

# **Activity Management Plan 2024 Water Supply**

**3 Waters | July 2024**



**Prepared by****Waimakariri District Council****215 High Street,****Private Bag 1005****Rangiora 7440,****New Zealand**[waimakariri.govt.nz](http://waimakariri.govt.nz)**Revision History:**

Revision N°	Description	TRIM	Date
A	Draft for presentation to Council	230516070466	30/01/2024
B	Final for presentation to Council	230516070466	25/06/2024

**Document Acceptance**

Action	Name		Signed	Date
Prepared by	Simon Collin	3 Waters Asset Management Advisor		11/12/2023
	Caroline Fahey	Water & Wastewater Asset Manager		11/12/2023
	Chris Bacon	Network Planning Team Leader		11/12/2023
Reviewed by	Kalley Simpson	3 Waters Manager		14/6/2024
Approved by	Gerard Cleary	Manager Utilities and Roading		13/6/2024
Adopted by	Council			25/06/2024

# Contents

---

<b>1 EXECUTIVE SUMMARY</b> .....	<b>9</b>
Levels of Service.....	9
Asset Condition.....	10
Risk 10	
Growth and Demand.....	10
Operation and Maintenance .....	11
Renewals .....	11
Financial Forecasts .....	11
Future Challenges .....	11
<b>2 INTRODUCTION</b> .....	<b>13</b>
Document Structure.....	13
Improvement Plan .....	14
Document Review Process .....	14
Financial Forecasts .....	14
<b>3 SCHEME DESCRIPTION (WHAT DO WE HAVE?)</b> .....	<b>16</b>
Scheme Statistics .....	16
<b>4 LEVELS OF SERVICE</b> .....	<b>23</b>
Changes to LoS for 2024 .....	23
Mandatory Performance Measures .....	23
Elective Levels of Service .....	25
Community Engagement .....	26
District Overview: 2022/2023 Performance: Mandatory Levels of Service .....	30
Scheme Differences.....	33
<b>5 ASSET CONDITION</b> .....	<b>37</b>
Base Life Calculation for Pressure Pipe Assets.....	37
Asset Condition Calculation.....	38
Headworks Asset Condition.....	38
Useful Lives on GIS.....	39
District Overview .....	39
<b>6 CRITICALITY</b> .....	<b>41</b>
District Overview – Criticality .....	43
<b>7 RISK ASSESSMENT - OVERVIEW</b> .....	<b>44</b>
<b>8 OPERATIONAL RISK ASSESSMENTS</b> .....	<b>46</b>

<b>Operational Risk .....</b>	<b>46</b>
<b>Risk Matrix.....</b>	<b>46</b>
<b>District Overview – Operational Risk .....</b>	<b>47</b>
<b>9 DISASTER RESILIENCE ASSESSMENT.....</b>	<b>49</b>
<b>10 CORPORATE RISK AND ASSUMPTIONS .....</b>	<b>50</b>
<b>11 CLIMATE CHANGE .....</b>	<b>51</b>
<b>12 DEMAND .....</b>	<b>54</b>
<b>Managing Uncertainty.....</b>	<b>55</b>
<b>District Overview – Growth Forecasts.....</b>	<b>55</b>
<b>Capacity &amp; Performance.....</b>	<b>60</b>
<b>Source 61</b>	
<b>14 OPERATION AND MAINTENANCE .....</b>	<b>69</b>
<b>Operation &amp; Maintenance Expenditure .....</b>	<b>70</b>
<b>15 CAPITAL WORKS APPROVAL.....</b>	<b>72</b>
<b>16 RENEWALS.....</b>	<b>73</b>
<b>District Wide – Renewals Expenditure .....</b>	<b>73</b>
<b>Scheme – Reticulation Renewal Timelines – Spatial view.....</b>	<b>77</b>
<b>17 NEW WORKS .....</b>	<b>78</b>
<b>Works Coordination .....</b>	<b>79</b>
<b>District Overview – Capital Works .....</b>	<b>80</b>
<b>Scheme – Capital Upgrade Works – Spatial view.....</b>	<b>81</b>
<b>18 OVERALL FINANCIAL FORECASTS.....</b>	<b>82</b>
<b>Financial Forecast Key Assumptions .....</b>	<b>82</b>
<b>Funding/Revenue Sources.....</b>	<b>82</b>
<b>Valuation .....</b>	<b>83</b>
<b>19 DATA CONFIDENCE .....</b>	<b>86</b>
<b>20 ASSET MANAGEMENT SYSTEM.....</b>	<b>88</b>
<b>Asset Management Maturity.....</b>	<b>88</b>
<b>21 NEGATIVE EFFECTS.....</b>	<b>90</b>
<b>22 SERVICE DELIVERY .....</b>	<b>91</b>
<b>23 IMPROVEMENT PLAN .....</b>	<b>92</b>
<b>24 CHANGES TO AMP AS A RESULT OF LONG TERM PLAN CONSULATION .....</b>	<b>97</b>
<b>Appendix 1: Rangiora Scheme Performance .....</b>	<b>98</b>
<b>Appendix 2: Kaiapoi Scheme Performance.....</b>	<b>102</b>
<b>Appendix 3: Woodend-Pegasus Scheme Performance .....</b>	<b>106</b>

**Appendix 4: Oxford Urban Scheme Performance (includes Oxford Rural No 2)..... 110**  
**Appendix 5: Waikuku Beach Scheme Performance ..... 114**  
**Appendix 6: Cust Scheme Performance ..... 119**  
**Appendix 7: Mandeville - Fernside Scheme Performance..... 123**  
**Appendix 8: West Eyreton-Summerhill Scheme Performance ..... 127**  
**Appendix 9: Oxford Rural No 1 Scheme Performance ..... 131**  
**Appendix 10: Ohoka Scheme Performance ..... 135**  
**Appendix 11: Poyntzs Scheme Performance ..... 139**  
**Appendix 12: Garrymere Scheme Performance..... 143**  
**Appendix 13: Glossary of Terms ..... 147**

## Tables

Table 1: District Overview – Key Projects .....	15
Table 2: District Overview – Scheme Summary Information .....	17
Table 3: District Scheme Statistics for 2022/2023 .....	18
Table 4: Links to Scheme Operational Descriptions .....	20
Table 5: District Water Supply Pipe Data Summary .....	21
Table 6: District Water Supply Valve Data Summary.....	21
Table 7: Data References .....	22
Table 8: Summary of Performance Measure Types and Reporting.....	23
Table 9: Water Supply Mandatory Performance Measures for 2024 AMP (unchanged from 2021 AMP) .....	24
Table 10: Elective Performance Measures for Water Supply for the 2024 AMP .....	27
Table 11: District Overview 2022/23 Performance: Mandatory Levels of service.....	30
Table 12: 2022/23 Scheme Performance - Elective Levels of Service (measured against the 2021 LTP LOS) .....	34
Table 13: Adopted Reticulation Asset base Lives for Pressure Pipes .....	38
Table 14: Criticality Assessment Criteria .....	42
Table 15: Criticality Score Categories .....	42
Table 16: District Overview – Mains Criticality % by Category (% shown by length).....	43
Table 17: Risk Events Considered .....	46
Table 18: District Overview – High Risks remaining (Operational).....	48
Table 19: Climate Change Actions from 2021 AMP.....	53
Table 20 Summary of the Growth Forecast for the Waimakariri Districts Water Schemes.....	57
Table 21: Scheme Capacities and Growth Forecasts .....	61
Table 22: Scheme Storage Requirements and Capacity .....	64
Table 23: Scheme Surface Pump Requirements and Capacity .....	65
Table 24: Overview of Planned and Reactive Maintenance Tasks .....	69
Table 25: Planned Budget Versus Renewals Model Recommendation 2024-34 .....	75
Table 26: New Works across Water Schemes Over 50 Years .....	79
Table 27: Asset Valuation .....	84
Table 28: Data Confidence Levels .....	86
Table 29: 2024 AMP Improvement Plan.....	93
Table 30: Audit NZ Questions and Responses .....	95
Table 31: A1 - Rangiora Elective LoS Performance - Assessed June 2023.....	98
Table 32: Kaiapoi Elective LoS Performance - Assessed June 2023.....	102
Table 33: Woodend-Pegasus Elective LoS Performance - Assessed June 2023 .....	106
Table 34: Oxford Urban Elective LoS Performance - Assessed June 2023 .....	110
Table 35: Waikuku Beach Elective LoS Performance - Assessed June 2023.....	114

Table 36: Cust Elective LoS Performance - Assessed June 2023 .....119

Table 37: Mandeville-Fernside Elective LoS Performance - Assessed June 2023.....123

Table 38: West Eyreton-Summerhill LoS Performance - Assessed June 2023 .....127

Table 39: Oxford Rural No1 Elective LoS Performance - Assessed June 2023 .....131

Table 40: Ohoka Elective LoS Performance - Assessed June 2023 .....135

Table 41: Poyntzs Elective LoS Performance - Assessed June 2023 .....139

Table 42: Garrymere Elective LoS Performance - Assessed June 2023 .....143

**Figures**

Figure 1: District - Asset Condition Summary ..... 39

Figure 2: Asset Condition Summary - Schemes ..... 40

Figure 3: Water Connection Projection ..... 59

Figure 4: District Overview - Projected Operation & Maintenance Expenditure..... 71

Figure 5: District Wide Projected Renewals Expenditure ..... 74

Figure 6: Renewals Expenditure Models ..... 76

Figure 7: District Overview - Projected Capital Works Expenditure ..... 80

Figure 8: District Overview - Total Projected Expenditure ..... 82



## 1 EXECUTIVE SUMMARY

### What Assets do we have?

Waimakariri District Council owns and operates 11 separate water supplies, which provide water to approximately 80% of the population, or about 55,900 people. There are a total of about 21,500 connections. Some of the connected supplies have been physically connected relatively recently, but they remain financially separate.

Schemes are either “on demand” (unrestricted), “restricted” (a specific amount of water per day is made available to the customer), or “semi restricted” (connections are allocated 19 m<sup>3</sup> per day which is close to an on demand supply).

The Ashley Rural Water Supply, which supplies water to about 1,680 properties within the WDC boundaries, is owned managed and operated by the Hurunui District Council. This water supply services the Ashley, Sefton and Loburn residential village areas and a number of rural residential lifestyle blocks north of the Ashley River.

### Levels of Service

In the lead up to the updating of the 2024 AMP’s, it was expected that the Council would not be preparing AMPs to support the 2024-2034 LTP, due to the 3 Waters reform. When the situation changed in May 2023, it was too late to carry out a review of LoS. As a consequence, the LoS in this AMP have remained largely unchanged when compared to the 2021 AMP version. The only difference being minor amendments arising from the introduction of the new Drinking Water Quality Assurance Rules (DWQAR). The 2021 AMP levels of service were presented to the Council’s Utilities and Roading Committee in July 2020, who recommended that the Council include them within the Draft 2021-31 Long Term Plan (refer to report 200406043184).

Historically, the primary driver of change to the LoS has been an ongoing programme of upgrades to achieve compliance with the Drinking-water Standards for New Zealand (DWSNZ). These standards have been replaced by the Water Services (Drinking Water Standards for New Zealand) Regulations 2022 and Drinking Water Quality Assurance Rules (DWQAR). The measures relating to bacterial, protozoal, chemical, radiological, and aesthetic compliance remain in the new standards, but the testing regime has become considerably more extensive. In addition, testing for compliance for some parameters in distribution networks is now required.

Until mid-2023, there was some uncertainty for the Council regarding chlorination, as it took some time for the new regulator (Taumata Arowai) to respond to Council’s first application for an exemption from chlorination. This was ultimately declined, and in October 2023 Council resolved to progressively turn on chlorination for all of its supplies, over an eight week period. Council will continue to explore options for chlorination exemptions, however.

Budget provision has already been made to install UV treatment on all water supplies. It is expected that all of these treatment plant upgrades will be completed by year 1 of the 2024-34 LTP.

## **Asset Condition**

Asset condition for the pipework assets has been determined based on detailed analysis of pipe burst data to inform expected lives of all assets, which in turn informs pipe condition rating. In 2020, work was completed by the Council's Network Planning Team to assess burst data collected on Council water mains to determine expected useful life by asset category. This useful life was then converted to a condition rating, based on criteria provided in the IPWEA International Infrastructure Management Manual (IIMM) to assign a condition score to all pipeline assets. This gives a more informed remaining useful life, and proxy condition score, as it is now derived from actual pipe performance data across the district. To verify the assigned asset life and condition score, individual pipe condition assessments are done on specific samples of AC pipe, as the opportunity arises when repairing breaks.

