and associated operation and maintenance costs. The outcomes will have a significant impact on the way the water service is delivered, managed, operated, maintained, monitored and reported on. It is expected that this will impact on stormwater and wastewater activities and require an increased holistic approach to 3waters management

#### 9.3.7 Manuals and procedures

Formal procedure manuals for headworks, treatment, reservoirs and pump stations are progressively developed, providing Council's Engineers and Contractors with documented emergency, operations and maintenance procedures required for Council's water assets (IP 7)

# 9.4 Renewal/Replacement

This covers Major work which restores an existing asset to its original capacity or its required condition (e.g. pipeline replacement, pump replacement or reconditioning). This plan includes:

- End of life projections
- Renewal decision making process
- Renewals strategies and methods to meet required LOS
- How renewals are identified, prioritised and to what standard they are replaced
- Summary of future costs

The renewal programme is prioritised on the basis of overall condition.

#### **Preventive Maintenance**

Preventative maintenance includes non-routine work required to protect the serviceability of the network and minimise the threat of water leakage and interruption to supply.

Standards

Water

Page 121 of 212



The MDC standards for replacement infrastructure are based on NZS 4404:2010. The O&M Contract specify Approved Materials.

#### 9.4.1 Renewal Strategy

The current replacement programme (Twizel) is based on a predictive failure model form the various pipe samples has been prepared.

The model takes into account the following

- Existing and future demand
- Roading replacement programme, both footpath and roadway
- Ability to fund
- Availability of contractors
- Refurbishment method

Analysis of these test results shows that the large diameter pipe in the reticulation has very good remaining life (80 years), but the 100mm and 150 mm diameter pipe has a varying remaining life, being at risk of serious failure over the next 20 years.

This strategy recommended that Council start the replacement programme in 2015/16 and continue to replace the rest of the asbestos cement pipe over the next 20 years. As part of the COVID 19 recovery package Council have accelerated this renewal programme and included concrete, asbestos cement, cast iron and galvanised steel mains in Fairlie and Lake Tekapo with completion programmed for 2021/22.

No formal criticality assessment has been documented, but Council engineers use practical experience and skilled application of staff and service providers in consideration of critical assets. This allows for different strategies to be applied depending on priority. For example, a "run to failure strategy" is applied to low priority assets as the consequence of failure is not major and the costs of ongoing condition monitoring may outweigh the costs of failure. A "risk and condition-based strategy" is applied where there is a significant implication due to failure, such as a major health and safety risk, significant reliability of supply consequence or significant expense to repair.

#### 9.4.2 Projected Renewals

Using the expected useful lives within the asset register provides the following graphical renewal projection of water mains.



Figure 9-5: District Wide Projected Renewals

Page 122 of 212

Water



The graph shows that there are 1.7km of AC pipe reaching the end of its expected useful life within the 1-5-year window. There is 26.9km of AC pipe that will reach the end of its expected useful life within the 6-10- year window. These mains are mainly in Twizel and Fairlie, with the greater portion (21.9km) in Twizel. This 21.9km of AC pipe is programmed to be replaced by the end of 2021 as part of the accelerated renewal programme. This is further illustrated in the figure below, which compare the theoretical renewal projections against the planned renewals of the water mains.

Figure 9-6 District Wide Projected Renewals vs planned renewals<sup>3</sup>



#### 9.4.3 Deferred Renewals

The Fairlie WTP upgrade was initially planned/programmed for the 2017/18 year, but due to the investigation into the appropriate treatment for the Fairlie WS the upgrade was deferred. The upgrade is instead programmed to take place during this LTP period (between 2021-20203).

The Fairlie water supply is a spring water supply with chlorination that does not currently comply with the Drinking-water Standards for New Zealand 2005 (Revised 2018) (DWSNZ). This means that there is a public health risk to the community receiving this water. Therefore, Mackenzie District Council (MDC) has commissioned Beca Ltd (Beca) to complete the design of a new Water Treatment Plant (WTP) which will meet the DWSNZ.

MDC has identified that a new WTP is essential to reliably provide safe drinking water to the community.

Key objectives for this upgrade are:

• DWSNZ compliance, 4-log protozoa removal – it is critical that the upgraded water supply consistently meets the requirements of the DWSNZ, requiring a reliable solution with appropriate redundancy

 28 L/s (2,420 m<sup>3</sup>/d) water supply capacity – Stage 1 water supply capacity of 28 L/s with provisions for future growth to 50 L/s capacity to allow additional scheme additions (12 L/s for Allandale) and future growth

Upgrade completed as soon as possible, the aim was previously to commence construction in 2020/21 financial year however this may be delayed with land procurement in particular yet to be completed.

The existing Fairlie water supply includes an intake, a small chlorine shed within the road reserve and reticulation including a reservoir

A draft concept design for the new Fairlie WTP has been completed and is summarised in the report titled *Fairlie Water Treatment Plant Concept Design* and dated 5 November 2020.

The upgraded treatment plant will include:

• Minor modifications to the raw water intake including raising the intake plinth above the road level

<sup>3</sup> Planned renewals are recorded below as reticulation in Error! Reference source not found, Deleted: Table 9-7

Page 123 of 212



Raw water tanks to provide a suction vessel for the membrane feed pumps and to settle grit
Membrane plant with space to expand the capacity in the future from an initial capacity of 28 L/s to an ultimate capacity of 50 L/s

- ultimate capacity of 50 L/s Chlorination through use of 70 kg gas cylinders pH correction with caustic A room in the building for fluoridation to be installed if required in the future Treated water storage reservoir(s) Connection to the existing reticulation Backwash ponds for membrane backwash water

#### 9.4.4 **Planned Renewals**

The planned renewals for the next 10 years are listed in the table below. This summarise the renewals for each water supply. The specific details are discussed within each individual water supply in Appendix А

All schemes include projects such as service connections, revaluation, meter verification, water quality testing, etc.

Page 124 of 212

Water



## Table 9-7: Planned Renewals

			2021-31 LTP period											
			Financial Year											
Project	Туре	2021/22	21/22 2022/23 2023/24 2024/25 2025/26 2026/27 2027/28 2028/29 2029/30 2030/3											
32 - Service Connections - New	Renewal	\$100,000	\$103,500	\$374,851	\$384,982	\$396,137	\$407,221	\$420,247	\$434,119	\$448,875	\$462,783			
33 - Reticulation	LOS	\$8,321,928	\$621,000	\$637,140	\$545,300	\$561,100	\$576,800	\$595,250	\$614,900	\$635,800	\$655,500			
34 - Treatment - New	LOS	\$2,421,080	\$4,919,355	\$0	\$0	\$0	\$17,304	\$0	\$0	\$0	\$32,775			
58 - Water Supply Mains Renewals	LOS	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0			
81 - Water Metering Trial - Twl Install	LOS	\$322,753	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0			
84 - Potable Water Supply remote properties - install	LOS	\$175,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0			
53 - Allandale/Spur Road water supply - Reticulation extension	LOS	\$54,660	\$0	\$0	\$545,300	\$0	\$0	\$0	\$0	\$0	\$0			
Total		\$11,395,421	\$5,643,855	\$1,011,991	\$1,475,582	\$957,237	\$1,001,325	\$1,015,497	\$1,049,019	\$1,084,675	\$1,151,058			

# 9.5 Asset Development

Most new assets are created as part of subdivisions and subsequently taken over by the Council.

The criterion used for justifying new/replacement construction undertaken by Council includes evidence of regular leakage and consequent interruption to supply. There are a number of asbestos cement pipelines (19.6%) in the district that are deteriorating from the inside out and will prematurely start to fail in the next twenty to thirty years or so. Council has an accelerated programme to replace all these AC mains.

#### **Development Standards**

MDC uses the Land Subdivision Standard NZS4404: 2010

#### **Development Programme**

The cost of pipeline renewal and development works is included in the Council Renewal Programme.

#### 9.6 Asset Disposal

In general Council has no specific plans for disposal of components of the Water Supply asset. Details for specific assets are included in the following table.

Asset	Comment
Pipes	Generally left in the ground for possible future use as duct pipe for telecommunications or are removed in pieces as part of the excavation to lay the replacement pipe Pipe bursting
Valves	Generally removed and disposed as scrap
Hydrants	Generally removed and disposed as scrap

All pipeline renewals have a corresponding disposal either through the pipes being removed and disposed of at the landfill, or being left in the ground if the water services are renewed using 'no-dig' techniques or the asset is replaced in a new location. A work order report records each disposal and the details put in the AssetFinda database. Similarly, replacement of components at treatment plans and pumping stations usually involves disposal of those items being renewed/upgraded.

Buried assets remain in the ground unless economic to remove or they pose a potential hazard.

In all cases asset disposal processes must comply with Council's legal obligations under the Local Government Act 2002, which covers:

- Public notification procedures required prior to sale
- Restrictions on the minimum value recovered
- · Use of revenue received from asset disposal

Under the Water Activity no assets for disposal are considered to be eligible to be for sale. When considering disposal options all relevant costs of disposal will be considered, including:

- Evaluation of options
- Consultation/advertising
- Obtaining resource consents
- Professional service, including engineering, planning and legal survey
- Demolition/making safe
- Site clearing, decontamination, and beautification

#### Asbestos Cement Pipe

AC pipes are composed of a mixture of Portland cement, asbestos fibres and finely ground silica. Asbestos fibres are hazardous to health and there has been a well-established link between airborne asbestos fibres and asbestosis since before 1900.

Water



It is therefore critical that exposure to airborne asbestos fibres is, where practical, eliminated or appropriate control measures are put in place to protect those working with AC pipes.

However, there is no evidence to show that asbestos fibres will cause any harm when they are wet and swallowed. The effects of asbestos in the water supply have been studied extensively, and results have not shown an elevated risk of asbestos-related disease.

When AC pipes are left undisturbed the risk of asbestos fibres becoming airborne is very low, and while they should still be treated as hazardous material, they present very low risk. Therefore, whenever it is practical, AC pipes should be left undisturbed (whether in service or abandoned).

When work on, or around, AC pipes is necessary, good working practices must be adopted to, where practical, eliminate or alternatively minimise exposure to airborne particles.

(Source: Water New Zealand Good Practice Guide - Volume 1, National Asbestos Cement Pressure Pipe Manual)

December 2020

Water

Page 127 of 212

#### 10.0 FINANCIAL

This Section documents the financial requirements to manage and operate the asset.

#### 10.1 Funding Details

#### 10.1.1 Financial Strategy

The Council is required to have a financial strategy as part of its Long Term Plan (LTP). The purpose of the Financial Strategy is to facilitate prudent financial management by providing a guide to consider proposals for funding and expenditure against, and to show the overall effects of funding and expenditure proposals on the Council's services, rates, debt and investments.

In the strategy, the Council is required to specify the factors expected to have a significant impact on Council for the period covered by the LTP.

Council outlined the factors considered to be significant. These include:

- a) Affordability of key infrastructure, including implementation of the Drinking Water Standards.
   b) Levels of internal debt currently held by Council and plans to repay that debt over a 25 year period.
- c) Reduction in Central Government roading subsidy contribution.
- d) Property Sales.

#### Affordability of Key Infrastructure

The Health (Drinking Water) Amendment Act 2007 requires water suppliers to take all practical steps to comply with the (previously voluntary) NZ Drinking Water Standards. To comply with the Act, Council must have in place a water safety plan which is approved by the Ministry of Health for each urban water supply. Dates for compliance with the Act are staggered depending on the size of the community.