## **Risk**

Historically a range of different types of risk assessments have been carried out for the District's water supply schemes. The operational risk assessment has previously generated a programme of work focussed primarily on improving security of supply and meeting the Drinking Water Standards. This work is now largely complete.

The vulnerability assessment and criticality assessments provide input data to the renewals programme. The effect of the vulnerability assessment, which only applies to underground pipes, is to accelerate the renewal of old brittle pipework, in areas of high risk of liquefaction.

The Disaster Resilience Assessment considers the risk to above ground assets from a broad range of potential natural disasters.

While much of the work from past assessments will remain relevant, they have become out of date. A new approach has been developed, which brings the three different methodologies noted above into a single risk assessment process. This is expected to make regular updating of the assessments more efficient. The new methodology will be used in 2024 to carry out a complete risk assessment of water services.

For water supplies the Drinking Water Safety Plans also contain a rigorous risk assessment with an emphasis on health and safety. The new methodology will not override those assessments.

## **Growth and Demand**

Growth projections have been updated with base population projections being calculated via a model, that provides town by town projections. Subsequent modelling has been carried out to identify new works or upgrades that will be required in the future to service this growth while continuing to meet the agreed levels of service. The necessary works have been incorporated into the capital project budgets.

Planning for growth is inherently uncertain. To respond to growth and enable short term capital planning adjustments to be made in response to changing market requirements, the Development Team works with Network Planning and the relevant Asset team when a major new development proposal is received to confirm infrastructure requirements and identify if any capital works programmes require adjustment in response. This avoids unnecessary expenditure on growth works before they are actually needed, and potentially ensure growth related projects are accelerated as necessary if growth occurs faster than anticipated.

Water source supply for the coastal towns of Kaiapoi, Woodend and Pegasus is from ample artesian aquifers for Kaiapoi, and deep sources for Woodend and Pegasus. Kaiapoi source wells are also used to supply Rangiora, via a pressure main from Kaiapoi. Finding additional water to

cater for growth for these communities is therefore not seen as a significant issue, although there will be ongoing projects to extend existing well fields.

The regulatory authority to protect both the availability of water and its quality lies with Environment Canterbury (ECan). Council works closely with Ecan in protecting the quality of the aquifers that supply water to the majority of the district's inhabitants.

### **Operation and Maintenance**

In 2021 Council was in a transitional phase, moving from predominantly reactive works, to a system in which individual asset performance can be better understood and future costs more accurately forecast.

This view was based on the new ability to capture data in the field, and a works management system implemented with the Asset Management Information System (AMIS). That system has provided useful short-term data, but it was embedded in the Council's enterprise software system. Unexpectedly that system is in the process of being replaced, and it is not currently known what functionality will be retained when the new enterprise software becomes operative.

### **Renewals**

Prior to the previous (2018-28) Long Term Plan, improvements were made to the Council's risk based renewals model, so that different levels of acceptable risk can be applied to the various categories of criticality. This included the proposal that highly critical assets are renewed before 85% of their expected life, while the lowest criticality assets may not be replaced until 120% of their assigned base life. Based on these risk profiles the model provides a prioritised list of pipe renewals needed across the district, identified by scheme. The model also provides an annual expenditure profile for the next 150 years, and identifies the annual revenue required that will enable this renewals expenditure to be made without the renewals fund falling into debt.

The system described above relies upon an accurate understanding of expected useful life of each asset. As the understanding of useful life has improved through the burst history analysis (described under Asset Condition), the renewals model is now able to better forecast which assets are required to be renewed within a certain time period. This helps ensure the optimum balance is achieved between assets being left in service longer than they should be, leading to unacceptable failure rates, versus assets being replaced prematurely meaning the full value of assets is not realised.

### **Financial Forecasts**

Financial forecasts included in the AMP show projected capital expenditure for growth, level of service, and renewals, together with operational and maintenance expenditure. Funds carried forward from previous years because capital projects have been delayed (carry overs) are not included, and none of the forecasts shown include inflation.

Periods shown vary, from 30 years for operations and maintenance, through to the full life cycle of long lived assets such as pipelines – 150 years. Scheme forecasts are aggregated up to provide a district wide view and shown graphically. See Section 18.

### **Future Challenges**

The following are the key upcoming challenges relating to water supply that require managing:

- **Changes to Regulation:** In 2021 the new drinking-water regulator (Taumata Arowai) commenced their responsibility taking over from the previous Drinking-water Assessors which came under the Ministry of Health. Taumata Arowai augmented the DWSNZ in 2022 with its Drinking Water Quality Assurance Rules. Council has not yet fully implemented the required testing regimes for all of its supplies and is a little behind in its annual update of Drinking Water Safety Plans. While Council has now made the decision to chlorinate all of its water supplies, it wants to explore options for gaining exemptions in the future. It is expected that the transition to the new environment will continue to provide some challenges.
- **Three Waters reform:** The Governments Three Waters Reform, which was initiated following the Havelock North Drinking-water contamination event and subsequent inquiry, has had a difficult path. With a change of government, what will replace that initiative is not clear, and realistically may not be known for some time. This uncertainty brings challenges, such as the need to prepare 2024 AMPs at relatively short notice, which it had previously been assumed would be the responsibility of the new South Island 3 waters entity.
- **Climate Change:** The potential impacts of climate change and sea level rise to water supplies requires further work. A broad-brush risk assessment of infrastructural assets, arising from climate change, has been completed, but this is essentially a first screening. Case by case studies of facilities and other assets identified as “at risk” in the initial screening work are planned for the coming three years.

Council will continue to work closely with Environment Canterbury regarding the allocation of groundwater to ensure there is adequate resource available going forward.

Community expectations may change, and there could be pressure to extend serviced areas, should shallow groundwater sources start to be problematic.

- **Sustainability:** Climate change may affect source supply, and nitrate concentrations may increase in groundwater sources affecting both public and private supplies. Source supply issues could put increasing pressure for Council to reduce its water use and regulation may ultimately require an improvement in network leakage, and/or water charging. For some supplies Council barely meets its leakage LOS, and for a realistic attempt at gaining chlorine exemptions, scheme leakages would need to be considerably reduced. Staff have investigated options for metering and volumetric charging, with a view to presenting the information to elected members for consideration. Growth must also be planned for in this context.

## 2 INTRODUCTION

The purpose of the Water Supply Activity Management Plan (AMP) is to provide a summary of the Council's water supply assets, outline the issues associated with these assets and show how the Council proposes to manage them in the future, so as to continue to supply agreed levels of service, or to demonstrate how levels of service that are not currently met will be achieved going forward.

The Activity Management Plan Utilities and Roading (U&R) Introductory Chapter provides the context for the suite of U&R activity management plans and gives an overview of the department's activities, and asset management practices and processes, and should be read in conjunction with this document.

The Council operates 11 public water supply schemes servicing a total of approximately 21,500 connections. This equates to around 55,900 people, which is about 80% of the population of the Waimakariri District. The remaining 20% of the population are supplied by either the Hurunui District Council as part of the Ashley Rural Water Supply (approximately 4,500 people) or private schemes and wells in the district. Note that some schemes which were historically separate schemes have recently been joined physically but are still rated separately. This means there are 11 physical schemes but 14 financial schemes.

Schemes are either "on demand" (unrestricted), "restricted" (a specific amount of water per day is made available to the customer), or a small number of properties within certain schemes are "semi restricted" (connections are allocated a flow equivalent to 19 m<sup>3</sup> per day which is similar to an on-demand supply)

The Ashley Rural Water Supply is owned, managed and operated by the Hurunui District Council. This water supply services the Ashley, Sefton and Loburn residential village areas and a number of rural residential lifestyle blocks north of the Ashley River. As this supply is managed by the Hurunui District Council, it is not covered by this document.

### Document Structure

The main body of this document contains tables of infrastructure data at both a district wide level, and scheme level. Further detail of the individual schemes is provided in the [AMP Plans and Figures Viewer](#). This includes:

- Network schematics,
- Pipe condition plans,
- Asset criticality plans
- Pipe renewal timeframes plan
- Capital upgrade works plan
- Detailed capital works table
- Scheme Serviced area
- Fire Districts

There is an appendix for each scheme which contains the Scheme Level of Service Performance table.

## **Improvement Plan**

The assessments carried out as part of the asset management review process are intended to identify issues that need to be addressed. Resolution may include new capital works, or adjusted management or process practices. All these improvements are collated in Table 29.

## **Document Review Process**

Review of the AMP has been carried out by a project team comprising the 3 Waters Manager, the 3 Waters Asset Management Advisor, the Water and Wastewater Asset Manager, and the Network Planning Team Leader, with additional technical input from the Network Planning Team. Project Management has been led by the 3 Waters Asset Management Advisor.

The project team met fortnightly, and progress was tracked against a detailed programme that set out the review actions necessary for each section of the document.

Internal advice was sought from the Council's Development Planning Team for growth projections, and liaison with the Asset Information Management team occurred during the update of the valuations. Asset Managers worked closely with the Finance department during development of the budgets.

Information regarding progress and requirements for both the Infrastructure Strategy and the LTP development was provided via the LTP Project Manager.

Draft versions of the documents were presented to the Utilities and Roding Committee at the end of 2023, with an updated version presented to Council in late January 2024 for adoption. Any changes in the AMPs resulting from modifications to the LTP, have been incorporated in the final version by way of an additional section. The final document is published on the Council's webpages after adoption of the 2024-2034 LTP.

## **Financial Forecasts**

The financial forecasts shown in this AMP exclude inflation and any carry-forwards between the 2023/24 and 2024/25 financial years.

### **District Overview – Key Projects**

Over the last 10 years, the key focus for water supply schemes has been upgrading schemes to comply with the Drinking-water Standards for New Zealand (DWSNZ). These projects have now nearly been completed. Chlorination equipment is operative for all previously non chlorinated supplies. There is a programme of works to install and commission UV at all treatment works with completion expected in 2024. However while the new infrastructure will soon be operative, the full effects of the new regulatory environment are not yet bedded in. Council also remains committed to exploring options for achieving exemptions to chlorination in the future.

Specific projects are expected to be in the following key areas:

- Implementing the full required water sampling/testing and reporting regime, and getting the new infrastructure operating efficiently
- Projects to improve the resilience and allow for growth, where there is not adequate redundancy in terms of source capacity or storage, or where growth is anticipated.
- Renewals projects to continue to renew assets as they deteriorate.
- Exploring options for achieving exemptions from chlorination, which will include reducing system leakage.

There are annual budgets for renewal projects which are relatively consistent from year to year. Known key projects that are not renewals are shown in Table 1 below

**Table 1: District Overview – Key Projects**

Scheme/s	Project	Reason	Timeframe
Ohoka West Eyreton	UV Treatment Installation	Provide treatment to supplies which are chlorinated only (no protozoal treatment), as required by Taumata Arowai	Complete in 2024/25
Oxford Urban – Rural No.2	New Reservoirs	To renew aging infrastructure, and accommodate future growth	2031/32
Oxford Urban – Rural No.2	New Well	To provide sufficient levels of redundancy, and allow for growth	2023/24 – 2024/25
Mandeville – Fernside	New Well	To provide sufficient levels of redundancy, and allow for growth	2023/24 – 2024/25
Garrymere	New Well	To provide sufficient levels of redundancy, and allow for growth	2023/24 – 2024/25
Oxford Rural No.1	New Well	To provide sufficient levels of redundancy	2023/24 – 2024/25
Kaiapoi	New Well	To provide sufficient levels of redundancy, and allow for growth	2023/24 – 2024/25
Rangiora	New Reservoir	To allow for growth	2035/36
Rangiora	New Well	To provide sufficient levels of redundancy, and allow for growth	2023/24 – 2024/25

All projects driven by growth are subject to growth occurring at the expected frequencies determined by population forecasts. The timing of these projects may be adjusted through future Annual Plans or Long Term Plans as actual growth rates are compared to current forecasts.

### 3 SCHEME DESCRIPTION (WHAT DO WE HAVE?)

Table 2 outlines, for each Council managed water supply scheme, total connection numbers as of June 2023, scheme type (on-demand, restricted or semi-restricted), treatment, and scheme value.

In the cases where two schemes have been joined, but they are still treated as separate schemes financially, these have been split into a main scheme and a sub-scheme.

A table of scheme statistics follows (Table 3), providing scheme by scheme information regarding scheme sources, flow rates and nominal storage.

Table 4 provides links to the Component 2 section of the Water Safety Plans, which provide a comprehensive description of the scheme's operation.

Asset tables follow which provide pipe and valve statistics by scheme. Table 7 shows data references of technical reports and file numbers used to compile the AMP, with links should further details be sought.

An overall map of the District's Council water schemes is shown in the [AMP Plans and Figures Viewer](#). Scheme specific plans are also available in the viewer:

- Network Schematics
- Serviced area
- Fire serviced area

#### **Scheme Statistics**

Up to date scheme statistics are also available in document TRIM [121108078783](#) which is updated quarterly. (Note - the file needs to be opened in "edit" mode not "view".)



**Table 2: District Overview – Scheme Summary Information**

Main Scheme	Rangiora	Kaiapoi	Woodend Pegasus	Oxford Urban – Rural No.2		Waikuku Beach	Cust	Mandeville - Fernside	Oxford Rural No. 1	West Eyreton – Summerhill- Poyntzs Road			Ohoka	Garrymere
Sub scheme	NA	NA	NA	Oxford Urban	Rural No 2	NA	NA	NA	NA	West Eyreton	Summerhill	Poyntzs Rd	NA	NA
Level of Service	On-Demand	On-Demand	On-Demand	On-Demand	Restricted	On-Demand	On-Demand	Restricted	Restricted	Restricted	Restricted	Restricted with some Semi-Restricted	Restricted with some Semi-Restricted	Restricted with some Semi-Restricted
No of connections (2023/24 rates strike)	7975	5782	3847	909	362	481	141	986	427	80	214	98	124	42
No of rating charges (2023/24 rates strike)	8780	6060	3965	1023	1094	569	153	2084	1667	270	584	385	1778	532
Total replacement value (2022 valuation)	\$108.8M	\$63.1M	\$66.9M	\$15.4M	\$9.0M	\$6.3M	\$4.1M	\$13.1M	\$15.6M	\$2.4M	\$5.6M	\$2.0M	\$2.5M	\$0.9M
Depreciated replacement value (2022 valuation)	\$80.0M	\$46.1M	\$55.8M	\$9.0M	\$6.0M	\$4.2M	\$3.0M	\$10.3M	\$10.7M	\$1.9M	\$4.5M	\$1.7M	\$1.9M	\$0.7M
Treatment	Chlorine disinfection with UV disinfection to be implemented in 2023/24	Chlorine disinfection with UV disinfection to be implemented in 2023/24	Chlorine disinfection with UV disinfection to be implemented in 2023/24	Chlorine disinfection with UV disinfection to be implemented in 2023/24	Chlorine disinfection with UV disinfection to be implemented in 2023/24	Chlorine disinfection and UV disinfection	Chlorine disinfection with UV disinfection to be implemented in 2023/24	Filtration, UV disinfection, chlorine disinfection and pH correction	Chlorine disinfection with UV disinfection to be implemented in 2023/24	Chlorine disinfection with UV disinfection to be implemented in 2024/25			Chlorine disinfection with UV disinfection to be implemented in 2024/25	UV disinfection, chlorine disinfection and pH correction.

**Table 3: District Scheme Statistics for 2022/2023**

Scheme Parameter	Rangiora	Kaiapoi	Woodend Pegasus	Oxford Urban – Rural No.2		Waikuku Beach	Cust	Mandeville - Fernside	Oxford Rural No. 1	West Eyreton – Summerhill-Poyntz Road			Ohoka	Garrymere
Principle Source	Smith Street wells (4 primary wells)	Six deep artesian wells which feed the Peraki Street and Darnley Square headworks.	Gladstone Park 1, Gladstone Park 2, EQ1, EQ2, EQ3, PW1	Domain Rd Well 1 and Domain Road Well 2 (secure groundwater)		Kings Ave Well 1 and 2 (artesian groundwater) Camping Ground well (artesian groundwater)	Springbank Well No. 2	Two Chain Road No. 2	McPhedrons Road Well (secure) Rockford Road Deep Well (secure)	2 x deep groundwater wells at West Eyreton headworks			Ohoka Well No. 2	Single well
Back up Source	Smith Street No 5 Well (high manganese) Ayers Street wells (2 wells) Dudley Park wells (2 wells) Western Wells (3 wells)	Either of two headworks Darnley & Peraki in Kaiapoi provide redundancy to each other. Rinaldi Ave well can provide backup to the Pines – Kairaki part of the system.	Chinnerys Rd well No. 2	Gammans Creek Well 1 and Gammans Creek Well 2)		Either of two headworks Kings Ave and Camping Ground provide redundancy to each other	Springbank Well No. 1	Two Chain Road Well No.1 and Tram Road Well (Fernside well)	Rockford Road No. 1 and No.2 infiltration gallery wells (surface water)	Shallow well at West Eyreton headworks Shallow well at Poyntz Road			Ohoka Well No.1	None
Average Daily flow (5 year average)	6,967 m <sup>3</sup> /day	4,481 m <sup>3</sup> /day	2,969 m <sup>3</sup> /day	1,069 m <sup>3</sup> /day	1,796 m <sup>3</sup> /day	552 m <sup>3</sup> /day	175 m <sup>3</sup> /day	1,402 m <sup>3</sup> /day	1,297 m <sup>3</sup> /day	89 m <sup>3</sup> /day	333 m <sup>3</sup> /day	135 m <sup>3</sup> /day	139 m <sup>3</sup> /day	136 m <sup>3</sup> /day
Peak daily flow (5 day average)	14,464 m <sup>3</sup> /day	10,481 m <sup>3</sup> /day	6,825 m <sup>3</sup> /day	2,695 m <sup>3</sup> /day	3,617 m <sup>3</sup> /day	1,490 m <sup>3</sup> /day	467 m <sup>3</sup> /day	1,820 m <sup>3</sup> /day	1,700 m <sup>3</sup> /day	144 m <sup>3</sup> /day	557 m <sup>3</sup> /day	218 m <sup>3</sup> /day	448 m <sup>3</sup> /day	256 m <sup>3</sup> /day
Resource Consent abstraction limit (principle source)	30,100 m <sup>3</sup> /day (Smith Street wells) (expires 2/10/2044)	Multiple consents with combined max abstraction rate of 472 L/s, and combined max daily take of 30,788m <sup>3</sup> / day.	6,912 m <sup>3</sup> /day, Chinnerys Rd (expires 28/02/2043 ) 12,288 m <sup>3</sup> /day, Pegasus (expires	4,760 m <sup>3</sup> /day (expires 13/06/2041)		3,456 m <sup>3</sup> /day (expires 16/04/2032 )	1,900 m <sup>3</sup> /day (expires 27/08/2034)	3,024 m <sup>3</sup> /day (expires 22 Dec 2039) combined for both Two Chain Road wells	1,987 m <sup>3</sup> /day (expires 4/08/2034) 864 m <sup>3</sup> /day, Rockford Deep Well (expires 14/12/2050) 2,592 m <sup>3</sup> /day, McPhedrons Rd Well	15,120 m <sup>3</sup> per 7 day period (2,160 /day) (expires 10 Dec 2044)			1,555 m <sup>3</sup> /day	389 m <sup>3</sup> /day (expires 2/04/2032)

Scheme Parameter	Rangiora	Kaiapoi	Woodend Pegasus	Oxford Urban – Rural No.2		Waikuku Beach	Cust	Mandeville - Fernside	Oxford Rural No. 1	West Eyreton – Summerhill-Poyntzs Road			Ohoka	Garrymere
		Expiry dates from 2031 to 2037	21/11/2043 )						(expires 06/07/2053)					
Average Daily Flow per Connection (5 year average)	898 L/con/day	800 L/con/day	859 L/con/day	1,178 L/con/day	1,429 L/con/day	1,258 L/con/day	1,220 L/con/day	1,453 L/con/day	3,510 L/con/day	1,215 L/con/day	1,699 L/con/day	1,435 L/con/day	1,165 L/con/day	3,254 L/con/day
Peak daily Flow per Connection (5 year average)	1,931 L/con/day	1,936 L/con/day	2,009 L/con/day	3,171 L/con/day	3,024 L/con/day	3,386 L/con/day	3,362 L/con/day	1,897 L/con/day	4,756 L/con/day	1,978 L/con/day	2,891 L/con/day	2,281 L/con/day	3,810 L/con/day	6,093 L/con/day
Nominal Storage	8,800 m <sup>3</sup>	800 m <sup>3</sup>	4,960 m <sup>3</sup>	850 m <sup>3</sup>		-	180 m <sup>3</sup>	335 m <sup>3</sup>	342 m <sup>3</sup>	289 m <sup>3</sup>			120 m <sup>3</sup>	120 m <sup>3</sup>

**Table 4: Links to Scheme Operational Descriptions**

Scheme	Rangiora	Kaiapoi	Woodend Pegasus	Oxford Urban – Rural No.2	Waikuku Beach	Cust	Mandeville - Fernside	Oxford Rural No. 1	West Eyreton – Summerhill-Poyntzs Road
Link to Component 2 of the Scheme Water Safety Plan	TRIM <a href="#">230712105096</a>	TRIM <a href="#">230712105098</a>	TRIM <a href="#">230712105102</a>	TRIM <a href="#">230712105105</a>	TRIM <a href="#">230712105106</a>	TRIM <a href="#">230712105111</a>	TRIM <a href="#">230712105113</a>	TRIM <a href="#">230712105115</a>	TRIM <a href="#">230712105116</a>

Scheme	Ohoka	Garrymere
Link to Component 2 of the Scheme Water Safety Plan	TRIM <a href="#">230712105119</a>	TRIM <a href="#">230712105121</a>

**Table 5: District Water Supply Pipe Data Summary**

Water pipe length (m) by pipe material											
Pipe Material	Rangiora	Kaiapoi	Woodend-Pegasus	Oxford Urban – Rural No 2	Waikuku Beach	Cust	Mandeville Fernside	Oxford Rural No 1	West Eyreton Summerhill Poyntzs Rd	Ohoka	Garrymere
Asbestos Cement	29,359	23,858	5,050	11,241	1,677	-	-	7,423	-	-	-
PE	64,418	85,920	76,870	49,752	3,807	1,105	41,059	76,889	47,712	2,238	779
PVC	134,964	53,880	73,998	58,571	9,413	9,851	41,833	53,184	30,992	4,112	4,014
Other	930	654	1,019	73	84	106	70	186	35	73	3
<b>Total</b>	<b>229,672</b>	<b>164,311</b>	<b>156,937</b>	<b>119,638</b>	<b>14,981</b>	<b>11,062</b>	<b>82,963</b>	<b>137,682</b>	<b>78,740</b>	<b>6,424</b>	<b>4,796</b>

**Table 6: District Water Supply Valve Data Summary**

Water pipe length (m) by pipe material											
Item	Rangiora	Kaiapoi	Woodend-Pegasus	Oxford Urban – Rural No 2	Waikuku Beach	Cust	Mandeville Fernside	Oxford Rural No 1	West Eyreton Summerhill Poyntzs Rd	Ohoka	Garrymere
Total Valves	2,162	1,520	1,704	408	129	90	249	254	218	72	15
Fire Hydrants	957	598	483	137	60	12	32	15	24	26	1

**Table 7: Data References**

<b>Data References - Common</b>	<b>Trim Reference</b>
Water Supply Flow Data Analysis	<a href="#">121108078783</a>
2021-22 3 Waters Asset Valuation	<a href="#">220803132120</a>
2022 Customer Satisfaction Survey	<a href="#">230504063243</a>
2020 Water Conservation Strategy	<a href="#">200501050668</a>
2023 50 Year Water and Sewer Growth Forecast	<a href="#">230413051831</a>
2020 Fire Fighting Code of Practice Compliance Update	<a href="#">200904117110</a>
Water Supply 50 Year Scheme Upgrades	<a href="#">230413051831</a>
<b>Data References – By Scheme</b>	<b>Trim Reference</b>
2023 Rangiora Water Safety Plan	<a href="#">230901135436</a>
2023 Kaiapoi Water Safety Plan	<a href="#">230630097997</a>
2023 Woodend-Pegasus Water Safety Plan	<a href="#">230621092399</a>
2022 Waikuku Beach Water Safety Plan	<a href="#">220905153030</a>
2022 Mandeville-Fernside Water Safety Plan	<a href="#">221103192305</a>
2022 Ohoka Water Safety Plan	<a href="#">220705113627</a>
2022 Oxford Urban/Oxford Rural No 2 Water Safety Plan	<a href="#">220915160099</a>
2023 Oxford Rural No 1 Water Safety Plan	<a href="#">230920147042</a>
2022 Summerhill/West Eyreton Water Safety Plan	<a href="#">221108194377</a>
2022 Garrymere Water Safety Plan	<a href="#">220707115417</a>
2023 Cust Water Safety Plan	<a href="#">230609085367</a>
Kaiapoi - New Beach Road pipeline and water source	<a href="#">140228019601</a>
Operation and Maintenance Manuals	190402048261 (Sladdens PS) 190402048258 (Gammans PS) 190402048253 (Bay Rd PS) 171214136062 (Domain Bore 2) 160928100322 (Domain Rd)

## 4 LEVELS OF SERVICE

Levels of Service (LoS) are a measure of the standard of service being provided. The target levels of service are a significant factor in determining the size, capacity and cost of operating each scheme.