For Burkes Pass, Allandale and Albury, the compliance date is 1 July 2016. (The Albury Water Supply is managed by the Albury Rural Water Supply Society Inc. under an agreement with Council, and expenditure on this scheme is not included in Council's budgeting process).

For Fairlie, Tekapo and Twizel, the compliance date was 1 July 2014. The Tekapo supply meets the drinking water standards, and Twizel meets the drinking water standards. In Fairlie, the expected capital outlay to enable compliance is approximately \$7.4 million. This is programmed for 2021/31.

Upgrades to sewerage and stormwater systems are also required in the Long Term Plan (LTP) period. While no significant change to the operation of most of the Council's stormwater assets is proposed, the Council is required to develop 'stormwater management plans' under the Land and Water Regional Plan, and stormwater discharges will be required to be progressively upgraded to improve discharge quality.

Changes to environmental standards, climatic conditions and growth will also require upgrades to some of the district's sewerage systems. Replacement of deteriorating infrastructure is also required over the term of the LTP.

#### 10.1.2 Rating

The District's urban water supply schemes vary in age and condition and there are some large renewal costs over the next decade. This, combined with an increase in costs to meet new drinking-water standards and other requirements, leads to a large financial burden of providing these water supplies.

The Council will fund large capital spends associated with the upgrades either through internal borrowing from its own cash reserves, or external borrowing. Depreciation and repayment of debt is charged as part of the targeted water rate.

In previous years, the urban water supply activity was funded by each town separately through a targeted rate. This meant that each town faced large rates rises when upgrades and replacements were required.

The Council has now moved to a system of amalgamating the rates for the four urban water supplies across the townships in the district (harmonisation – refer to Section 10.1.3 below).

Page 128 of 212

Water





Rural Water Supplies are funded from the users of those supplies. All costs are charged equally to consumers. This system has worked well in the past and will continue to apply.

Similarly, stock water race systems will continue to be funded as they are at present, from the users of those systems.

The general approach to funding of the annual costs of the 3 Waters schemes starts from the premise that those who benefit (either directly or indirectly) should pay. – termed targeted rating.

#### 10.1.3 Harmonisation

During the 2015-25 LTP Council consulted with the community on harmonisation of infrastructure costs across the district. Council has done extensive forward planning and this showed that over the next 30 years each town in the district will need to upgrade and maintain much of its infrastructure. These projects come at significant cost. There were concerns that people who rely on a fixed income, such as a pension, might not be able to afford the spikes in rates that would happen in the future as these big projects were undertaken.

Council has decided to address this issue by spreading the costs of each utility across the towns so all users pay the same for each service. Every town have the same level of service. This spread the costs smoothly over time and insulate the towns from sudden costly rate increases when capital work is needed. It also ensures the sustainability of the district in the future.

#### 10.1.4 Price Level Changes & Forecast Financial Statements

Accounting rules require that Council adjust its forecast financial information to take account of the impact of inflation. This should more fairly indicate rates movements, particularly in the first three years of the Plan. Council, through the Society of Local Government Managers has contracted Business and Economic Research Ltd (BERL) to construct forecast price level changes for key categories of expenditure as they affect local government. Council has considered this advice and considers it appropriate to apply it to our circumstances.

Council has endorsed the rates produced by BERL and has used these rates as the assumption for accounting for inflation for the preparation of the LTP.

FY	<u>2023</u>	<u>2024</u>	2025	<u>2026</u>	<u>2027</u>	2028	<u>2029</u>	<u>2030</u>	<u>2031,</u>	
% change										-
(on prior	<u>3.5</u>	2.6	2.7	2.9	2.8	3.2	<u>3.3</u>	3.4	3.1	
year)										

BERL Mid Scenario Cost Adjustors

#### 10.1.5 Vested Assets

When a developer carries out a subdivision, they are required to vest various assets to Council. These assets include any new roads, water mains, sewer mains, stormwater systems, footpaths, street lighting and landscaped areas. The Council is then responsible for the maintenance and future replacement of those assets.

The Council record the cost of those vested assets at the current cost when received and the assets will be revalued in line with the Council's other infrastructural assets. These assets will also be subject to depreciation.

#### 10.1.6 Funding Strategy

The first priority is to maintain and operate the existing network in its current condition then allow for renewal expenditure that revitalises a component of the network that has worn out. Capital projects are funded through the Council's Policy for Funding Capital Expenditure, which was adopted as part of the 2012-2022 Long Term Plan.

The policy is summarised as follows:

#### Capital Reserves

• A Capital Reserve has been established for each activity that the Council undertakes.

December 2020

Water

Page 129 of 212

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- All depreciation that has been funded from that activity will be lodged into the Capital Reserve on a quarterly basis when each instalment of rates is due.
- Funds from other reserves or financial contributions can also be deposited into the Capital Reserve.
- All capital expenditure will be paid from the Capital Reserve at the time of payment.
- Capital Reserves may go into overdraft at any stage with prior approval of Council.

#### Capital Expenditure

 All Capital Expenditure must be approved by Council through the budget process or by an explicit resolution.

#### Interest Component For Debt Incurred Prior to 30 June 2012:

- If the balance of the Capital Reserve is overdrawn, the community of interest for the relevant activity will be charged an interest rate set at 100 basis points greater than the Official Cash Rate determined by the Reserve Bank. Such interest will be charged as a cost to the activity operating expenses and be rated for.
- If the balance of the Capital Reserve is in funds, then the Council will pay the community of
  interest in the relevant activity an interest payment set at 25 basis points less than the Official
  Cash Rate determined by the Reserve Bank. Such interest will accrue to the activity's Capital
  Reserve.

#### Interest Component For Debt Incurred After 30 June 2012:

For the component of the debt incurred after 30 June 2012 the interest rate will be set at a level
equal to the Council's average bond portfolio rate applying at the previous 1 January. Such
interest will be charged as a cost to the activity operating expenses and rated for.

In determining the projects to be undertaken the benefit/cost ratio is the governing criteria used with preference being given to projects which can be shown to be economically justified, attract subsidy and have the necessary Council funding available.

#### Three Waters Stimulus Package

The Council has accepted crown stimulus grant funding for projects as part of the Three Waters Services Reform. The crown has committed approximately \$500m nationwide in tranche 1, and the MDC allocation is \$5.111m, of which \$2.560m has already been received by MDC as an advance payment. These stimulus projects are in addition to current LTP projects already underway.

#### 10.2 Asset Valuation

The last valuation of the Water Supply infrastructural network and associated assets was undertaken as at 1 July 2019 and is summarised in the following table. The valuation is updated 3 yearly to take into account capital works and additions to the water supply network.

The valuation consists of an assessment of the replacement cost, depreciated replacement cost and the annual depreciation or decline in service potential of the network. The annual depreciation or decline in service potential is the amount the asset declines in value over a year as a result of the remaining life of the asset reducing. Provision is required to be made to fund this depreciation so as to make suitable allowance for the future replacement or renewal of the asset.

#### Table 10-1: Asset Valuation

Asset Type	Optimised Replacement Cost/ORC (\$)	Optimised Depreciated Replacement Cost/ODRC (\$)	Annual Depreciation (\$)		
TOTAL	\$45,986,000	\$29,187,351	\$656,781		

The total optimised replacement cost of the Water Supply Infrastructure was assessed to be \$45,986,000 as at 1 July 2019. The total optimised depreciated replacement cost was assessed to be \$29,187,351.

Page 130 of 212

Water





#### Figure 10-1: Asset Valuation



The table and figure below shows the asset value distribution of the water, wastewater and stormwater assets.

Water Replacement Costs	Wastewater Replacement Costs	Stormwater Replacement Costs
\$45,986,000	\$34,934,000	\$9,801,000

### Figure 10-2: 3 Waters Asset Value Distribution



### 10.2.1 Depreciation

Depreciation is provided on a straight-line basis on all physical assets at rates which write off the cost of the asset to the estimated residual value at the end of its assumed effective life.

Expenditure on renewing or improving the capacity of the asset is capitalised annually as are assets which are vested in Council by developers. Capital work in progress is not depreciated. The total cost

of this work is capitalised at the end of the financial year in which it is completed and depreciated from then onwards. The annual depreciation for water assets has been determined to be \$695,676 per annum (in 2021/22) and increases over the 10 year period as the council takes on additional vested assets and capital projects are complete as shown in the figure below.

#### Figure 10-3 Annual depreciation (inflated)



#### 10.2.2 Valuation methodology

All assets have been valued using depreciated replacement cost (DRC). A DRC valuation requires:

- Determination of quantities of assets optimised to relate to those required for current service delivery and foreseeable demand
- Unit rates for replacement with modern engineering equivalent assets
- Effective lives that take account of local influences
- Depreciation that defines current value given a definable remaining life.

The NZ Infrastructure Asset Valuation and Depreciation Guidelines 2006 give direction as to the overall methodology applicable to a DRC valuation for water supply assets. This has been applied in this case to achieve a suitable valuation for MDC Improvements and Infrastructure Asset Valuation.

Borrowing costs were excluded from the valuation.

The primary data source for this revaluation was MDC's Asset Register.

#### 10.2.3 Asset Lives and Assumptions

The base life of an asset is set during the valuation process in order to identify what is believed to be the average length of time that the asset will be capable of providing the required level of service. The setting of the base life is the factor in the valuation process that directly affects the annual depreciation requirement for the asset.

The expected base lives in the reticulation for water, sewer and stormwater are reviewed as part of each valuation to align the expected lives, and the method of setting these with the renewal decision making practice.

Asset group	Expected useful life (years)
Pipe mains	60-80
Pumps	25
Service lines	80 - 100
Hydrants	80

Page 132 of 212

Water





Valves	80
Meters	25
Reservoirs	80

#### 10.2.4 Resource Consents

It is difficult to determine the fair value of Resource Consents due to their specialised nature and having no active market to compare values against. For these reasons, Council holds resource consents at deemed cost and they are amortised over the life of the consent.

# 10.3 Financial Summary

The future overall financial requirements for the Water activity are tabled and graphically illustrated below:

December 2020

Water

Page 133 of 212

# Table 10-2: Future Financial Requirements

			2021-31 LTP period									
			Financial Year									
Project	Туре	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	
32 - Service Connections - New	Renewa	\$100,000	\$103,500	\$374,851	\$384,982	\$396,13 7	\$407,221	\$420,247	\$434,119	\$448,875	\$462,783	
33 - Reticulation	LOS	\$8,321,928	\$621,000	\$637,140	\$545,300	\$561,10 0	\$576,800	\$595,250	\$614,900	\$635,800	\$655,500	
34 - Treatment - New	LOS	\$2,421,080	\$4,919,35 5	\$0	\$0	\$0	\$17,304	\$0	\$0	\$0	\$32,775	
58 - Water Supply Mains Renewals	LOS	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
81 - Water Metering Trial - Twl Install	LOS	\$322,753	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
84 - Potable Water Supply remote properties - install	LOS	\$175,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
53 - Allandale/Spur Road water supply - Reticulation extension	LOS	\$54,660	\$0	\$0	\$545,300	\$0	\$0	\$0	\$0	\$0	\$0	
Total		\$11,395,42 1	\$5,643,85 5	\$1,011,99 1	\$1,475,58 2	\$957,23 7	\$1,001,32 5	\$1,015,49 7	\$1,049,01 9	\$1,084,67 5	\$1,151,05 8	

# Table 10-3: Three Waters Capital Projects (Inflated)

	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Water	<u>\$11,395,421</u>	<u>\$5,643,855</u>	<u>\$1,011,991</u>	\$1,475,582	<u>\$957,237</u>	\$1,001,325	<u>\$1.015.497</u>	<u>\$1.049.019</u>	<u>\$1,084,675</u>	\$1,151,058
Waste water	<u>\$2,419,075</u>	<u>\$776,250</u>	<u>\$807,044</u>	<u>\$8,724,800</u>	\$9,538,700 <b>,</b>	<u>\$1,153,600</u>	<u>\$1,190,500</u>	<u>\$1,229,800</u>	<u>\$0</u> ,	<u>\$0</u>
Stormw ater	<u>\$409,670</u>	<u>\$414,000</u>	<u>\$0</u> ,	<u>\$0</u> ,	<u>\$0</u> ,	<u>\$0</u>	<u>\$0</u> ,	<u>\$0</u> ,	<u>\$0</u> ,	<u>\$0</u> ,
Grand Total	<u>\$14,224,166</u>	<u>\$6,834,105</u> ,	<u>\$1,819,035</u> ,	\$10,200,382	<u>\$10,495,937</u>	<u>\$2,154,925</u>	\$2,205,997 <del>,</del>	<u>\$2,278,819</u> ,	<u>\$1,084,675</u> ,	<u>\$1,151,058</u>

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Page 134 of 212

December 2020







December 2020

Page 135 of 212

# Table 10-4: Funding Impact Statement

Water Supply	Annual Plan 2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/2030	2030/31
Sources of Operating Funding	2020/21	2021/22	2022/25	2023/24	2024/23	(thousands)	2020/21	2021120	2020/23	2023/2030	2030/31
General Rates, uniform annual general charges, rates penalties	0	0	0	0	0	0	0	0	0	0	0
Targeted rates	1,637	1,398	1,773	2,033	2,124	2,420	2,496	2,589	2,716	2,854	2,921
Subsidies and grants for operating purposes	0	535	0	0	0	0	0	0	0	0	0
Fees & Charges	0	120	124	127	131	135	138	143	148	153	157
Internal charges and overheads recovered	3	5	5	5	5	5	5	6	6	6	6
Local authorities fuel tax, fines, infringement fees and other receipts	0	0	0	0	0	0	0	0	0	0	0
Total operating funding (A)	1,640	2,058	1,902	2,165	2,260	2,560	2,639	2,738	2,870	3,013	3,084
Applications of Operating Funding											
Payments to staff and suppliers	730	1,307	829	942	1,008	1,212	1,291	1,361	1,395	1,538	1,615
Finance costs	0	25	124	169	191	189	179	204	194	185	175
Internal charges and overheads applied	47	50	54	57	56	56	60	58	59	62	60
Other operating funding applications	0	0	0	0	0	0	0	0	0	0	0
Total applications of operating funding (B)	777	1,382	1,007	1,168	1,255	1,457	1,530	1,623	1,648	1,785	1,850
Surplus (deficit) of operating funding (A-B)	863	676	895	997	1,005	1,103	1,109	1,115	1,222	1,228	1,234
Sources of capital funding											
Subsidies and grants for capital expenditure	0	498	0	0	0	0	0	0	0	0	0
Development and financial contributions	0	707	1,028	1,143	2,313	1,722	1,763	1,811	2,008	2,069	1,843
Increase (decrease) in debt	10,500	6,534	3,750	-505	-21	-478	-454	-431	-410	-389	-370
Gross proceeds from sale of assets	0	0	0	0	0	0	0	0	0	0	0
Lump sum contributions	752	0	0	0	0	0	0	0	0	0	0
Other dedicated capital funding	0	0	0	0	0	0	0	0	0	0	0
Total sources of capital funding (C)	11,252	7,739	4,778	638	2,292	1,244	1,309	1,380	1,598	1,680	1,473

Page 136 of 212

December 2020



Water Supply	Annual Plan 2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/2030	2030/31
			2022/20		202 20				1010/10	1010/1000	2000/01
Applications of capital funding											
Capital expenditure											
To meet additional demand	0	0	0	0	0	0	0	0	0	0	0
To improve the level of service	9,087	11,295	5,540	637	1,091	561	594	595	615	636	688
To replace existing assets	1,157	100	104	375	385	396	407	420	434	449	463
Increase (decrease) in reserves	1,871	-2,980	29	623	1,821	1,390	1,417	1,480	1,771	1,823	1,556
Increase (decrease) of investments	0	0	0	0	0	0	0	0	0	0	0
Total applications of capital funding (D)	12,115	8,415	5,673	1,635	3,297	2,347	2,418	2,495	2,820	2,908	2,707
Surplus (deficit) of capital funding (C-D)	-863	-676	-895	-997	-1,005	-1,103	-1,109	-1,115	-1,222	-1,228	-1,234
Funding Balance ((A-B) +(C-D))	0	0	0	0	0	0	0	0	0	0	0

Please note the above financial impact statement excludes the Downlands Project

# 11.0 IMPROVEMENT PLANNING

An important component of this Activity Management Plan is the recognition that it is a "live" document in need of monitoring, change and improvement over time. This Section details the improvements that will lead to improved management and increased confidence.

### 11.1 Improvement Plan Achievements

Many of the Improvement Plan Tasks identified have been achieved. The following table details improvements achieved to date.

Project Description	Status	Date	Comment
Current age and remaining life of all assets needs to be reviewed and determined	Complete	June 2017	
Augment existing LoS information (NFPM)	Complete	June 2017	
Undertake customer surveys with defined performance targets.	Completed	2016	Ongoing
Develop a strategy for analysing the condition of the AC pipe assets and produce a reliable deterioration model for Tekapo and Fairlie to more accurately predict replacement programmes.	Complete	June 2017	Accelerated programme to replace all AC mains 100mm dia or smaller.
Conduct a research study, including the impact of District Plan changes, to assess future demand on the network, in particular identifying any expected change in land use and other demands on the asset within the MDC area, which potentially could impact on the water asset.	On going	June 2017	
Complete a Customer Survey, including local industry, to establish any changes in customer expectations as they relate to demand on the network.	Complete	2016	Ongoing
All assets need to be assessed for criticality	Transferred	June 2017	Part of the Current IP Programme
Risk management register needs to be developed. Assessed risks can then be linked to maintenance and renewals programmes.	Transferred	June 2017	Part of the Current IP Programme
Significant negative effects need to be identified and provide an input into the LTP. Also identify procedures for mitigating significant negative effects.	Completed	June 2017	Included in Section 5.8.3
Emergency management (including lifelines) requires full review and inclusion. Require procedures in place for rapid response to emergency failures.	Completed	June 2017	Part of Maintenance Contract
Corporate insurance policy/requirements and updating of asset insurance costs needs to be considered and incorporated.	Complete	June 2017	
Review and update the Asset Register database. Ensure all inventory data is captured.	Complete	June 2017	Ongoing
Complete a full review of the network assets (using both the Asset Register and field inspections) and develop a detailed 10 year Forward Work Programme for all asset groups	Complete	June 2017	
Produce Annual Plan Forecasts, adjust 10 year plan and add Year 10 to total programme	Complete	June 2017	Ongoing
The assessment of annualised depreciation needs to be reviewed to ensure that the depreciation collected is realistic and comparable to the lifecycle renewal cost.	Complete	June 2017	

# Table 11-1: Improvement Plan Achievements

Page 138 of 212



Project Description	Status	Date	Comment
The default construction date and the expected life of all assets need to be reviewed	Complete	June 2017	Ongoing
Sustainability - Include further summary of sustainability measures that are in place, including details of Council Sustainability policy, strategies and operations enabling greater sustainability etc.			

The following tables document the Improvement Programme from the Water Safety Plan for each Water Supply and the status at the time of writing this AMP (September 2020).

# Table 11-2: Water Safety Plans Improvement Plan Achievements

Improvement Item	Reference Risk Table	Status
Fairlie Water Supply	I	L
Prepare a monitoring/inspection schedule	3.2 - 3.8; 6.2; 6.5	Completed
Increase testing of FAC at TP (weekly to daily)	3.2 - 3.8	Completed
Install continuous chlorine monitoring at TP	3.2 - 3.9; 6.2; 6.5	Completed
Investigate alternative source	1.1; 1.2; 3.5; 3.9; 6.6	Completed
Implement analysis of a suite of chemical determinands every 2 years	1.1; 1.2; 1.6	Completed
Implement a regular flushing programme for the distribution network	5.6	Completed
Lake Tekapo Water Supply		
Prepare a drinking water supply contamination response plan	8.8	Completed
Install a turbidity meter at the UV plant	1.1; 3.5; 5.2; 8.2; 8.5; 8.6	Completed
Install continuous chlorine monitoring at TP	3.2 – 3.8; 8.2; 8.5	Completed
Increase testing of FAC at TP (weekly to daily)	3.2 - 3.8	Completed
Investigate relocating chlorine plant	5.6; 8.7; 8.9	Completed
Twizel Water Supply		•
Prepare a drinking water supply contamination response plan	11.7	Completed
Prepare a monitoring/inspection schedule	7.2; 7.3; 7.6; 7.7; 11.2; 11.5	Completed
Install continuous chlorine monitoring at TP	7.2; 7.3; 7.6; 7.7; 11.2; 11.5	Completed
Investigate installing security fences or buildings around the bores and power boxes	2.1	Completed
Investigate connecting the bore power supply to the treatment plant generator or installing a portable generator connection to the bore power supply	2.3; 11.6	Completed
Undertake testing from flushed taps for copper and lead to determine if they should remain as P2 determinands	10.4	Completed
Burkes Pass Water Supply	•	•
Prepare a monitoring/inspection schedule	4.5; 5.2 – 5.8; 7.2; 7.5	Completed
Install a turbidity meter at the TP	5.5; 5.9; 7.2; 7.5	Completed
Investigate options for further filtration and install protozoa barrier at TP	1.1; 4.5; 5.5; 5.9; 7.6	Completed
Install further storage to provide redundancy and chlorine contact time	1.6; 2.3; 3.1; 3.2; 4.1-4.4; 5.1	Completed
Investigate replacing bulk main with larger pipe to improve pressure and flow to distribution system	3.3; 6.2	Completed
Allandale Water Supply		
Investigate changing chlorination system to chlorine gas	4.2; 4.3; 4.7; 4.8; 6.7	Completed
Prepare a monitoring/inspection schedule	4.2-4.8; 6.2; 6.5	Completed

December 2020

Water

Page 139 of 212

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Improvement Item	Reference Risk Table	Status	
Install continuous chlorine monitoring at TP	4.2-4.8; 6.2; 6.5	Completed	

The following tables document the Improvement Programme from the Water Safety Plan for each Water Supply and the status at the time of writing this AMP (June 2017).