There is a hierarchy to the water supply LoS. Some are measured at district wide level, some at scheme level, and some differ depending on the type of water supply. The way that LoS measures are assigned, measured, and reported is summarised below, and explained in more detail in the following paragraphs.

**Table 8: Summary of Performance Measure Types and Reporting**

	<b>Mandatory Performance Measures</b>	<b>Elective Performance Measures</b>
Set By:	These measures are set by the Department of Internal Affairs (DIA), but the targets set by individual local authorities.	These measures are set by individual local authorities.
Reporting:	Long Term Plan and Annual Report. Quarterly reports to Council	Activity Management Plans Annual report to Council (future improvement). Some measures are also included within the Long Term Plan and Annual Report.

### Changes to LoS for 2024

In early 2023, when the LOS and targets would normally have been reviewed again, the 3 Waters reform based on four new entities to manage 3 Waters infrastructure nationally, was going ahead. A National Transition Unit was operating under the Department of Internal Affairs, and the expectation was that the 2024 AMPs would be prepared by that Unit. By the time that the government changed the planned new structures, and delayed the entire programme it was too late to be able to review LoS, and have them approved by the U&R Committee/Council. Therefore the LoS and targets in the 2024 AMPs, both Mandatory and Elective, are generally unchanged from the 2021 AMPs.

The 2021 set of measures were approved by the Council's Utilities and Roading Committee for inclusion in the 2021 Draft Long Term Plan (report [200406043184\[v1\]](#)), before being approved by Council.

Some minor changes have been necessary to align the LOS with the new Water Services (Drinking Water Standards for New Zealand) Regulations 2022 and Drinking Water Quality Assurance Rules (DWQAR), which have replaced the previous drinking water standards (DWSNZ) current at the time of the last LTP. These have been noted in the sections that follow.

### Mandatory Performance Measures

In 2010, the Local Government Act 2002 was amended (Section 261B) to include new rules specifying non-financial performance measures for local authorities. The measures are intended to help members of the public compare the level of service provided by different councils at District or City level. The Council is required to incorporate the performance measures into their long-term plans and report against them in their annual reports. The element that is measured cannot be changed (as this is mandatory) but the targets can be changed. Measures are reported at both

district wide level, and at scheme level. This is provided to Council on a quarterly basis, and the annual results are included in Council’s Annual Report. It is anticipated that the DiA will make some minor modification to the mandatory measures at some stage, so that they align with the new drinking water regulatory regime brought in by Taumata Arowai. Reporting will be modified as required at that time.

Table 9 sets out the full set of mandatory performance measures and targets for the 2024 AMP, but which will be subject to minor change, as noted above.

**Table 9: Water Supply Mandatory Performance Measures for 2024 AMP (unchanged from 2021 AMP)**

Level of Service	Performance Measure	2024 Target	Community Outcome that this LoS Contributes to
<p><b>Safety of Drinking Water</b> All public water supplies comply with the Water Services (Drinking Water Standards for New Zealand) Regulations 2022</p>	<p>The extent to which drinking water complies with the Water Services (Drinking Water Standards for New Zealand) Regulations 2022* for</p> <p>a) Bacterial compliance b) Protozoal compliance</p> <p>*The Non-Financial Performance Measures Rules 2013 required local authorities to report their compliance with the bacterial and protozoal contamination criteria of the New Zealand Drinking Water Standards 2005. These standards have been superseded by the Water Services (Drinking Water Standards for New Zealand) Regulations 2022 (per practice notes issued by Taituara (Local Government Professionals Aotearoa) in April 2024) and therefore the Council is reporting against these measures relying upon the relevant incorporation by reference provisions in New Zealand law.”</p>	<p>a) 100% compliant b) 100% compliant (Measured across all supplies combined)</p>	<p><i>The natural and built environment in which people live is clean, healthy and safe.</i></p>
<p><b>Maintenance of the Reticulation Network</b> All public supplies are actively maintained to minimise the loss of water leakage</p>	<p>The percentage of real water loss from the networked reticulation system</p>	<p>Less than 22%</p>	<p><i>Infrastructure and services are sustainable, resilient, and affordable.</i></p>
<p><b>Fault Response Times</b> All public water supplies are actively maintained to minimise the outage of water</p>	<p>The median response times to attend a call-out in response to a fault or unplanned interruption to the network reticulation system:</p>		<p><i>Infrastructure and services are sustainable, resilient, and affordable.</i></p>
	<p>a) Attendance for urgent call-outs: from the time that the local authority receives notification to the time that the service personnel reach the site, and</p>	<p>less than 60 minutes</p>	<p><i>Infrastructure and services are sustainable, resilient, and affordable.</i></p>



Level of Service	Performance Measure	2024 Target	Community Outcome that this LoS Contributes to
	b) Resolution of urgent call outs : from the time that the local authority receives notification to the time that the service personnel confirm resolution of the fault or interruption, and	less than 480 minutes	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
	c) Attendance for non-urgent call-outs: from the time that the local authority receives notification to the time that the service personnel reach the site, and	Less than 2160 minutes (36 hours)	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
	d) Resolution of non-urgent call outs : from the time that the local authority receives notification to the time that the service personnel confirm resolution of the fault or interruption.	Less than 2880 minutes (48 hours)	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
<b>Customer satisfaction</b> All public water supplies are managed to an appropriate quality of service	The total number of complaints received by the local authority 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, and (f) Council's response to any of these issues  Expressed per 1000 connections to the networked reticulation system	Aggregate of a) to f) to be < 5 per 1000 connections	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
All public water supplies are managed to ensure demand does not outstrip capacity	The average consumption of drinking water per day per resident within the district.	Less than 450 L/person/day	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
Level of Service	Performance Measure (Non Mandatory but reported with the Mandatory measures at District level)	2024 Target	Community Outcome that this LoS Contributes to
Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil / year	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>

## Elective Levels of Service

The mandatory measures do not replace the scheme specific elective LoS reported in the AMPs and used by the Council to monitor and manage the performance of individual water supply schemes.

Elective LoS are motivated by either legislative requirements (for example, compliance with resource consent conditions) or by established best practice (for example, provide a minimum water pressure of 250kPa at the boundary for urban supplies). These are categorised as technical levels of service, and they are to be reported to Council on an annual basis. They have been developed over time, and are guided by a number of factors, including:

- Customer Expectations
- Affordability
- Council Community Outcomes (strategic goals and objectives)
- Legislative Requirements

Primary customers are households or businesses that are connected to Council water supply schemes, with key stakeholders being Community Boards and Councillors, and the Regional Council.

### **Community Engagement**

The level of service component of the Activity Management Plans were consulted upon comprehensively as part of the 2005 review. While a comprehensive public review has not been carried out since then, levels of service are tested with the public in a number of ways:

- For general feedback the principal method of communicating proposed LoS to customers is via the LTP process. As noted, mandatory performance measures form part of the LTP documentation that goes out for public consultation, during preparation for the LTP.
- The Council's water supply AMPs, which are updated concurrently with preparation for the LTP, are made available on Council's website, which allows a channel for feedback from customers who may be interested.
- More specific consultation is carried out when significant changes in the LoS are proposed. For example upgrades have recently been undertaken for a number of water supplies, driven primarily by the need to meet the Drinking Water Standards for New Zealand. Where there have been options available to meet this requirement, with different costs and risks associated with each option, a specific detailed engagement programme has been carried out to seek the views of those affected.
- The general satisfaction of customers with the level of service being received is gauged through tracking of complaints through the service request system, as well as through the Council's customer satisfaction survey. Changes to this survey have been made so that information is now available on a per scheme basis. Trends in complaints are available through the Council's Business Intelligence reporting system, allowing easy analysis for trends both at a district level and a scheme level. Where upgrades to schemes have been completed, the positive impacts can be seen to flow through to complaint levels, which provides a useful measure of success of projects.
- Both LoS were reviewed, in house, in 2020 and the proposed changes put to the U&R Committee for approval before going to Council for final approval. Refer to Council report 200406043184 for the changes made and the motivation for those changes.

Table 10 shows the 2024 AMP adopted set of performance measures, unchanged since the 2021 AMP except as required to align with DWQAR.

The performance results as assessed for the 2022/23 year for each scheme, are included in the relevant scheme appendix to this document. Each table includes proposed actions to address situations where the performance measure targets have not been met.

**Table 10: Elective Performance Measures for Water Supply for the 2024 AMP**

Level of Service	Performance Measure (2024 AMP)	Target	Community Outcome that this LoS Contributes to
Consent Breach – Action Required	Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	<i>The natural and built environment in which people live is clean, healthy and safe.</i>
Customers % Satisfied	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory"	> 90%	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
DWSNZ - Aesthetic Compliance	Water is supplied that is within the guideline range in the <b>DWSNZ</b> for aesthetic parameters, with the exception of pH.	95% of samples comply	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil / year	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of <b>DWQAR, measured on a daily basis</b> (Note: measure modified to align with Taumata Arowai drinking water requirements)	Complies for 365 days	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
DWSNZ - Radiological Compliance	Water supply delivers water that achieves a standard suitable for compliance with the radiological requirements of <b>DWQAR</b>	Complies	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
DWSNZ - Chemical Compliance	Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of <b>DWQAR</b>	Complies	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
DWSNZ - Bacterial Compliance	Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of <b>DWQAR, measured on a daily basis, and for each component of the scheme.</b> (Note: measure modified to align with Taumata Arowai drinking water requirements)	Complies for 365 days	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
Fire CoP – System Flow - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for flow from system	95%	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
Fire CoP - Hydrant Placement - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for placement of hydrants	100%	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>

Level of Service	Performance Measure (2024 AMP)	Target	Community Outcome that this LoS Contributes to
Flow - Allocated Units	Percentage of properties where flow received is consistent with allocated units at the point of supply in Restricted or Semi Restricted schemes, (excluding outages) as demonstrated by restrictor checks completed at not more than 5 yearly intervals	100% of restrictors tested at no more than 5 yearly intervals	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
Losses	Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR; b) For schemes with an ILI of "C" or "D", an economic assessment shall be carried out to determine the value in further leak detection work	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
Scheme Capacity - On Demand	Actual peak capacity of the scheme for domestic use - On Demand	>2500 litres/connection/day	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
Scheme Capacity - Restricted	Actual peak capacity of the scheme for domestic use - Restricted	>1150 litres/allocated unit/ day	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
Pressure - Boundary - Restricted	Water pressure at the point of supply of Restricted connections, excluding outages, as demonstrated by a reticulation model or reactive audits.	>150kPa for all connections at peak demand	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
Pressure - Point of Supply - On Demand	Water pressure at the point of supply in On Demand and Semi-Restricted schemes, excluding outages, as demonstrated by a reticulation model or audits.	>250kPa for all connections at peak demand >300kPa for 99% of connections at peak demand	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
Storage - On Demand	Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme by scheme basis, depending on resiliency and redundancy of source infrastructure	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed reasonable water use	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>
Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	<i>Infrastructure and services are sustainable, resilient, and affordable.</i>



## District Overview: 2022/2023 Performance: Mandatory Levels of Service

Table 11 shows the recent levels of service achievement for those measures that are assessed at the district level. Measures shown are all the mandatory ones, plus two non-mandatory. Two tables are necessary to accommodate the change in the drinking water regulatory regime that occurred during the year. Appendices to this document can be referred to for the performance results for the individual schemes. Community outcomes shown are from the 2021-31 LTP.