#### Table 11-3: Water Safety Plans Improvement Plan

Improvement Item	Reference Risk Table	Status	
Fairlie Water Supply			
Prepare a drinking water supply contamination response plan	6.9	??	
Install a protozoa barrier at the TP	1.1; 1.2; 6.6	Scheduled	
Investigate need and options for providing filtration process	1.1; 1.2; 3.5; 3.9; 6.6	Scheduled	
Prepare and implement a backflow prevention policy	5.4	To be completed (IP 6)	
Investigate the need to install a permanent generator at TP	6.8	??	
Undertake analysis of water parameters (corrosion potential)	5.8	??	
Install further storage	2.1; 4.5	Scheduled	
Lake Tekapo Water Supply			
Prepare and implement a backflow prevention policy	7.4	To be completed (IP 6)	
Undertake testing for THMs in treated water	3.9	??	
Twizel Water Supply			
Prepare and implement a backflow prevention policy	10.4	To be completed (IP 6)	
Burkes Pass Water Supply			
Prepare a drinking water supply contamination response plan	7.8	??	
Install fencing around and upstream of infiltration gallery	1.1	??	
Investigate installing selective abstraction at infiltration gallery	1.1; 4.4; 4.5; 5.9; 7.6	??	
Install continuous FAC monitoring and automated dosing rate adjustment	5.2-5.8; 7.2; 7.5	Scheduled	
Reconfigure connections to make supply a restricted supply	1.6; 2.3; 3.1; 3.2; 4.1-4.4; 5.1	In process	
Implement a regular flushing programme for distribution network	6.6	??	
Ensure all connections to on-site tank have an air-gap (backflow prevention)	6.4	To be completed (IP 6)	
Allandale Water Supply			
Prepare a drinking water supply contamination response plan	6.9	??	
Investigate options – filtration or supply designation	1.1; 4.5; 4.9; 6.6	???	
Prepare and implement a backflow prevention policy	5.4	Part of IP 6. Air gap at point of supply	

# 11.2 Improvement Plan Focus

The Mackenzie District Council Water Services Asset Management Improvement Plan and Projects will be focused on the following key areas:

- Ensuring our communities are protected against drinking water related health issues by providing quality potable water to agreed areas
- Water treatment improvements
- Risk Management
- Supply knowledge update
- Investigating innovative ways to provide an efficient and cost effective water supply and ensure
  ongoing affordability of the water supply service

Page 140 of 212

Water



Asset Management

# 11.3 Current Improvement Plan

The following table documents the Improvement Items identified during the review and update of the AMP.

December 2020

Water

Page 141 of 212

# Table 11-4: Current Improvement Plan

IP #	Reference Section	Project Description	Timeline	Responsibility	Internal/External Resource
IP 1	Section 4.10	Develop a formal documented criticality assessment			
IP 2	Section 5.2.3	Develop hydraulic network model for Allandale			
IP 4	Section 8.3	Develop Risk Management Schedule including all associated documents			
IP 5	Section 9.3.3	Develop 3 yearly restrictor inspection programme			
IP 6	Section 9.3.3	Develop Backflow Prevention Policy			
IP 7	Section 9.3.7	Develop & maintain Operation and Maintenance Manuals			
IP 8	Section 11.6A1.4.2	Investigate options and implement standby power supply for Fairlie WTP			
IP 9	Section 11.6A1.4.6	Implement firefighting ability in Everslea Reserve area			
IP 10	Section 11.6A3.2	Investigate bore pump capacity & efficiency Twizel			
IP 11	Section 11.6A4.2	Implement change in Level of Service (on demand to restricted), Burkes Pass			
IP 12	Section 11.6A5.2	Investigate resolution for poor workmanship, Allandale			
IP 13	Section 11.6A6.2	Investigate options – ownership/divestment associated risks and DWSNZ compliance, Albury			
IP 14	Section 4.4.1	Implement a mains flushing and hydrant testing programme			
IP 15	Section 8.3.2	Water Safety Plan Gap analysis			



# 11.4 Project Identification and Assignment

Projects are identified through various processes including but not limited to:

- Legislative Compliance
- Levels of Service
- Growth
- Renewal
- Operation & Maintenance

Projects are then assigned to the individual staff to complete depending on their association or main project criteria e.g. Facilities/Reticulation/Asset Management, etc.

While projects in year 1 of the updated LTP are considered to be highly relevant, over the following two years some become less or totally inappropriate. This is generally due to:

- changes in legislation which remove the need for the work or change priorities
- better understanding of methods, costs and timing to deliver the project outcomes. This may be via other council business units, external agencies or through other projects.
- The community and council no longer supporting the work

#### 11.5 Reporting on Projects

Currently all projects in the Long Term Plan 2021-30 and Annual Plan are reported quarterly. It is acknowledged that the management and completion of improvement items will contribute to the achievement of Community Outcomes, and regular reporting on activity items assist to ensure that achievement towards each outcome.

#### 11.6 AM Preparation, Monitoring & Review

This AMP will continue to be developed over time to incorporate further advanced asset management techniques, make use of improved data collection and management systems, respond to legislative and policy changes, and address evolving issues. This Plan will be further tested and developed with ongoing focus on legislative compliance, planning for climate change, environmental management, and improving efficiency.

This AMP is to be reviewed on a 3-yearly basis, with the next full review taking place in 2023. Each review will be completed in line with whole of Council LTP delivery plans. During the three year period leading up to this review, the items in the Improvement Programme should be addressed within the timeframes provided. These improvements can then be incorporated into the next review of the AMP.

This AMP is the responsibility of the 3Waters Manager.

Page 144 of 212

Water


# APPENDIX A INDIVIDUAL SUPPLIES DESCRIPTION

# A1 Fairlie Water Supply

# A1.1 Overview

Description		Quantity	
Population Served 2020		1,000 (Drinking Water Online) (895 UR)	
% of district serve	ed by community water supply	32%	
Type of Supply		High pressure with unrestricted/metered. Restricted	
	Able to connect	527	
	Connected		
Properties	metered		
Topenies	restricted		
	not metered		
	Not connected	-	
Water Source		Spring	
History	Original scheme installed in	1940's	
Length of reticulation		42.9km	
Number of valves		196	
Number of hydrants		122	
Number of pump stations		2	
Storage		140m <sup>3</sup> (BPT)	
Treatment	Treatment	None	
Treatment	Disinfection	Chlorination	
	Target level of service at point of supply		
Pressure & Flow	Pressure	70 kPa	
	Flow	15 Lts/min	
Sustainability	Source Security	Unsecure	
	Funding	Targeted rate (Fairlie, Tekapo, Twizel & Burkes Pass)	
Financial	Annual maintenance cost (2015/16) % of District Water O&M	\$48,603 17%	

# A1.2 Key Issues for Service

Issues	Resolution
DWSNZ compliance	Treatment Plant upgrade (2021-23)
Storage	Build reservoir (2021-23)
AC pipe	Planned renewals (accelerated programme)
Demand management	Universal (smart) metering
Integrity of water supply	Backflow prevention

December 2020

Water

Page 145 of 212

#### A1.3 Overview & History

The Fairlie Water Supply was established in the 1940's to provide domestic water to the communities of Fairlie and Kimbell. The Fairlie Water Supply does not currently meet the Health (Drinking Water) Amendment Act (2007). Investigations were undertaken to determine the best source water for Fairlie for the foreseeable future. Council has confirmed that the existing source will be the source going forward.

The upgraded treatment plant will include:

• Minor modifications to the raw water intake including raising the intake plinth above the road level

- Raw water tanks to provide a suction vessel for the membrane feed pumps and to settle grit
- $\bullet$  Membrane plant with space to expand the capacity in the future from an initial capacity of 28 L/s to an ultimate capacity of 50 L/s
- Chlorination through use of 70 kg gas cylinders
- pH correction with caustic
- A room in the building for fluoridation to be installed if required in the future
- Treated water storage reservoir(s)
- · Connection to the existing reticulation
- · Backwash ponds for membrane backwash water

#### A1.4 Condition, Capacity, Performance & Criticality

#### A1.4.1 Source

The source for the Fairlie Water Supply is a spring (known as 3 Springs) adjacent to the Opihi River and beside State Highway 8 approximately 2.2kms North West of Kimbell township. The original intake structure at the spring was constructed in 1940 along with a 75mm diameter pipeline to the break pressure tank (BPT).

In 1961 another intake structure was constructed along with a 225mm concrete pipe line to the chlorination plant and a 150mm pipeline from the chlorination plant to the reservoir. The pipelines are connected at the chlorination plant to ensure all the water is chlorinated. The pipelines between the spring and the chlorination plant became blocked by tree roots in about year 2000. The 225mm line was unblocked and its replacement was budgeted for in 2007. The 225mm dia trunk main was replaced in 2007 from the Trunk Main from the intake to the Chlorinator shed with a fusion welded pipeline (DN 250 PE PN6.3). During 2016/17 the 150mm AC was replaced with a 225mm PVC pipe from the Chlorine shed to Kimbell.

A report in 1973 estimated that the spring is capable of supplying 45,000 m³/day.

The bacteriological concentration and turbidity of the spring water appear to be closely linked to the Opihi River water. The water has a low Ph (6.8) which may cause corrosion of household plumbing and consequent leaching of metals (blue stain on baths).

The security at the spring has been improved in recent years.

Figure 11-1: Fairlie Water Supply Source & Intake Structure



Page 146 of 212

Water





#### A1.4.2 Treatment Plant

The Disinfection plant is situated adjacent to SH 8 approximately 1 km from the intake. The WTP building is of concrete block construction. Photograph below shows the outside of the building. The building is well maintained.

Inside one half of the building is the Chlorination unit, which provides the residual disinfection for the reticulation.

In the other half of the building there is a turbidity meter which is measuring the degree of turbidity of the water. There is also a Magflow water meter in the line to measure and record the water use. Free Available Chlorine (FAC) and pH is also monitored. The site is monitored by Council' SCADA system. Supervisory monitoring and captured data (including compliance monitoring data) is forwarded to the Council central system to relay operational, alarm, command and monitoring information.

## Figure 11-2: Fairlie WS Treatment Plant



The WTP upgrade to ensure compliance with the DWSNZ is programmed during 2020/21.

## A1.4.3 Storage

A Break Pressure Tank (BPT) is installed on the trunk main to bring the pressure within the system back to zero/atmospheric pressure at that specific site. The BPT also provides some minimal additional storage within the system. The BPT is at an elevation of 350m. The Top Water Level of the BPT is 354m and it has a volume of 140m<sup>3</sup>. The BPT is incapable of providing sufficient storage for the township.

There was some leakage around the joints, but this is controlled to a degree by a Butynol liner inside the tank and the joints being repaired with Humebond. Controlling the height of the water level in the reservoir below the top level of the butynol liner prevents leakage.

December 2020

Water

Page 147 of 212

Figure 11-3: Fairlie WS BPT



There is also a 25m<sup>3</sup> tank on Nixons road and a booster pump that feeds another 25m<sup>3</sup> tank on School Road. This provides a potable supply to sections on School Road that would be unable to access the supply without it.

A level transducer in the break pressure tank controls the level within the break pressure tank by transmitting a signal to the pressure sustaining valve upstream of the tank, closing and opening the diaphragm of the pressure sustaining valve.

A pressure sustaining valve is installed at the reservoir to maintain pressure in the Kimbell network.

#### A1.4.4 Pump Stations

There is a booster pump on Nixon's Road that feeds the 25m<sup>3</sup> tank on School Road. There is a single booster pump within the Kimbell reticulation that supplies water to a new subdivision.

#### A1.4.5 Reticulation

The trunk main route is within the grass verge running parallel and adjacent to SH 8. The trunk main running from the reservoir into Fairlie is 300mm uPVC. This is a new main installed in 2011 to replace the original 200mm concrete main.

The trunk main also supplies a number of metered rural properties on the route into town, which may not have backflow preventers installed. Rural properties are known to contain contaminants that are dangerous to people and during high flows and low pressures backflow from these types of properties may occur.

There is approximately 21 kilometres of pipework. The remaining concrete pipe is understood to be the original material for the reticulation and will be fully replaced by 2021/22. It is noted that the rubber ring joints caused the major problem with the concrete pipes. During maintenance of the reticulation, samples of the pipework are recovered and the remaining life expectancy estimated. During periods of high demand and consequent low pressure the areas of Struthers Street loses water. Struthers St is provided with "Tank Supply". On-property storage is required to meet demand during these periods. No evidence was found of air valves present in these positions to release trapped air.

Fairlie experiences a number of high demand periods during the summer months and this can cause pressure loss within the reticulation, and associated risks.

Hosing restrictions are imposed during periods of very high demand to maintain reasonable pressure in the reticulation and to stay within resource consent limits.

Page 148 of 212

Water



Replacement of the concrete, asbestos cement, cast iron and galvanised steel water mains is programmed for replacement during 2021/22 as part of the accelerated renewal programme under the COVID 19 recovery stimulus.

## A1.4.6 Fire fighting

Typically, the Fire and Emergency New Zealand (FENZ) tests the flows at fire hydrants on occasion and have not reported any serious deficiencies within the Fairlie Urban Fire District. However, traffic management requirements have resulted in FENZ no longer undertaking this activity. Council will conduct mains flushing and hydrant testing through the operation and maintenance contract (IP 14).

A hydraulic model of the reticulation indicates that it is not able to supply residential fire flows throughout a large part of the reticulation on top of other demand.

The fire flows could be improved in these areas by turning off other parts of the town while a fire is being fought.

There are fire hydrants on pipelines outside the Fairlie Urban Fire District which are incapable of delivering a fire flow eg: Allandale Road and the lower end of Talbot Rd. Other areas outside the Fairlie Urban Fire District which are supplied with small diameter pipe e.g. Struthers St and Nixons Rd do not have fire flow capacity.



December 2020

Water

Page 149 of 212

#### A1.5 Environmental Management

The following table list the resource consent associated with the Fairlie Water Supply.

Consent #	Description	Expiry Date	Allowable take
CRC040921	Take and use water	19 August 2044	28 litres/s 2,420m³/day 725,000m³/year

The intake structure and pipe configuration limit the take to 28 litres/sec under normal operating conditions. As there is very little storage the water take closely follows the demand. Hosing restrictions are imposed when the demand exceeds 28 litres/sec or when there are low flows in the Opihi due to dry conditions and as a consequence restrictions in line with the Resource Consent are imposed.

#### A1.6 Water Quality

Fluoridation	Nil
Disinfection	Chlorine gas
Quality issues	During times of flooding in the Opihi the turbidity rises in the raw water. There is no recognised barrier for Giardia and Cryptosporidium

#### Appendix Table 1: Fairlie Sampling Locations

Scheme	Sampling Location			
Fairlie WS	New sample point in Kimbell			
	Tap outside the Fairlie Community Centre			

Sampling is done in accordance with the requirements of the Drinking Water Standards of New Zealand 2005 (2018) and performed by the O&M contractor, Whitestone Contracting Ltd, and tested by Hill Laboratories in Christchurch.

#### A1.6.1 Demand

Council carries out regular leak detection programmes to determine the location of any system leaks. Any leaks that are located are then repaired thus reducing system losses. The initial survey in 2008 and follow up repair work reduced the line losses by 4 litres/sec.

Historical data indicates a low growth rate in Fairlie. The latest demand projections confirm this. It is conservatively assumed that the population will grow 0.1% per annum.

Water Supply	Average daily demand (m <sup>3</sup> )	Resource consent limit (m³)/day
Fairlie	993	2,420

## A1.7 Water Supply Standards

The Health (Drinking Water) Amendment Act (2007) was passed into legislation in October 2007. This Act replaces a mainly voluntary approach to ensuring compliance with the Drinking Water Standards for New Zealand 2005 (Revision 2018)

The impact of this legislation is discussed in detail in Section 6.9.2

A Water Safety Plan has been completed and approved by the Ministry of Health. Council will undertake a gap analysis of the Water Safety Plan to ensure it aligns with the regulatory changes (IP 15)

Water





## A1.8 Asset Details



Water mains make up 89% of the total reticulation asset values Tobies make up 4% of the total reticulation asset value

# Figure 11-5: Water Main Diameters



31% of the total water mains length is Ø50mm and smaller 19% of the total water mains length are Ø100mm and the majority of this is PVC





There is 1.7km of AC pipe that will reach the end of its expected useful life during the 1-5-year window. There is 2.8km of AC pipe reaching the end of its expected useful life within the first 6-10-year window.





The graph shows that 39% of the reticulation consist of PVC and 43% of PE.

Page 152 of 212

Water

December 2020

H



## Figure 11-8: Reactive Maintenance



Toby replacements peaked in 2014. Reactive maintenance consists mainly of Toby Replacements and Mains Leaks. Mains leaks trended upwards until 2015. This was mainly associated with the Fairlie trunk main which has been replaced.

December 2020

Water

Page 153 of 212

# A1.9 Supply Map



Page 154 of 212



December 2020





Page 156 of 212



A1.10 Supply Schematic



December 2020

Water

Page 157 of 212



# A2 Lake Tekapo Water Supply

# A2.1 Overview

Description		Quantity	
Population Served 2020 % of district served by community water supply		500 (1,050 during holidays) 16%	
Type of Supply		High pressure with unrestricted/metered.	
	Able to connect	687	
	Connected		
December 1	metered		
Properties	restricted		
	not metered		
	Not connected	-	
Water Source		Infiltration Gallery	
History	Original scheme installed in	1950's	
Length of reticulation		27.7km	
Number of valves		235	
Number of hydrants		100	
Number of pump stations		1	
Storage		1,100m <sup>3</sup>	
Turning	Treatment	None	
Ireatment	Disinfection	Chlorination & Ultra Violet Irradiation	
	Target level of service at point of supply	<u> </u>	
Pressure & Flow	Pressure	200 kPa	
	Flow	25 Lts/min	
Sustainability	Source Security	Unsecure	
	Funding	General rate for community of benefit(Fairlie, Tekapo, Twizel & Burkes Pass)	
Financial	Annual maintenance cost (2015/16) % of District Water O&M	\$51,895 17%	

## A2.2 Key Issues for Service

Issues	Resolution
Cast Iron, Galvanised Iron & AC mains	Planned renewals
Resilience - trunk main from reservoir to reticulation	Duplicate trunk main
Resilience - storage	Provide storage on east and west side of the Tekapo River
Maintaining and monitoring chlorine residual	Install FAC monitoring at pump stations and connect to SCADA
Integrity of water supply	Backflow prevention

Page 158 of 212

Water



#### A2.3 Overview & History

The Tekapo Water Supply was developed during the 1950's when the town was a village serving workers on the Tekapo hydro-electrical scheme. The town has since developed into a significant tourist destination.

## A2.4 Condition, Capacity, Performance & Criticality

#### A2.4.1 Source

The supply abstracts water from an infiltration gallery adjacent to Fork Stream, which was installed during the early 2000's and is accessed from Braemar Road.

The gallery is 150 metres long and consists of two arms, each 75 metres and six metres deep. The gallery is located within 130metres of Fork Stream, but groundwater quality is relatively stable indicating that the influence from surface conditions and the stream are minimal.

Figure 11-9: Lake Tekapo Water Supply Intake



The source of the Tekapo water supply is a shallow aquifer besides the Forks River west of Little Mount John. For further information see Pattle Delamore report on Lasefiche/....3 Waters/Tekapo/Water/Projects.

December 2020

Water

Page 159 of 212

#### A2.4.2 Treatment Plant

The abstracted water is disinfected by chlorine gas and Ultra Violet Irradiation, each in separate buildings.

The chlorination plant is located on Braemar Road, where 2 x 70kg gas cylinders are installed in a duty/standby arrangement. The  $Cl_2$  building is concrete tilt slab construction and was constructed in 1998.

Inside one half of the building is the Chlorination unit, which provides the residual disinfection for the reticulation. The other half of the building house the Magflow meter. The site is monitored by Council's SCADA system.

Figure 11-10: Lake Tekapo WS Cl<sub>2</sub> building & UV treatment



The location of the UV treatment is located in a shed off State Highway 8 west of Tekapo. The treatment uses a Trojan UV reactor model D03 complete with all controls. The turbidity-, FAC-, and pH monitors are also housed in this building. The site is monitored by Council' SCADA system. Supervisory monitoring and captured data (including compliance monitoring data) is forwarded to the Council central system to relay operational, alarm, command and monitoring information.

#### A2.4.3 Storage

The reservoir construction is a poured in situ reinforced concrete storage tank of 1,100 $\mathrm{m}^3$ , at an elevation of 780 $\mathrm{m}$ .

#### Figure 11-11: Lake Tekapo WS Reservoir



The reservoir provides only one days storage at the current average daily demand. This does not cause any problems as the supply is reliable and the turbidity is constantly within guidelines. The delivery of water to the reservoir is currently by gravity which provides certainty of supply.

Page 160 of 212

Water



The reservoir never fills completely. A PLC and level transducer controls the level in the reservoir by opening and closing the actuated valve located at the UV unit.

The tank condition is consistent for its age with no leakage. The reservoir was lined with a liquid rubber during 2016 to prevent leakage. A bypass line has been installed at the reservoir.

With increased demand and development additional storage may be required. The elevation of the reservoir restricts supply to possible development in some areas without inline boosting. For increased resilience greater storage is required and on either side of the Tekapo River.

#### A2.4.4 Pump Stations

Flow is boosted to the higher elevations in the Lochinver subdivision by an in ground booster pump set on Lochinver Avenue.

#### A2.4.5 Reticulation

The trunk main route is overland through Mt John Station, crossing SH 8 near the sub-station then through the UV unit and then to the reservoir. This pipeline is a 225 dia uPVC. There are numerous air relief valves on the line including intermediate line valves or washouts on the trunk main.

The trunk main also supplies water to the Tekapo Airfield (metered).

There is approximately 6.8 kilometres of pipework in the trunk main, this pipework is in excellent condition being only installed in 1998. However, to increase resilience the trunk main needs to be duplicated from the reservoir to the reticulation.

Tekapo reticulation is generally in good condition with initial pipework installed in 1955 and progressively since then.

There are 5.8km of Asbestos Cement pipework within the reticulation.

Replacement of the asbestos cement, cast iron and galvanised steel water mains is programmed for replacement during 2021/22 as part of the accelerated renewal programme under the COVID 19 recovery stimulus.

#### A2.4.6 Fire fighting

Typically, the Fire and Emergency New Zealand (FENZ) tests the flows at fire hydrants on occasion and have not reported any serious deficiencies within the Lake Tekapo Urban Fire District. However, traffic management requirements have resulted in the FENZ no longer undertaking this activity. Council will conduct mains flushing and hydrant testing through the operation and maintenance contract (IP 14).

All new water supply reticulation is required to meet the standards as defined in SNZ PAS 4509:2008, New Zealand Fire Fighting Code of Practice

December 2020





## A2.5 Environmental Management

The following table list the resource consent associated with the Lake Tekapo Water Supply.

Consent #	Description	Expiry Date	Allowable take
CRC971413	To erect structures	13 August 2033	Not applicable
CRC971414	To take groundwater	13 August 2033	40 litres/s

# A2.6 Water Quality

Fluoridation	Nil
Disinfection	Chlorine gas & UV Irradiation
Quality issues	There are no water quality issues.

## Appendix Table 2; Lake Tekapo Sampling Locations

Scheme	Sampling Location		
Tekapo WS	At UV shed (TP)		
	At Lochinver pump station (Programmed site)		
	In reticulation (Caravan – Hamilton Drive)		

Sampling is done in accordance with the requirements of the Drinking Water Standards of New Zealand 2005 (2018) and performed by the O&M contractor, Whitestone Contracting Ltd, and tested by Hill Laboratories in Christchurch.

## A2.7 Demand

Council carries out a regular leak detection programme to determine the location of any system leaks. Any leaks located will be repaired under the normal maintenance regime.