**Table 11: District Overview 2022/23 Performance: Mandatory Levels of service**

Performance Measure	Target	Target met 2022/23	Commentary	Action to Address
<p>The extent to which drinking water complies with the drinking water standards/quality assurance rules for:</p> <p>a) Bacterial compliance b) Protozoal compliance</p>	<p>a) Fully compliant b) Fully compliant</p>	<p>a) No b) No</p>	<p>New Drinking Water Assurance rules operative from Nov 2022, which have higher thresholds than the previous Drinking Water Standards have resulted in non compliance from that date. It is expected this will continue until planned new treatment infrastructure has been completed. The evidence to date is that applications for chlorine exemptions are unlikely to be successful.</p> <p>Protozoal non compliance will also continue until planned UV treatment is in place</p>	<p>UV treatment for all supplies is planned and is expected to be completed by FY24/25.</p> <p>Chlorine exemption was applied for for Cust as a test case but was declined. Chlorine is now being used for all supplies.</p>
<p>The percentage of real water loss from the networked reticulation system</p>	<p>Less than 22% (based on 240 l/connection /day)</p>	<p>Yes</p>	<p>This figure of 22% was re-calculated in Jan 2023 for the 2022 year. A peer review was undertaken in March 2023, the recommendations of the review are yet to be assessed. The reported figure may be updated depending on the outcome.</p>	<p>Budgets made available for planned leakage improvement works.</p>
<p>The median response times to attend a call-out in response to a fault or unplanned interruption to the network reticulation system:</p>	<p>See below</p>	<p>N/A</p>	<p>N/A</p>	<p>N/A</p>
<p>a) Attendance for urgent call-outs: from the time that the local authority receives notification to the time that the service personnel reach the site, and</p>	<p>less than 60 minutes</p>	<p>Yes</p>	<p>The result for the year was 48.25 minutes</p>	<p>NA</p>
<p>b) Resolution of urgent call outs : from the time that the local authority receives notification to the time that the service personnel confirm</p>	<p>less than 480 minutes</p>	<p>Yes</p>	<p>The result for the year was 89.4 minutes</p>	<p>NA</p>

Performance Measure	Target	Target met 2022/23	Commentary	Action to Address
resolution of the fault or interruption, and				
c) Attendance for non-urgent call-outs: from the time that the local authority receives notification to the time that the service personnel reach the site, and	Less than 2160 minutes (36 hours)	Yes	The result for the year was 3.3 hours	NA
d) Resolution of non-urgent call outs : from the time that the local authority receives notification to the time that the service personnel confirm resolution of the fault or interruption.	Less than 2880 minutes (48 hours)	Yes	The result for the year was 5.73 hours	NA
The total number of complaints received by the local authority about any of the following:  a) <i>drinking water clarity</i> b) <i>drinking water taste</i> c) <i>drinking water odour</i> d) <i>drinking water pressure or flow</i> e) <i>continuity of supply, and</i> f) <i>Council's response to any of these issues</i>  <i>Expressed per 1000 connections to the networked reticulation system</i>	Less than 5 complaints	No	Actual results per 1000 connections were:  a) 0.71 b) 0.99 c) 0.19 d) 1.74 e) 1.46 f) 0 Aggregate = 5.08	Taste and Odour complaints can be related to the recent chlorination in schemes where chlorine residual was not present before.
The average consumption of drinking water based	Less than 450 L/person/day	No	470.5	With recent changes in weather patterns, including temperature

Performance Measure	Target	Target met 2022/23	Commentary	Action to Address
on litres per day per person within the District.				and precipitation fluctuations, water demand has increased in the warmer and drier years. Increased water conservation campaigns through Council communications media.
Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory"	>90%	No	87% of respondents from the 2022 survey indicated that they were either Very Satisfied (40%), or Satisfied (47%).	Council will continue in its efforts to meet all its LOS, which may lift overall satisfaction. However the introduction of chlorine will be seen negatively.
Number of events that cause water not to be available to any connection for >8 hours	Nil / yr	No	There were two events in February and April. There was a communication failure in both events between the after-hours call service and the Water Unit, who did not receive notification that water was out until the day following the initial phone call.	We are working with our customer service to avoid missing track of the after-hours service requests.

## Benchmarking

A number of the performance measures above are collated and reported nationally, and therefore can be benchmarked against other service providers to compare performance. Waimakariri District Council participates in Water NZ's annual national Performance Review (NPR). The customised 2020-21 report prepared for WDC can be found here: TRIM [230324041126](#)

The more general report for 2021-22, which still enables comparisons with other Councils can be found here: [2021-22 National Performance Review](#)

This survey function has recently been taken over by Taumata Arowai, and WDC will continue to participate.



## Scheme Differences

As well as assessing the performance measures included within the AMP at a district level, there are a number of related measures assessed at scheme level. This allows for a comparison between schemes to highlight areas where improvements are required. For example, in terms of the leakage performance measure, while this is just met at a district level, there are also related performance measures at scheme level (i.e leakage in terms of litres per connection per day is a performance measure at scheme level). By addressing the relevant schemes where the scheme specific performance measures are not met, improvements will flow up into the district measure.

Another example where scheme specific improvements flow up to district level measures is in respect to DWQAR compliance. At each scheme, performance is assessed in terms of bacterial and protozoal compliance with the DWQAR. There is then a district wide performance measure that all schemes achieve compliance. So, in this case, by addressing non-performances at scheme level, district wide performance measures will also be achieved.

Table 12 below shows the 2022/23 elective performance measures for each scheme .

The scheme appendices contain tables that show scheme performance history going back to 2008

**Table 12: 2022/23 Scheme Performance - Elective Levels of Service (measured against the 2021 LTP LOS)**

Level of Service	Target	Rangiora	Kaiapoi	Woodend Pegasus	Oxford Urban – Rural No.2	Waikuku Beach	Cust	Mandeville - Fernside	Oxford Rural No. 1	West Eyreton – Summerhill-Poyntzs Road	Ohoka	Garrymere
Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	Not Achieved 50%	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory".	>90%	Achieved	Not Achieved 78%	Not Achieved 77%	Not Achieved 82%	Achieved	Not Achieved 71%	Achieved	Not Achieved 78%	Not Achieved 79% (Summerhill 100% West Eyreton and Poyntzs 58%)	Not Achieved 71%	NA - (Not Assessed)
Water is supplied that is within the guideline range in the DWSNZ for aesthetic parameters, with the exception of pH.	95% of samples comply	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Not Achieved – 79%	Achieved	Achieved	Achieved
Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/year	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of DWSNZ	Complies	Not Achieved <sup>1</sup>	Not Achieved 1	Not Achieved <sup>1</sup>	Not Achieved <sup>1</sup>	Not Achieved <sup>1</sup>	Not Achieved <sup>1</sup>	Not Achieved <sup>1</sup>	Not Achieved 1	Not Achieved <sup>1</sup>	Not Achieved 1	Not Achieved <sup>1</sup>
Water supply delivers water that achieves a standard suitable for compliance with the radiological requirements of DWSNZ	Complies	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of DWSNZ	Complies	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of DWSNZ	Complies	Not Achieved <sup>1</sup>	Not Achieved 1	Not Achieved <sup>1</sup>	Not Achieved <sup>1</sup>	Not Achieved <sup>1</sup>	Not Achieved <sup>1</sup>	Not Achieved <sup>1</sup>	Not Achieved 1	Not Achieved <sup>1</sup>	Not Achieved 1	Not Achieved <sup>1</sup>

Level of Service	Target	Rangiora	Kaiapoi	Woodend Pegasus	Oxford Urban – Rural No.2	Waikuku Beach	Cust	Mandeville - Fernside	Oxford Rural No. 1	West Eyreton – Summerhill-Poyntz Road	Ohoka	Garrymere
Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for flow from system	95%	Achieved	Achieved	Achieved	Achieved	N/A although 94% is provided	Not Achieved (2%)	N/A	N/A	N/A	N/A	N/A
Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for placement of hydrants	100%	Achieved	Achieved	Achieved	Not Achieved (91%)	N/A although 95.5% is provided	Not Achieved (49%)	N/A	N/A	N/A	N/A	N/A
Percentage of properties where flow received is consistent with allocated units at the point of supply in Restricted or Semi Restricted schemes, (excluding outages) as demonstrated by restrictor checks completed at not more than 5 yearly intervals	100% of restrictors tested at no more than 5 yearly intervals	Not Achieved – 86%	Not Achieved – 63%	Not Achieved – 77%	Not Achieved - 43%	Not Achieved – 97%	Not Achieved – 0%	Not Achieved – 21%	Not Achieved – 27%	Not Achieved – 33%	Not Achieved – 17%	Not Achieved – 16%
Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR; b) For schemes with an ILI of "C" or "D", an economic assessment shall be carried out to determine the value in further leak detection work	Achieved	Achieved	Achieved	Not Achieved (C) Assessment planned	Achieved	Achieved	Not Achieved (D) Assessment planned	Not Achieved (C) Assessment planned	Achieved	Achieved	Achieved
Number of events that cause water not to be available to any connection for >8 hours	Nil/year	Achieved	Achieved	Achieved	Achieved	Achieved	Not Achieved - 1	Achieved	Achieved	Achieved	Not Achieved -1	Achieved
Actual peak capacity of the scheme for domestic use - On Demand	>2500 litres/connection/day	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	N/A	N/A	N/A	N/A	N/A
Actual peak capacity of the scheme for domestic use - Restricted	>1150 litres/allocated unit/day	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
Water pressure at the point of supply of Restricted connections, excluding outages, as demonstrated by a reticulation model or reactive audits	>150kPa for all connections 100% of the time at peak demand	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Not Achieved	Achieved	Achieved	Achieved	Not Achieved (68%)

Level of Service	Target	Rangiora	Kaiapoi	Woodend Pegasus	Oxford Urban – Rural No.2	Waikuku Beach	Cust	Mandeville - Fernside	Oxford Rural No. 1	West Eyreton – Summerhill-Poyntz Road	Ohoka	Garrymere
Water pressure at the point of supply in On Demand and Semi-Restricted schemes, excluding outages, as demonstrated by a reticulation model or audits.	>250kPa for all connections at peak demand >300kPa for 99% of connections at peak demand	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	N/A	N/A	Not Achieved. (long term will move to all restricted connections)	Achieved	Not Achieved. (long term will move to all restricted connections)
Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme-by-scheme basis, depending on resiliency and redundancy of source infrastructure <sup>3</sup>	Achieved	Achieved	Achieved	Achieved	N/A (storage not required)	Achieved	Achieved	Achieved <sup>2</sup>	Achieved	Achieved	Achieved
Actual usage on average day	Maintain the average daily water use below 100% of the assessed reasonable water use	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Not Achieved
Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	Achieved	Achieved	Achieved	Not Achieved	Achieved	Not Achieved (135%)	Achieved	Achieved	Achieved	Not Achieved (190%)	Not Achieved (208%)

<sup>1</sup>The requirements of the new Water Quality Assurance Rules are unable to be met for bacterial and protozoal parameters until additional treatment equipment is in place. Necessary infrastructure expected to be completed in 2024/25 for all supplies.

<sup>2</sup> Oxford Rural No. 1 available volume will be reduced in the short term, as Chalk Hills tanks are decommissioned. Further storage planned 2029. As an interim measure to overcome the shortfall, a new generator at Rockford Rd HW is being provided, and the Woodstock Rd supply pipe is being upgraded.

<sup>3</sup> See Table 28 for details

## 5 ASSET CONDITION

The asset condition for the reticulation has been determined based on criteria set out in the International Infrastructure Management Manual (IIMM), published by the Institute of Public Works Engineering Australasia (IPWEA), combined with updated calculations of base lives for the pipeline asset types.

The IIMM sets out criteria for converting remaining useful life as a percentage to a Condition Grade from 1 (Very Poor) to 5 (Very Good). This is a relatively simple conversion. However the determination of the base lives, which in turn gives remaining useful life, is a more complex process.

### Base Life Calculation for Pressure Pipe Assets

A significant body of work has been completed in 2020 by the Council's Network Planning Team to better understand expected reticulation asset lives, to inform the asset condition calculation. This work has provided a more complete understanding of the performance of various asset types, and also sets up a correlation between failure rates and expected lives. This will ensure that decisions on pipework replacements are optimised, with assets not left in service longer than intended, or not replaced prematurely when they still have a large degree of remaining useful life.

The work undertaken to achieve the outputs described above, is detailed below:

- Review of failure rates (pipe bursts) by asset type across all WDC water supply pipe assets. Pipe failure data has been analysed from 2007 to 2019.
- Incorporation of mechanism of failure, but excluding failures not related to asset condition (i.e. third party damage).
- Introduction of a greater number of bands of asset type, based not only on material type, but allowing for differing performance within a particular material. For example asbestos cement pipes differentiated by diameter, and plastic pipes differentiated by the generation of plastic used.
- Each asset type category was then analysed for accumulated failures over a period of time, and matched to an exponential curve to plot past performance and expected future performance for each of the asset categories selected.
- A rate of 7 failures of pipe per km of main accumulated over the asset life was deemed to represent the end of life of an asset. A sensitivity analysis was carried out on adjusting this failure rate, and 7 failures of pipe per km of main was found to achieve a practical balance between cost and level of service.
- Verification of the model results was completed by comparing the asset lives generated by the model with typical asset lives provided from a combination of sources, including:
  - Previous valuation data;
  - Water New Zealand National Asbestos Cement Pressure Pipe Manual (the AC Pipe Manual)
- The benefits of the new process are that it provides a more accurate estimate of pipe performance by taking into account actual performance of each asset group across the district, as well as referencing a more broad range of reference material (including the AC Pipe Manual). This is more accurate compared to the previous asset base lives which were based off more broadly defined 'text book' values, which had not been calibrated against the performance of assets within the district.

This process generated the following expected asset lives, for the asset types analysed.

**Table 13: Adopted Reticulation Asset base Lives for Pressure Pipes**

Pipe Category and Definition	Calculated Asset Life (years)
PVC Modern (PVC pipe installed post 1997)	100
PVC Old (PVC pipe installed prior to 1997)	60
PE Modern (PE pipe installed post 1990)	100
PE Old (PE pipe installed prior to 1990).	35
AC Small (AC pipe with diameter < 100mm)	55
AC Medium (AC pipe with diameter 100mm to 150mm)	60
AC Large (AC pipe with diameter >= 200mm)	90

### Asset Condition Calculation

With the asset base lives calculated as per the process described above, and the condition defined as a function of remaining useful life, the remaining data required to calculate the condition of each asset is the year of installation of the asset. This information is held for each asset within the Council’s TechOne asset database. Thus, through a combination of expected asset life, year of installation, remaining useful life of asset, the condition grade for each asset is able to be assigned.

The results of this analysis at a District level are presented in Figure 1. It is noted that “Headworks” is inclusive of all above ground assets associated with the water supply scheme (e.g. reservoirs, buildings, pump sets). “Reticulation” covers the remainder of the assets, which are typically below ground pipework related assets.

### Headworks Asset Condition

Headworks asset condition is determined using asset age and asset class. No comprehensive asset condition assessment at facilities has yet been carried out so confidence in asset condition is not high. However field staff are required to take note of assets that are deteriorating, when carrying out their normal regular maintenance checks/inspections. In the recent complete facilities asset inventory work that has been undertaken the scope included identifying assets in particularly bad condition. Only 21 assets were found that fitted this criteria, and steps are being taken to attend to them.

In the absence of a formal assessment it is believed that the majority of headworks assets have more than 50% remaining useful life (based on age).

Electrical componentry at headworks has received more attention, and a regular inspection programme is in place to identify renewal needs, managed through Council’s electrical servicing contractor. Works identified from these assessments are programmed and budgets incorporated in the ten year plan.

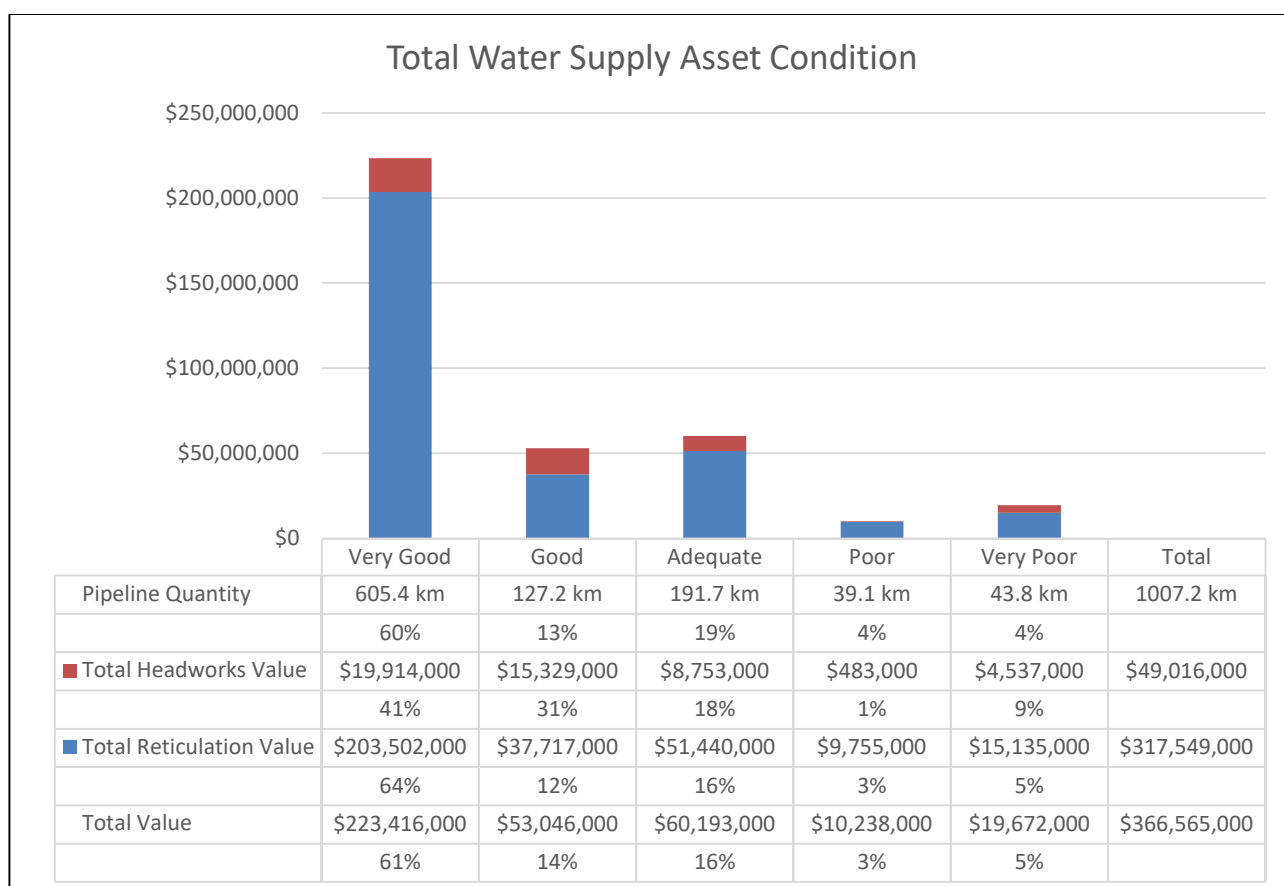
## Useful Lives on GIS

The [AMP Plans and Figures Viewer](#) contains a GIS plan for each scheme that spatially illustrates the remaining useful life of the reticulation assets within the network. Included on each plan is the location of any repair activity recorded since 2007. This provides a useful picture of the relative asset age, condition and performance.

## District Overview

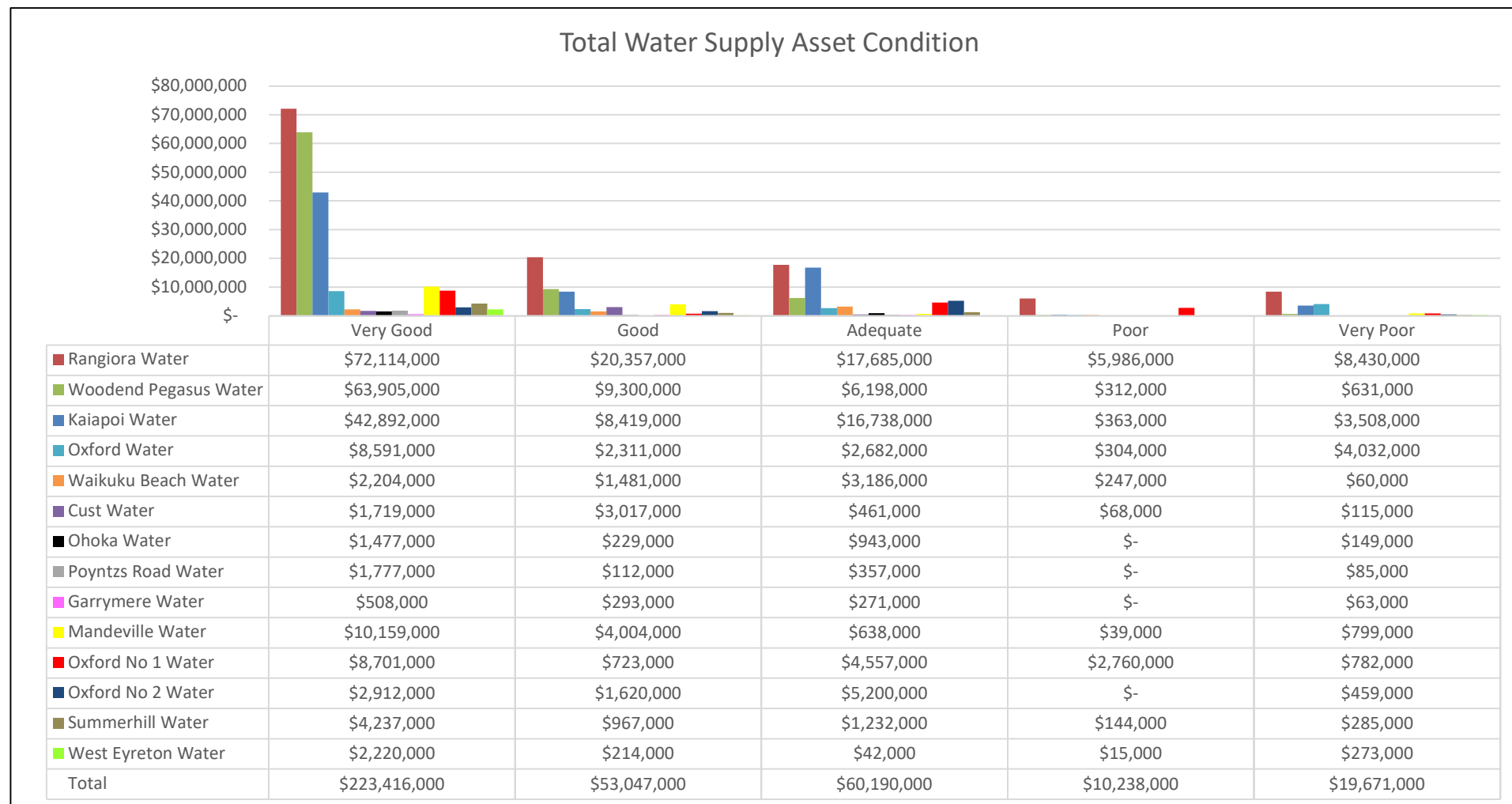
Asset condition for both headworks and reticulation are shown graphically in Figure 1, and detail is provided in the Viewer. Note that “Headworks” is inclusive of all above ground assets, while “Reticulation” covers the remainder of the assets, which are typically below ground pipework related assets.

**Figure 1: District - Asset Condition Summary**



Parameter	Very Good (Grade 1)	Good (Grade 2)	Adequate (Grade 3)	Poor (Grade 4)	Very Poor (Grade 5)
Definition	More than 80% of life remaining	Between 50% and 80% of life remaining	Between 20% and 50% of life remaining	Between 10% and 20% of life remaining	Less than 10% of life remaining

**Figure 2: Asset Condition Summary - Schemes**





## 6 CRITICALITY

Criticality is a measure of the importance of a given asset to the overall scheme and is determined by the consequence of failure. Assets for which the financial, business, or service level consequences of failure are sufficiently severe to justify proactive inspection and rehabilitation are considered more highly critical. Critical assets have a lower threshold for action than non-critical assets. Criticality is used as a means to:

- Identify the most important assets in the overall network;
- Prioritise assets that warrant specific condition assessment;
- Prioritise assets for repair following multiple failures, e.g. following an earthquake;
- Quantify the relative consequence of failure, which can then be used to assess the risk of failure and prioritise renewals. Specifically this means that assets with higher criticality rating are renewed before their end of life, while renewal of low criticality assets will be delayed beyond theoretical end of life.