The daily water use per head is quite high due to the amount of irrigation required to maintain the landscaped areas within Tekapo.

Page 162 of 212

Water

December 2020

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Tekapo is a strong growth area, but current zoning rules, the limited availability of land and the COVID 19 impacts may constrain growth.

The recent design for a new water source predicted a design population of 3,500 by 2017. This design population reflects the peak tourist population, not the resident population. It is anticipated that the resident population will increase at a lesser rate than the peak tourist population. Developments such as motels/hotels and subdivisions where the properties are purchased as holiday homes do not increase the resident population but have a significant effect on the peak tourist population capacity, however where they are used as Air BnB accommodation the reverse is true. And in fact the demand is tied to the customers arriving at between 4.00pm and 6.00pm with a similar trend in the morning as they pack up and leave.

It is estimated that the resident population will increase at 5% to serve the peak tourist population. However the cost of housing in the township is at a level that a lot of workers serving the tourist industry can not afford to live there.

The only possible concern is the current trend to extensively landscape new subdivisions that require significant volumes of water to irrigate these features. Council will only allow this for the first two years to establish the landscaping.

Water Supply	Average daily demand (m <sup>3</sup> )	Resource consent limit (m³/day)
Lake Tekapo	1,285	3,456

#### A2.8 Water Supply Standards

The Health (Drinking Water) Amendment Act (2007) was passed into legislation in October 2007. This Act replaces a mainly voluntary approach to ensuring compliance with the Drinking Water Standards for New Zealand 2005 (2018)

A Water Safety Plan has been completed and approved by the Ministry of Health. Council will undertake a gap analysis of the Water Safety Plan to ensure it aligns with the regulatory changes (IP 15)

#### A2.9 Asset Details

#### Figure 11-12: Replacement Costs for Reticulation



December 2020

Water mains make up 87% of the total reticulation asset values. Valves make up 5% of the total reticulation asset value.

## Figure 11-13: Water Main Diameters



8% of the total water mains length is Ø50mm and smaller. 29% of the total water mains length are Ø100mm and the majority of this is PVC.

Figure 11-14: Pipe Age Group Replacement Cost



There is 60metres of AC pipe that will reach the end of its expected useful life within the 6-10-year window.

Page 164 of 212

Water



Figure 11-15: Water Main Material



The graph shows that 56% of the reticulation consist of PVC and 21% of AC.

## Figure 11-16: Reactive Maintenance



Most of the work associated with reactive maintenance consists of toby replacements and mains leaks. Toby replacements & Mains leaks show a downward trend. New connections show to stabilise over the last three years.

December 2020

Water

Page 165 of 212

Page 166 of 212

Water



# A2.10 Supply Map



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Page 168 of 212

Water

E.



# A3 Twizel Water Supply

# A3.1 Overview

Description		Quantity
Population Served 2020		1,300 (3,500 during holidays)
% of district served by community water supply		42%
Type of Supply		High pressure with unrestricted/metered. Restricted
	Able to connect	1,769
	Connected	
Describer	metered	
Properties	restricted	
	not metered	
	Not connected	-
Water Source		Three shallow bores
History	Original scheme installed in	1969/70
Length of reticulation		71.4km
Number of valves		563
Number of hydrai	nts	312
Number of pump	stations	2
Storage	7,500m <sup>3</sup>	
Tractment	Treatment	Filtration
Ireatment	Disinfection	Ultra Violet Irradiation & Chlorination
	Target level of service at point of supply	
Pressure & Flow	Pressure	250 kPa
	Flow	25 Lts/min
Sustainability	Source Security	Unsecure
Financial	Funding	Targeted rate (Fairlie, Tekapo, Twizel & Burkes Pass)
	Annual maintenance cost (2015/16) % of District Water O&M	\$132,525 43%

## A3.2 Key Issues for Service

Issues	Resolution
AC pipe	Planned renewal (completion planned for 2022)
Resilience – trunk main from treatment plant to reticulation	Duplicate trunk main
Maintaining and monitoring chlorine residual	Install FAC monitoring at pump stations and connect to SCADA
Integrity of water supply	Backflow prevention

December 2020

Water

Page 169 of 212

#### A3.3 Overview & History

The Twizel Water Supply was installed during 1969/70 to service the Upper Waitaki Hydro Development and was not supposed to survive the project. However, extensive lobbying by various groups ensured the town's survival and the town has since developed into a significant holiday and tourist destination.

During the period 2011 to 2013, Council undertook a significant investigation to determine if there was a better source for the Twizel water supply. Council was looking for a source to the west of the town that would only require pumping once to a reservoir on the high ground behind Simon Cameron's house. We were unable to locate a suitable source and Council confirmed that the source for the Twizel water supply would be the original 3 bores adjacent to the Fraser Stream.

## A3.4 Condition, Capacity, Performance & Criticality

## A3.4.1 Source

The source of the Twizel water supply is three wells (200mm dia pipe, 16.75m long, within a 1200mm Benoto bore 21.5m deep) drawing from a shallow unconfined aquifer besides the Fraser Stream adjacent to Glen Lyon Rd. The space between the bore and the 200mm dia pipe has been filled with washed gravels 8-25mm.

## Figure 11-17: Twizel Water Supply Intake



No 3 Bore and Pump Shed

Page 170 of 212



## A3.4.2 Treatment Plant

Until December 2011 the Twizel water supply was not treated. However, at that time the Community Board installed a temporary a Sodium Hypochloride solution proportional flow dosing plant to disinfect the supply as a result of an approach by the Medical Officer of Health. This system had some initial setup problems with odour due to die off of the biofilm build up. This was expected and after line flushing and time the odour and taste issues have been corrected.

Note. During the Hydro project days the water supply was disinfected with Chlorine Gas and Fluoridated. The equipment was housed in the current pump house, built in 1970 and is located on Glen Lyon Rd adjacent to the reservoir.

During the WTP upgrade in 2015/16 the existing pump set that provides pressure to the town has been completely replaced and all controls modernised. The treatment upgrade included filtration, UV and chlorination and complies with the DWSNZ. A permanent generator was also installed providing backup power in the event of a power failure.

Figure 11-18: Twizel WS Treatment Plant

December 2020



## A3.4.3 Storage

There are two reservoirs serving Twizel. The covered raw water reservoir  $(7,000m^3)$  is an earth structure, waterproofed with a HDPE liner.

There is a covered reinforced concrete reservoir (500m<sup>3</sup>) beneath the pump house which contains the treated water.

## Figure 11-19: Twizel WS Raw Water Reservoir



## A3.4.4 Pump Stations

Apart from the pumps at the Treatment Plant there are two other pump stations within the reticulation, one at North West Arch which boosts supply to The Drive subdivision, and another supplying water to the Pukaki Airport.

## A3.4.5 Reticulation

Total length of reticulation. = 71.4km

The rising main takes a direct route from the wells to the raw water reservoir. This pipeline is a 300 dia AC with spiral welded steel pipe above ground. The above ground steel pipe is programmed for replacement.

Page 172 of 212

Water

December 2020

H



Apart from the AC mains (21.9km and 31% of the network) the Twizel reticulation is generally in good condition. The initial pipework (100 mm dia and greater) for the village is Asbestos Cement pipe. This pipework has been the subject of recent specialist testing on various samples to determine its remaining life. Those tests have shown some alarming results with some sections of water main at risk of eminent failure due to softening of the pipe wall. As a consequence, a replacement programme has been devised that will see all the 100mm to 150mm diameter AC pipe replaced. Replacement of the asbestos cement water mains is programmed for replacement during 2021/22 as part of the accelerated renewal programme under the COVID 19 recovery stimulus. This replacement programme is detailed in section 7.6.2. Smaller rider mains are PVC and in good condition.

There are also some small diameter galvanised iron pipe fittings serving individual properties that have corroded so much as to restrict the flow to those properties. Council has an ongoing replacement programme for these service connections. Leaking supply points is an on-going issue and are replaced as they are identified.

The network layout plan shows the area where Council provides an "on-demand" supply in the residential area. Those areas outside that zone, but supplied with water from the Twizel water supply are only supplied as a restricted supply. Those properties are restricted to one unit (1,820 litres/day) of water.

This is because those properties are generally larger than a residential section with the potential to use a large amount of water. The use of the restrictor eliminates the peak demand for those properties.

## A3.4.6 Fire fighting

Typically, the Fire and Emergency New Zealand (FENZ) tests the flows at fire hydrants on occasion and have not reported any serious deficiencies within the Twizel Urban Fire District. However, traffic management requirements have resulted in the FENZ no longer undertaking this activity. Council will conduct mains flushing and hydrant testing through the operation and maintenance contract (IP 14).

All new water supply reticulation is required to meet the standards as defined in SNZ PAS 4509:2008 New Zealand Fire Fighting Code of Practice

December 2020



# A3.4.7 Pukaki Airport

The Pukaki Airport water supply was recently connected to the Twizel water supply. This has an inline booster pump supplying water to the development on a restricted basis. There is no firefighting capability from the supply.

## A3.5 Environmental Management

The following table list the resource consent associated with the Twizel Water Supply.

Consent #	Description	Expiry Date	Allowable take
CRC042741	Take and use water	20 August 2047	130 litres/s 3,942m³/day (annual average) 1,440,000m³/year

Page	174	of 212	
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Water



## A3.6 Water Quality

Fluoridation	Nil
Disinfection	UV and Chlorine hypochloride
Quality issues	There is no quality issues with this supply

## Appendix Table 3: Twizel Sampling Locations

Scheme	Sampling Location
Twizel WS	At the TP
	At a top on the outside of the MDC Administration building

Sampling is done in accordance with the requirements of the Drinking Water Standards of New Zealand 2005 (2018) and performed by the O&M contractor, Whitestone Contracting Ltd, and tested by Hill Laboratories in Christchurch.

## A3.7 Demand

Council is carrying out a regular leak detection programme to determine the location of any system leaks. Any leaks located will be repaired under the normal maintenance regime.

The daily water use per head is very high due to the amount of irrigation, both private and public, required to maintain the landscaped areas within Twizel. During the peak day in February 2020, 7,069m<sup>3</sup> were consumed. This represents a daily demand of approximately 4.5m<sup>3</sup> per property per day. NZS 4404:2010 suggests a figure of 1.5m<sup>3</sup> per property per day. The Mackenzie Growth Projections 2020 project 2.6% growth per annum over the next 30 years.

Twizel is experiencing a growth in demand in a number of areas close to Twizel. These are creating rural/residential blocks generally on a restricted supply basis.

Twizel experiences significant fluctuations in peak tourist population and in water demand largely due to sporting events such as rowing and skiing and the summer holiday tourists. Twizel has experienced peaks of up to 7,000 people during rowing events.

Recent rezoning around Twizel has bought with it an expectation that water supply will be available. Council has completed its investigations into a possible new source and determined that the only viable option is to rebuild the current plant using the existing source. What this means is that all those areas outside the original Twizel area will either have to receive water on a restricted basis without full or any fire fighting capacity or the supply to those areas will require boosting to supply the required flows and pressures.

Water Supply	Average daily demand (m <sup>3</sup> )	Resource consent limit (m³/day)
Twizel	3,276	3,942

December 2020

Water

Deleted: 7



The per capita water demand in the Mackenzie district is above industry standards. Refer to Figure 7-2 Demand – Average Daily per Person. Water metering raises awareness of water use and the value of water among customers and enables the means of determining where the water is going, who is the high users, etc. Metering drives behavioural change and encourages supplier and consumer to take note of actual consumption.