The criticality assessment carried out on the reticulation uses an automated GIS model using both GIS and modelling data to determine the criticality of pipes. The previous criticality assessment model for treatment plants and pump stations has been updated and used again in this document, but now that a comprehensive asset stocktake at facilities has been completed, it will enable a new model for assessing the criticality of pump stations and treatment plants to be developed.

WDC have chosen to use a component failure and public-impact based approach to identify and rank critical assets.

For water assets “Failure” is defined as any single component malfunctioning causing a loss of service or significant impact to others under normal operating circumstances. The criticality assessment was undertaken assuming an average peak daily demand. “Impact” is defined as:

- Public health impact – the failure of the asset creates an unacceptable impact on public health.
- Socio-economic impact – the failure of the asset creates an unacceptable social and/or economic loss to the community. This includes disruption to essential services, significant economic activities and important roads.
- Financial loss – The failure of the asset, or the repair of a failed asset, creates an unacceptable financial loss to the community, including the Council.
- Environmental impact – the failure of the asset creates an unacceptable environmental effect.

The criticality of water mains is assessed using seven key criteria:

**Table 14: Criticality Assessment Criteria**

Criteria	Assessment Notes
Loss of Service	The number of customers to lose water supply in the event of a single pipe failure. This was determined by modelling data assuming average peak daily flow.
Crossings	The disruption caused by a pipe failure on a major crossing point. Railways, Motorways, State Highways and Major Waterways were all considered under this item and identified using GIS queries. The disruption under this item relates to both the other service and the difficulty and time to make repairs to the water main.
Private Land	Pipes on private land were given a higher criticality rating based on the difficulties associating with making repairs to the pipe and the impact on the private landowner of a pipe failure. These pipes were identified using GIS queries.
Diameter	Large diameter water mains were given a higher criticality rating to reflect the difficulty and time required to repair these mains and to reflect the intrinsic importance of these mains in the network.
CBD	Pipes within CBD or retail shopping areas were given a higher criticality rating to reflect the financial impact of water shutdown in these areas and the likely effect of a pipe repair on pedestrian traffic. These pipes were identified using GIS queries.
Roads	The location of the pipe in the road corridor and the nature of the road was considered here. A pipe within the road carriageway and pipes on high volume strategic roads were given a higher rating to reflect the greater impact on road users. These pipes will also likely be more expensive and time consuming to repair.
Material	Where a pipe was identified as a large diameter spiral steel pipe this was given a higher criticality rating to reflect the difficulties associated with repairing these pipes.

**Table 15: Criticality Score Categories**

Criticality Rank		Criticality Rank Code
High Criticality	Extreme Criticality	AA
	High Criticality	A
Moderate Criticality		B
Low Criticality		C

Because the pipe criticality assessment is undertaken using GIS data the assessment can now be repeated and updated on a more regular basis. Annual updates are therefore planned that will inform each year’s detailed renewals programme.

### Operations

Criticality is used to determine if a “stand over” is necessary by our in-house operations contractor, when external contractors are working on or near WDC assets. This effectively means that there is a greater level of oversight for works near critical assets relative to non-critical.

## District Overview – Criticality

Table 16 summarises the percentage of mains in each of the criticality classes:

**Table 16: District Overview – Mains Criticality % by Category (% shown by length).**

Scheme	AA	A	B	C
Cust Water	0%	34%	24%	42%
Garrymere Water	0%	0%	42%	58%
Kaiapoi Water	5%	4%	22%	69%
Mandeville Water	5%	6%	25%	64%
Ohoka Water	3%	15%	47%	35%
Oxford No 1 Water	1%	4%	23%	72%
Oxford No 2 Water	10%	8%	29%	53%
Oxford Water	6%	5%	29%	60%
Poyntzs Road Water	0%	0%	19%	81%
Rangiora Water	7%	12%	14%	67%
Summerhill Water	2%	9%	35%	54%
Waikuku Beach Water	4%	0%	16%	79%
West Eyreton Water	0%	0%	36%	64%
Woodend Pegasus Water	1%	8%	15%	76%
<b>All Schemes</b>	<b>4%</b>	<b>7%</b>	<b>21%</b>	<b>67%</b>

### Criticality on GIS

The [AMP Plans and Figures Viewer](#) contains spatial views of the criticality of pipe and facility assets for each scheme.

## 7 RISK ASSESSMENT - OVERVIEW

The purpose of carrying out risk assessments on water supply schemes is to identify any risks to the scheme, which need to be mitigated and to prioritise implementation of any mitigation plans.

Historically a number of different risk assessments have been carried out, each one with a specific focus, although there is some overlap. A description, and the purpose of each assessment is provided below

- i. *Operational Risk Assessment*: This is the broadest scope assessment. Possible causes of failure of the water supply system were examined, together with the consequences of that failure. Failure includes contamination, or treatment failures as well as failure caused by natural disasters. This assessment was last carried out for the 2015 AMP review, but has not been updated for this review. It was the intention that a review of these operational risks be carried out in time for this AMP, but as it was expected that the next AMP would be written by the new entity being set up under the 3 Waters reforms, this was not carried out.
- ii. *Disaster Resilience Assessment (DRA)*: Assessed the risk to above ground assets from a broad range of potential natural disasters. See 9 DISASTER RESILIENCE ASSESSMENT section
- iii. *Vulnerability Assessment*: Focuses solely on underground assets, assessing the vulnerability of pipes to damage from natural hazards, and uses an automated approach. One of the principal inputs to the risk based methodology for determining the renewals programme. See 16 RENEWALS section.
- iv. *Corporate Risk*: High level risk assessment carried out corporately in association with the development of the LTP and Infrastructure Strategy. Covers Environmental, Economic, and Social risks. Council updated its Risk Management Policy and Framework in 2022. TRIM [220428064824](#) and [220428064825](#). The most recent corporate risk assessment is available here: TRIM [230321039241](#)
- v. All water supply schemes have Water Safety Plans, and with the new regulatory requirements of Taumata Arowai they are required to be updated annually. Further information is provided in the Water Safety Plans section

Updating the 3 Waters risk assessments is now a priority. A new approach has been recently developed, which brings the Operational, Disaster Resilience and Vulnerability assessments into a single risk assessment process. This is expected to make regular updating of the assessments less of a hurdle. The new methodology will be used in 2024 to carry out a complete risk assessment of water services.

The new methodology enables consistent, measurable quantifying of risks for customers and the environment from operation of water supply (and also stormwater and wastewater) schemes. Key risks are presented as outcomes such as loss of, or contamination of water supplied to customers, or stormwater or wastewater discharges resulting in flooding or downstream environmental contamination.

The method achieves consistency by assigning numerical values to conditions that lead to events (for example – “pump station failure”) which causes the adverse outcome “loss of supply”.

Likelihood is determined by using preset data to assign values to conditions which are common across schemes. A typical condition is, for example, “average asset condition - % of life remaining”. For this example each percentage range specified in the condition receives a rating of between 1 and 5, with “1” being “almost certain” and “5” being “rare”. Likelihood scores for each condition are averaged to determine an overall likelihood rating for each event. Conditions are measurable,

using asset and scheme operating data, drawing from procedural, mechanical or structural factors or natural hazards which contribute to the events.

The resulting likelihood scores are averaged with consequence scores (comprising agreed severity values modified by scheme exposure) to determine final risk ratings for each event and scheme. "Scheme exposure" is determined by the number of connections to each scheme. This gives an indication of the scale of impact of an event and size of the likely Council response that would be required to resolve it.

Findings from these updated risk assessments will be compared with outcomes of the Water Safety Plan source water risk assessments, to support prioritisation of future actions to improve the safety and reliability of the water supplies.

## 8 OPERATIONAL RISK ASSESSMENTS

### Operational Risk

The table below details the risks considered under the previous assessment methodology, which was last carried out for the 2015 AMPs.

**Table 17: Risk Events Considered**

Process	Event
Source	Contamination
	Insufficient Water
	Natural disaster and Other
Treatment	Protozoa contamination
	Inadequate chlorination
	Insufficient pH correction
	Too much pH correction
	Filtration ineffective
	Elevated turbidity
	Natural disaster
Distribution	Inadequate supply
	Pipeline breakages causing contamination or loss of supply
	Contamination from back flow
	Insufficient firefighting supply
	Natural Disaster
General	Operation/Management failures

### Risk Matrix

Each of the 58 possible causes for the events shown are rated for consequence (1 to 5) and likelihood (A to E) and then combined to give a risk score using the matrix shown below. The three cells highlighted by a black frame show where the WDC matrix differs from the standard AS/NZ 4360 risk matrix. These changes were made as they better reflect the level of risk accepted by WDC on their 3 Waters assets.

Risk Matrix		Consequences				
		Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
Likelihood	A Almost certain	M	H	H	E	E
	B Likely	M	H	H	E	E
	C Possible	L	M	H	H	E
	D Unlikely	L	L	M	H	E
	E Rare	L	L	M	H	H

### District Overview – Operational Risk

The 2015 assessment identified 32 high risks remaining across all the water supply schemes in the district, with all the extreme risks having been previously attended to. The high risks have largely been dealt with now too, but in some cases the risk has changed, due to changing legislative requirements, and further work is now required.

Table 18 summarises the current status of the high operational risks identified in 2015 across all the water supply schemes. It should be noted that operational risks relating to the safety of the drinking water, will have been separately assessed and recorded in the Water Safety Plans.

Since a completely new comprehensive risk assessment is about to be embarked upon, with completion in 2024 anticipated, the medium and low risks identified in the 2015 assessment have been removed from this 2024 version of the AMP.

**Table 18: District Overview – High Risks remaining (Operational)**

Scheme	2015 Risk Assessment	Operational Risk Assessment update	Comment
Cust	3	1 (insufficient fire fighting supply)	Further upgrades still required to achieve full firefighting compliance (delivery main upgrade, and retic upgrades). These are in the forward works programme already, but almost impossible to deliver with our current rating structure.
Fernside	3	0	Amalgamated with Mandeville, to mitigate risks
Garrymere	5	0	No remaining high risk, but note a further well is planned in 2024/25 to increase resilience
Kaiapoi	0	0	
Mandeville	0	0	
Ohoka	3	0	UV treatment planned in 2024/25 to meet requirements of DWQAR
Oxford Rural 1	9	1 (insufficient storage)	Second well needed to improve redundancy as there are current issues where we can't take the current source offline to do maintenance on well. No new storage, but instead alternative projects to improve redundancy with a second primary well currently in design with construction in 24/25, plus a generator to be installed in 23/24 to reduce the reliance on storage.
Oxford Rural 2	5	0	Joined to Oxford Urban scheme to mitigate risks
Oxford Urban	0	0	
Pegasus	0	0	
Poyntzs Road	3	0	Joined to West Eyreton scheme to mitigate risks
Rangiora	0	0	
Summerhill	0	0	
Waikuku Beach	1	0	Campground WTP upgraded to provide full redundancy to scheme.
West Eyreton	0	0	
Woodend	0	0	



## 9 DISASTER RESILIENCE ASSESSMENT

The 2009 Disaster Resilience Assessment (DRA) was a desktop assessment of the risk from natural hazard events for all Council operated water supply, wastewater and drainage schemes including above ground and reticulation assets.

In calculating risk the following factors were considered:

- The likelihood of the hazard event occurring, determined from return period
- The resilience or vulnerability of the asset to each hazard (desktop based)
- The consequence of asset failure to the community

The DRA was updated in 2011 to take into account new hazard assessments, in particular the increased seismic risk to the water supply assets throughout the District including further work on areas susceptible to liquefaction. The outputs of new tsunami modelling, a rapid flood hazard assessment and, an updated wildfire threat assessment were also included.

This update focused on above ground assets, as the assessment of risk to below ground assets became incorporated from this time on, into the renewals model. Risk from earthquake events that could induce liquefaction, on brittle pipes (AC and earthenware) is managed using a reticulation vulnerability score. This is used as an input to the risk based renewals assessment. See the 16 RENEWALS section.

A comprehensive review of the DRA Action Plan was carried out in 2014 to update progress made on tasks and prioritise future initiatives. As a result of the review, related tasks were consolidated into a reduced number of improvement projects to be actioned. Limited progress has been made on these improvements since the 2015 AMP revision, due to resourcing constraints.