As a result universal property metering is programmed for 2021/22. It is Council's intention to carry out metering in a trial area such as Twizel initially and then roll it out to the wider area.

#### A3.8 Water Supply Standards

The Health (Drinking Water) Amendment Act (2007) was passed into legislation in October 2007. This Act replaces a mainly voluntary approach to ensuring compliance with the Drinking Water Standards for New Zealand 2005 (2018)

The Ministry of Health agrees with a 3 log protozoal treatment being appropriate as indicated in the catchment assessment using table 5.1a. This needs to be re-assessed every five years.

The following improvements were implemented for preventing, reducing or eliminating the identified public health risks in the Twizel drinking water supply.

i. Treatment —the supply will need to remain chlorinated, and be disinfected by UV.

This work was completed in 2015/16. A Water Safety Plan has been completed and approved by the Ministry of Health. Council will undertake a gap analysis of the Water Safety Plan to ensure it aligns with the regulatory changes (IP 15).

Water



## A3.9 Asset Details

# Figure 11-20: Replacement Costs for Reticulation



Water mains make up 84% of the total reticulation asset values. Tobies make up 6% of the total reticulation asset value.

## Figure 11-21: Water Main Diameters



21% of the total water mains length is Ø50mm and smaller. 36% of the total water mains length are Ø100mm and mainly AC and PVC.

Figure 11-22: Pipe Age Group Replacement Cost



There is 21.9km of AC pipe reaching the end of its expected useful life within the 6-10-year window. Council started with a renewal programme during 2015 focussed on replacement of the AC mains. As part of the COVID 19 recovery package Council have accelerated this renewal programme and the completion is programmed for the end of 2021.

There is 11km of PVC pipe reaching the end of its expected useful life within the 26-30 year window.

# Find the reticulation consist of PVC and 31% of AC 23% of PE

## Figure 11-23: Water Main Material

Page 178 of 212







Most of the work associated with reactive maintenance consists of toby replacements. Toby replacements show a slight downward trend. Toby leaks and toby replacements are related, but toby leaks may result in toby replacements. Toby replacement involve replacing the toby with a manifold which allows potential metering of an individual site. Valve replacements peaked in 2014 and no valve replacements since 2016. This coincides with main replacements as valves are replaced when the main is replaced and as a result individual valve replacements reduced markedly.

December 2020

# A3.10 Supply Map



Page 180 of 212


December 2020

1



A3.11 Supply Schematic



Page 182 of 212

December 2020

Water

Page 183 of 212



# A4 Burkes Pass Water Supply

# A4.1 Overview

Description		Quantity	
Population Served 2020		30	
% of district serve	ed by community water supply	1%	
Type of Supply		Mix of on demand/un	nrestricted/metered/restricted.
	Able to connect	18	
	Connected		
December 1	metered		
Properties	restricted		
	not metered		
	Not connected	-	
Water Source		Infiltration Gallery	
History	Original scheme installed in	1940's	
Length of reticulation		3.3km	
Number of valves		2	
Number of hydra	nts	1	
Number of pump stations		-	
Storage		82m <sup>3</sup>	
	Treatment	None	Filtration and Ultra Violet
Ireatment	Disinfection	Chlorination	June 2021
Flow	Target level of service at point of supply	1,818 litres/day	
Sustainability Source Security		Unsecure	
	Funding	Universal rate (Fairlie	e, Tekapo, Twizel & Burkes Pass)
Financial	Annual maintenance cost (2015/16) % of District Water O&M	<mark>\$13,228</mark> 5%	

### A4.2 Key Issues for Service

Issues	Resolution	
Manage demand within consent limits	Consider changing from on demand to restricted supply (IP 11)	
Equal access to water supply		

#### A4.2.1 Overview & History

The small village of Burkes Pass currently is occupied by some permanent residents and some holiday homes. The scheme was first built around 1940 but over the years has been modified and extended.

Originally the Burkes Pass WS was developed as a restricted supply, with on site storage tanks and the reticulation all small diameter pipes. Over time, connections have been made without flow restrictors or storage tanks, creating potential demand issues.

Page 184 of 212

Water



#### A4.3 Condition, Capacity, Performance & Criticality

#### A4.3.1 Source

The source for the Burkes Pass water supply is an infiltration gallery in the bed of Paddy's Market Stream approximately north west of the village.

The infiltration gallery has been damaged and stock have access to the water course at the gallery. Council has a proposal to shift the gallery slightly upstream and fence off the creek bed for approximately 100m.





#### A4.3.2 Treatment Plant

The treatment is located 200metres downstream of the intake gallery. It was upgraded in 2010 with the installation of two Dosatron dosing pumps.

There has been a significant upgrade completed in March 2021 to the treatment system. Solar power was installed at the treatment shed and this has enabled the installation of a new filter unit and ultraviolet unit to provide improved treated water to the residents of Burkes Pass.

The supply is still dosed with Calcium Hyperchloride but the dosing pump is connected to and thus controlled by a flow meter.

The system is monitored by SCADA to log turbidity, free available chlorine , pH and also total flows through a magflow meter.

### A4.3.3 Storage

The storage consists of two new 30,000 litre tanks with a level indicator connected to the SCADA. The origional concrete tank storage is disconnected and no longer used.

#### A4.3.4 Pump Stations

There are no pump stations within the Burkes Pass reticulation.

### A4.3.5 Reticulation

Total length of reticulation. = 3.3km.

December 2020

Water

Page 185 of 212

F

The pipe work is generally as shown however there may be other material used as well on the trunk line to the township. This will be confirmed as maintenance is carried on the pipelines. The trunk main has been laid quite shallow and is at risk from farming operations.

The pipework is suitable only for tank supply however it is known that some properties have hose connections prior to the tank. If these supplies are used to any great degree it impacts on the service to the higher level properties. As the community is so small, this issue generally does not cause too many problems.

All new connections are supplied on a restricted supply basis.

### A4.3.6 Fire fighting

The scheme has no fire fighting capability being a small bore scheme.

#### A4.4 Environmental Management

The following table list the resource consent associated with the Burkes Pass Water Supply.

Consent #	Description	Expiry Date	Allowable take
CRC971594	to divert water for Burkes Pass community supply	29 October 2032	6 litres/s 520m³/day
CRC971595	to discharge by-wash water to Paddy's Market Stream	29 October 2032	6 litres/s 520m³/day
CRC971593	to disturb the bed of Paddy's Market Stream	29 October 2032	Not applicable

### A4.5 Water Quality

Fluoridation	Nil
Disinfection	Calcium Hypochloride
Quality issues	Water take is from a surface stream that stock have access to

#### Appendix Table 4: Burkes Pass Sampling Locations

Scheme	Sampling Location	
Burkes Pass WS	At reservoir	
	In reticulation	

Sampling is done in accordance with the requirements of the Drinking Water Standards of New Zealand 2005 (2018) and performed by the O&M contractor, Whitestone Contracting Ltd, and tested by Hill Laboratories in Christchurch.

### A4.6 Demand

On average each property uses 800 m<sup>3</sup> per annum. Like all the communities in the Mackenzie a significant proportion of this is used for irrigation. A meter has been installed to better monitor the water use.

Water Supply	Average daily demand (m <sup>3</sup> )	Resource consent limit (m <sup>3</sup> /day)
Burkes Pass	10.6	520

#### A4.7 Water Supply Standards

Page 186 of 212

Water

December 2020

#### Deleted: 10



The Health (Drinking Water) Amendment Act (2007) was passed into legislation in October 2007. This Act replaces a mainly voluntary approach to ensuring compliance with the Drinking Water Standards for New Zealand 2005 (Revision 2008)

The Ministry of Health agrees with a 4 log protozoal treatment being appropriate as indicated in the catchment assessment using table 5.1a.

The following improvements are recommended for preventing, reducing or eliminating the identified public health risks in the Burkes Pass drinking water supply.

- i. Treatment Indications are that the supply will need to remain chlorinated, most likely go through a filtration process followed by UV disinfection.
- ii. Storage new reservoir for one day's storage
- iii. Reticulation Renewal Reticulation is renewed as required.

A Public Health Risk Management Plan has been completed and submitted to the Ministry for consideration. At the time of writing this Plan the treatment options were still under investigation.

### A4.8 Asset Details

### Figure 11-26: Replacement Costs for Reticulation



Water mains make up 97% of the total reticulation asset values

December 2020

Water





55% of the total water mains length is Ø50mm and the majority is Galvanised pipe. 33% of the total water mains length are Ø20mm and the majority of this is PE.

Figure 11-28: Pipe Age Group Replacement Cost



There is 1km of GI pipe and 0.2km of AC pipe that has reached the end of its expected useful life.

Page 188 of 212

Water

H



Figure 11-29: Water Main Material



The graph shows that 46% of the reticulation consist of PE and 33% of GI.

# Figure 11-30: Reactive Maintenance



Toby replacements show a slight upward trend. Mains leaks show an upward trend. Due to the size of the system the above is not seen as significant and addressed through a reactive maintenance approach.

December 2020

Water

Page 189 of 212

Page 190 of 212

Water



# A4.9 Supply Map



\*\*\*2020





Page 192 of 212

Water

E.

December 2020

Water

Page 193 of 212



# A5 Allandale Water Supply

## A5.1 Overview

Description		Quantity
Population Served 2013		150
% of district serve	ed by community water supply	5%
Type of Supply		Restricted
Proportion	Connected	
Froperties	restricted	524
Water Source		Opuha River
History	Original scheme installed in	
Length of reticulation		117.7km
Number of valves		64
Number of hydrants		2
Number of pump stations		-
Storage		
Tasatasaat	Treatment	None
reatment	Disinfection	Chlorination
Flow	Target level of service at point of supply	1,818 litres/day
Sustainability	Source Security	Secure/Unsecure
Financial	Funding	Targeted rate for community of benefit
	Annual maintenance cost (2015/16)	\$56,061
	% of District Water O&M	18%

# A5.2 Key Issues for Service

Issues	Resolution
Poor workmanship on PE pipes	Investigate resolution (IP 12)
DWSNZ Compliance -	Potentially connect to Fairlie
Protozoa compliance	
Power to treatment plant	
Didymo clogging up filter	

# A5.3 Overview & History

The Allandale rural water supply is a 'Restricted Flow' supply. A restricted flow supply is where a small continuous flow is supplied by a flow control device across an air gap separation, and storage is provided by the customer to cater for their demand fluctuations.

# A5.4 Condition, Capacity, Performance & Criticality

### A5.4.1 Source

The water source for this supply is a surface water connection to the Ashwick Opuha stock water race intake chamber. In the past the water was sourced from an infiltration gallery adjacent to the South

Water



Opuha River where it emerges from the gorge. This was a new intake constructed in 2003 which silted up over time and struggled to supply the required flow. The gallery was enhanced by two free draining gravel trenches to the edge of the river. However, these trenches have silted up and a surface water take connection from the Ashwick supply has had to be installed. Didymo in the Opuha River is causing blockage to the inlet filters necessitating regular cleaning.

#### Figure 11-31: Allandale Water Supply Source & Intake Structure



#### A5.4.2 Treatment Plant

The water treatment plant was built as part of the Headwork's upgrade in 2003 and as such it is in excellent condition. The treatment plant is located approximately 4km from the intake.

At the time there was some debate about the type of disinfection to be used for the scheme and the building has been set up to allow enough room to treat the water with UV. This issue has not yet been resolved. In the meantime a Sodium Hyperchloride solution proportional flow dosing system has been installed to provide the necessary disinfection.

The water supply becomes turbid during periods of high river flow. More research on this issue, needs to be undertaken prior to considering improved treatment, to meet compliance with Drinking Water Standards New Zealand (DWSNZ)

Ultra Violet Irradiation treatment is considered. Transmitted UV light dosage is affected by water clarity and the water take will potentially be shut down during periods of high turbidity. A reservoir to balance the water demand during these periods of no take allows water turbidity levels to return to normal. However, the cost of replacing the reservoir is deemed to be too high and the 13 kilometres of trunk main is deemed to provide sufficient storage.

It has been suggested that the Allandale Water Supply could be connected to the Fairlie Water Supply to supply treated water to that network to avoid expensive upgrades and the ongoing operational costs. It will, however, require a feasibility study to ensure that this is workable and will involve a significant length of connecting pipe. However, if this is a viable option it would resolve a number of issues associated with the Allandale Water Supply including but not limited to:

• compliance with the DWSNZ,

December 2020

Water

Page 195 of 212

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- didymo clogging up filters requiring regular maintenance. Provide treated water to other properties that wish to connect •
- Reduce treatment costs.

Investigations are ongoing.

### Figure 11-32: Allandale WS Treatment Plant



# A5.4.3 Storage

The reservoir was built for the original scheme in 1966.

With the new gravity source the old reservoir was taken off line as it was leaking significantly The scheme relies on the water within the 13kms of trunk main and the individual on farm storage. As the scheme is a restricted supply with constant flow and on property storage, additional storage is not required.

# A5.4.4 Pump Stations

The Spur Road booster pump boosts supply to the elevated properties along Spur Road.

Water



#### A5.4.5 Reticulation

Total length of reticulation. = 117.7m

The 13km long trunkmain was ploughed in through difficult country in 2003. It is a RRJ uPVC 200mm diameter pipeline in excellent condition.

The trunk main and gallery was designed to supply 12 litres/sec at a point 10 metres above the existing Allandale reservoir. The design also allowed for a further 12 litres/sec on Ashwick Flat Rd for a possible future piped water supply to cover some of the area currently serviced by the Ashwick Opuha water race.

The scheme was upgraded in 2007 and amalgamated with the Spur Rd supply. Part of the process was to significantly enhance the scheme and sell extra units up to the maximum of the allowed take, 12 litres/sec. The new scheme supplies 597 units to the enlarged area.

The reticulation upgrade abandoned a significant amount of existing scheme pipe, replacing it with larger pipe to supply the additional units.

#### A5.4.6 Fire fighting

The scheme has no fire fighting capability being mainly a small bore scheme. There is one hydrant used only for scouring the line and drawing off small quantities of water.

#### A5.5 Environmental Management

The following table list the resource consent associated with the Allandale Water Supply.

Consent #	Description	Expiry Date	Allowable take
CRC020124.1	Take and use water	19 October 2030	12 litres/s

#### A5.6 Water Quality

Fluoridation	Nil
Disinfection	Sodium Hypochlorite
Quality issues	The water supply is basically a surface take with most of the flow coming from a pipe in the Ashwick intake. The catchment above the intake has very low stocking rates therefore is not subject to significant contamination.

### Appendix Table 5: Allandale Sampling Locations

Scheme	Sampling Location	
Allandale WS	2km downstream of the TP	
	In reticulation at Mt Michael	

Sampling is done in accordance with the requirements of the Drinking Water Standards of New Zealand 2005 (2018) and performed by the O&M contractor, Whitestone Contracting Ltd, and tested by Hill Laboratories in Christchurch.

#### A5.7 Demand

The scheme is a restricted supply delivering 532 units to the Allandale area, plus a further 65 units are pumped to the higher area serving Spur Road. Flow to each property is controlled by Maric flow controllers that deliver the nominated flow with an accuracy of +-10%.

Water

Page 197 of 212

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There is a meter at the treatment plant which can be used to reconcile water produced and water sold to identify possible line losses.

Allandale water is sold as A and B units, with A units the appropriate volume allocated to a property. One unit (A or B) equals 1,800 litres. B units is an over allocation of water and consist of supplementary volume allocated to a property. B units may be transferred to another property when not required.

Potential property owners are made aware of A and B units allocated to a property during the LIM process.

#### A5.8 Water Supply Standards

The Health (Drinking Water) Amendment Act (2007) was passed into legislation in October 2007. This Act replaces a mainly voluntary approach to ensuring compliance with the Drinking Water Standards for New Zealand 2005 (Revision 2008)

The Ministry of Health have not assigned a log credit for protozoal treatment as Council has not yet confirmed if it requires the scheme to be assessed under Section 5, 10 or Section 12. Section 12 is of the DWSNZ "Rural Agricultural Drinking Water Supplies" is still in preparation and subject to consultation.

It is anticipated that compliance will come under Section 10 'Small Water Supplies, Alternative Compliance Criteria'.

Council has assumed that UV disinfection will be added to the existing chlorine disinfection. Some form of filtration is likely to be required for periods when the source water is not suitable for UV disinfection. As noted in A5.4.2, it is suggested that Allandale could be connected to the Fairlie supply, thus providing compliant treated water to that supply.

A Water Safety Plan was completed.

# A5.9 Asset Details

#### Figure 11-33: Replacement Costs for Reticulation



Page 198 of 212

Water



Water mains make up 97% of the total reticulation asset values. Tobies, valves, laterals & meters make up the remaining 3% of the total reticulation asset value.

# Figure 11-34: Water Main Diameters



62% of the total water mains length is Ø50mm and smaller and this is mainly PE. 19% of the total water mains length are Ø100mm and greater and 46% of this is PE.





There is 9km of PE pipe and 1.5km of PVC pipe that will reach the end of its expected useful life during the 26 - 30year window.

December 2020

Water

Page 199 of 212

Figure 11-36: Water Main Material



The graph shows that 86% of the reticulation consist of PE and 14% of PVC Figure 11-37: Reactive Maintenance



Mains leaks make up the greatest component of reactive maintenance. Mains leaks show a significant upward trend. This is the result of poor quality workmanship (butt welding). Pipes are being replaced as leaks appear and leakage is being tracked to ensure early detection and progressive replacement of leaking pipes.

Page 200 of 212

Water

December 2020

Water

Page 201 of 212

# A5.10 Supply Map



# ALLANDALE WATER SUPPLY LINES



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Page 202 of 212

Water

\*\*\*2017







Page 204 of 212

December 2020

Water

Page 205 of 212

# A6 Albury Water Supply

# A6.1 Overview

Description		Quantity
Population Served 2020 % of district served by community water supply		125 (estimated) 4%
Type of Supply		Restricted
Droportion	Connected	
Properties	restricted	
Water Source		Opawa River
History	Original scheme installed in	1971
Length of reticula	ition	107.9km
Number of valves		2
Number of hydrants		-
Number of pump stations		-
Storage		180m <sup>3</sup>
Transforment	Treatment	Filtration
Treatment	Disinfection	Chlorination
Flow	Target level of service at point of supply	1,818 litres/day
Sustainability	Source Security	Unsecure
	Funding	Targeted rate for community of benefit
Financial	Annual maintenance cost % of District Water O&M	Unknown – performed by ARWSS Inc. ******%

# A6.2 Key Issues for Service

Issues	Resolution
Locally managed (risk)	Water Safety Plan in place and implemented

### A6.3 Overview & History

The scheme is owned by Mackenzie District Council but managed by the Albury Rural Water Supply Society Inc. The Council has a formal agreement with this group to control the direction of the scheme but the operation and management is all carried by that group. Data on upgrades and pipeline condition has not been supplied to Council for some years. As such little is known about the current condition of the scheme and the size of the asset. The society is aware of the requirement to meet the Drinking Water Standards. The agreement between Council and the Society expired within the next year and Council are considering the way forward and all associated risks. The scheme has an approved Water Safety Plan.

Water

December 2020

F



A6.4 Condition, Capacity, Performance & Criticality

#### A6.4.1 Source

The water source for this supply is from the headwaters of the Opawa River.

Figure 11-38: Albury Water Supply Source & Intake Structure



### A6.4.2 Treatment Plant

In 2018 the Albury Water Supply Committee upgraded the supply to provide basic treatment for bacteriology compliance with Drinking Water Standards for New Zealand (DWSNZ). This consisted of dosing with Calcium Hypochlorite. There is als o monitoring equipment installed in the the treatment shed that samples turbidity, Ph and Free Available Chlorine (FAC) Water still passes through a Rapid Sand Filter prior to treatment which is regularly back washed with un-filtered water. Flow monitoring by magflo meter was installed in 2016 so that they can meet the water use reporting

Flow monitoring by magflo meter was installed in 2016 so that they can meet the water use reporting requirements to Ecan.

Water

Page 207 of 212

Figure 11-39: Albury WS Treatment Plant



### A6.4.3 Storage

The reservoir is a tank farm consisting of three 22,500 litre concrete tanks and three 25,000 litre tanks.

# Figure 11-40: Albury WS Storage Tanks



### A6.4.4 Pump Stations

There are no pump stations within the Albury WS.

#### A6.4.5 Reticulation

Total length of reticulation = 110,158m.

The scheme was built in 1971 with various additions since. As such the pipework is generally in good condition.

### A6.4.6 Fire fighting

The scheme has no fire fighting capability being mainly a small bore scheme. There are hydrants used only for scouring the line and drawing off small quantities of water

### A6.5 Environmental Management

The following table list the resource consent associated with the Albury Water Supply.

Page 208 of 212

Water



Consent #	Description	Expiry Date	Allowable take
CRC990685	To divert water	20 January 2034	Not applicable
CRC990686	To take water for community water supply	20 January 2034	12.6 litres/second
CRC991431	To disturb, and place and maintain structures	20 January 2034	Not applicable
CRC991418	to discharge water	20 January 2034	Not applicable

#### A6.6 Water Quality

Fluoridation	Nil
Disinfection	None
Quality issues	The water supply is a surface take. The catchment above the intake has very low stocking rates therefore is not subject to significant contamination.

#### Appendix Table 6; Albury Sampling Locations

 Scheme
 Sampling Location

 Albury WS
 Unknown

Sampling is done in accordance with the requirements of the Drinking Water Standards of New Zealand 2005 and performed by the water operator, Albury Rural Water Supply Society Inc.

#### A6.7 Demand

The scheme is a restricted supply delivering 368 units with capacity of 616 units. Flow to each property is controlled by Marac flow controllers that deliver the nominated flow with an accuracy of +/- 10%.

#### A6.8 Water Supply Standards

The Health (Drinking Water) Amendment Act (2007) was passed into legislation in October 2007. This Act replaces a mainly voluntary approach to ensuring compliance with the Drinking Water Standards for New Zealand 2005 (Revision 2008)

The Albury Supply has not had a catchment risk assessment completed.

For Albury, the supply can be assessed as either a small supply against Section 10 of the DWSNZ or against Section 5 (the same as larger schemes). Section 5 indicates a protozoal removal requirement of Log 4. This could potentially be reduced to Log 3 if the supplies are designated small supplies and assessed against Section 10. A further option may be Section 12, "Rural Agricultural Drinking Water Supplies" which is still in the course of preparation. A Water Safety Plan was completed.

#### A6.9 Depreciation

The scheme does not fund depreciation on the network but relies on volunteers and user contributions when renewals or upgrades are required.

#### A6.10 Asset Details

There are no asset details within the asset register.

December 2020

Water

Page 209 of 212

Deleted: 16

Page 210 of 212

Water





A6.11 Supply Schematic

December 2020

Water

Page 212 of 212

Water