The new risk assessment methodology described in section 7 above has been developed with the purpose of incorporating the DRA risk analysis within it. It is therefore expected that it will result in similar actions/improvement projects to the DRA, but integrated with the outcomes of the operational risk assessment.

The DRA, together with the risk based renewals assessment, were the Council's 3 Waters department's primary tools in meeting the obligations of the CDEM Act which requires that all lifeline utilities operate to the fullest possible extent before, during and after an emergency. The new risk assessment process and the risk based renewals assessment will be the tools used going forward to meet those obligations.

## 10 CORPORATE RISK AND ASSUMPTIONS

An assessment of key risks and assumptions was prepared by the Council in preparation for the 2024-34 LTP, and is included in the Infrastructure Strategy. The assessment outlines all of the Key Assumptions and Risks that could potentially impact Council service delivery for the 3 Waters activities. Mitigation measures are explained in response to each identified risk.

The Key Risks and Assumptions table is available at TRIM 240611093590.

The definitions of likelihood and consequence and the overall risk priority used in the Corporate Risk Assessment are included in the Council's Risk Framework Document [TRIM 220428064825](#).

A number of the financial risks and assumptions identified in this document imply future uncertainty, with future changes potentially affecting the individual scheme financial projections. Changes to corporate assumptions have been taken note of as part of this AMP review and projections and budgets revised accordingly.

### **Drinking Water Safety Plans**

Drinking Water Safety Plans (DWSPs) provide a summary of how the scheme is operated, including a risk assessment for the scheme, identification of preventative measures, and recommendations for any upgrades to address unacceptable risks. They are required under the Water Services Act 2022, and administered by Taumata Arowai. They are required to be updated annually. The Nov 2023 due date will not be met for all of Council's supplies, but it is expected they will all be completed early in 2024.

Budgetary requirements arising from the plan are incorporated into the draft LTP.

## 11 CLIMATE CHANGE

For some time Waimakariri District Council has been including the expected effects of climate change in both the hydraulic modelling that it carries out, and design work, and has assumed the worst-case projection of RCP8.5.

Notwithstanding, in 2022 the Council commissioned NIWA to carry out a district specific climate report, and in June 2022 the Council resolved to

*Adopt the NIWA climate projections for the RCP 8.5 Scenario as its baseline evidence for corporate planning, including District planning and the 2024 LTP suite of corporate documents (LTP, activity management plans and infrastructure strategy).*

The key findings of the NIWA report are as follows:

- The projected Canterbury temperature changes increase with time and increasing greenhouse gas concentrations. For RCP8.5 the mid-century mean air temperature is projected to increase by 0.9°, with an end of century increase of 2.4°. Diurnal temperature range (i.e., difference between minimum and maximum temperature of a given day) is expected to increase with time and increasing greenhouse gas concentrations.
- For RCP8.5 the mid-century mean maximum air temperature is projected to increase by 1.2°, with an end of century increase of 3.3°. Changes in mean minimum air temperature are largely uniform across the district.
- For RCP8.5 the mid-century mean minimum air temperature is projected to increase by 0.5°, with an end of century increase of 1.6°. Changes in mean minimum air temperature are largely uniform across the district.
- The average number of hot days (days  $\geq 25^{\circ}\text{C}$ ) is expected to increase with time. 15 by mid century and 44 by end century. Hot days in the Lees Valley and western plains could see the largest increase by the end of century with upwards of 50 additional hot days projected per year.
- The number of frost days (days  $< 0^{\circ}\text{C}$ ) is expected to decrease throughout the region. Largest decreases are expected in inland areas, with frost days reducing by up to 26 per annum by end century.
- Increased rainfall is projected across the lower altitude plains and coastal areas, and no change (or slight decreases) in annual rainfall are projected in the western high-altitude zones. However rainfall intensity is expected to increase. Extreme rainfall will likely increase by approximately 7% per 1 °C of climate warming, and shorter duration rainfall events (e.g., hourly) could increase by as much as 15% per 1 °C of climate warming.
- The future amount of accumulated PED (Potential Evapotranspiration Deficit) is projected to increase, therefore drought potential is projected to increase.
- Mean annual low flow in rivers generally decreases by late century, with decreases of 20%-50%.
- Floods (characterised by the Mean Annual Flood; MAF) are expected to become larger, with increases exceeding 50%. However, as noted in The Canterbury Regional climate change report (Macara et al., 2020), the mean annual flood “should not be considered a comprehensive metric for the possible impact of climate change on New Zealand flooding”.
- Sea-level rise will continually lift the base mean sea level on which the tide rides, which means there will be an increasing percentage of normal high tides which exceed a given present-day elevation e.g., street level, berm or stop bank crest.

This report validates the approach 3 Waters has been taking with its modelling and design work.

### **Previous Climate Change Initiatives**

WDC's initial studies carried out on the effects of climate change focused on the coastal fringe. An investigation into groundwater levels, (TRIM [191202168785](#)) concluded that rising groundwater levels will subject underground assets to more frequent inundation, and exacerbate surface flooding. Existing drainage systems are likely to become less effective. However a study of coastal erosion (TRIM [191202168789](#)) found that dune erosion is not likely to follow from sea level rise, as the Waikamariri River delivers enough additional material along the coast to the north of the river, to compensate for any increased rate of erosion. This study also considered coastal inundation, but a further more comprehensive study (TRIM [200312034365](#)) concluded that various combinations of storm tide, fluvial events and a rising mean sea level will cause overtopping of existing stop banks and natural river banks.

More recently a study (TRIM [231115183268](#)) has been carried out of the potential effects of climate change on the Council's infrastructural assets. This study used Council's previous risk assessment and criticality work to consider the likely increase in risk to assets arising from global warming. The conclusion is that the greatest risk come from the increased likelihood of flooding. The key outputs from the report are a comprehensive list of all the assets under threat from the higher flooding risk, and a high level assessment of costs to mitigate the danger. Solutions may include strengthening the asset to enable it to withstand the flooding, moving the facility/asset to a safer site, or accepting the damage, and repairing it when flooding does occur. For some solutions the work will be able to be integrated with the normal renewals programme. However this study is only a first screening, and the assets at risk will need case by case studies to further refine the actual threat, and commence development of a prioritised programme to mitigate risks.

It is proposed that this additional work will be carried out over the next three years. Notwithstanding this additional refining work, the report's future costs to adapt have been included in the 30 year capital programme as place holders in years 11 to 20.

Overall the effects of climate change are expected to increase pressure on water supplies, with potential effects near the coast from sea level rise, and away from the coast from potentially lower levels of groundwater recharge. Discussions have been held with ECan regarding the impact this may have on groundwater resources, and how this will be managed. The following key points can be made:

- Although predications are for the Canterbury Plains groundwater recharge to decrease, the large alpine rivers are predicted to increase flows so that the steady recharge the aquifers receive from them is expected to be the same. This means that shallower groundwater may become more vulnerable, but the deeper sources (which supply the vast majority of Council's public water supplies) will be less vulnerable to increased frequency of low recharge. Refer 201029145198.
- The intention in terms of allocation of the groundwater resource going forward is to have an adjustable allocation accounting for climate change, which also acknowledges the priority the drinking-water has in the Resource Management Act (RMA). Refer 201029145198.

Ongoing engagement with ECan is required to keep abreast of any work they are doing in this area.

There were specific actions in the 3 Waters activity area that were identified in the 2021 AMPs that the WDC planned to carry out with respect to reduction of carbon emissions. Table 19 below provides an update on progress made against those actions

**Table 19: Climate Change Actions from 2021 AMP**

Item	2023 Update for Water Supply. (Progress for wastewater assets reported in WW AMP)
Investigate technology and improvements which help reduce greenhouse gas emissions from treatment plants and other 3 Waters infrastructure via energy efficiency improvements.	No progress made
Record nitrogen, BOD and other parameters influent and effluent to enable accurate calculation of greenhouse gas emissions from large wastewater treatment plants. Provide an updated greenhouse gas emission profile to Management Team as result of the assessment.	Not relevant for water supply
Report progress quarterly on preparation and process for installation and initial operation of solar power array project (Rangiora WWTP)	Not relevant for water supply
Identify appropriate targets for reduction of greenhouse gas emissions from Council's corporate and infrastructure facilities.	No progress made

**Future Climate Change Initiatives**

Looking forward Council’s 3 Waters team plans to carry out more with respect to mitigation and embed climate change consideration into its investment decisions. Within the three year term of the 2024 LTP it intends to use the guidance in the Water NZ publication Navigating to Net Zero to:

- Confirm the operational emissions boundary that 3 Waters intends to use.
- Update and refresh the 3 Waters operational emissions inventory, including biogenic emissions – using the guidance in “Water NZ Carbon Accounting Guidelines for Wastewater treatment CH<sub>4</sub> and N<sub>2</sub>O. This work to be aligned with the corporate climate change work programme.
- Develop an operational emissions forecast.
- Develop a capital emissions baseline. Note the previous focus has been on operational emissions alone, but establishing a “business as usual” capital emissions baseline, will enable emission reduction opportunities from adopting alternative low-carbon approaches to be appropriately assessed. Establishing this baseline will be a significant body of work, and for it to be used effectively, the implication is that all future infrastructural projects will need to be assessed from both a climate and financial perspective once the baseline has been established.
- Set carbon reduction targets.

## 12 DEMAND

Growth projections were updated in 2023 to determine the expected growth on each water scheme in order to understand what upgrade works are required to meet the agreed levels of service. There are a number of factors that influence future demand on water in the District:

- Population trends or increases in population
- Changes in water use practices
- Changes in legislation
- Advancements in technology
- Implementation of water conservation measures (such as water metering)

To date only growth has been considered in establishing the district's future demand for water. A more complex approach is planned for the future with consideration of the effects of the factors noted above.

The overall district population growth scenario used for the 2024 AMP update was calculated by the consultant Formative under direction from Council's Development Planning Unit (DPU). The Formative data, which shows the population broken down into towns and rural areas is available here: [Population Forecasts report](#). The "50 Year Water and Sewer Growth Forecast" report, was updated using this data (TRIM [230413051831](#)) which was the basis for the infrastructure planning.

To calculate the growth for the water supply schemes, population increases were applied to planned growth areas at densities agreed with the DPU. Account was also taken of the capacity for infill to absorb the necessary increases. In cases where the required increase in population could not be fitted inside growth areas, further discussions were held with the Development Planning Unit to agree on locations where the additional growth should be applied. Water supply scheme growth in connections was then calculated based on the growth areas.

The following growth projection horizons were used;

1	1 – 3 years	(2024/25 to 2026/27)
2	4 – 10 years	(2027/28 to 2033/34)
3	11 – 20 years	(2034/35 to 2043/44)
4	21 – 30 years	(2044/45 to 2053/54)
5	31 – 50 years	(2054/55 to 2073/74)

A project shown in the 2021 Improvement Plan section followed on from Council's Water Conservation Strategy (TRIM 200501050668). The project aimed to investigate current water usage and then review and refine the reasonable water use targets used in the Water Conservation Strategy, which act as a benchmark against which future water conservation programmes can be measured. This will allow for future changes in water demand for new connections, which may be different from historical demand, to be factored into future demand assessments. While the project remains relevant to future water demand issues it has been placed on hold following a related project arising from the new Taumata Arowai requirements. Council wishes to fully investigate achieving chlorine free status for one of its schemes by way of a pilot (Cust). This will involve elements of demand reduction, information from which will inform the original project when it is taken off hold.

## **Managing Uncertainty**

The corporate growth model developed by the Council for assessing growth related works is by its nature uncertain as it relies on population projections that are highly dependent on changing economic and social factors. Generally however, there is a greater degree of certainty in initial years, and greater levels of uncertainty when looking forward to the future. This means that over time, there is the ability for growth projections to be updated and refined over time as contributing factors evolve. There are also a number of other strategies employed to manage this uncertainty, which are outlined below.

A key means of managing this uncertainty has been to use the best available data and consult widely with Council staff in the policy and planning fields for the best information.

As part of the 2024 AMPs, a sensibility analysis was also undertaken by comparing the past 5 years of actual scheme connection growth with the future growth projections. The projections are seen to generally align well with recent growth that has occurred.

Long term, the 2024 projections are very similar to the 2021 AMP projections, and thus as a whole there are not significant changes to the overall capital work programme, however some changes have been recommended for particular projects.

To further reduce the uncertainties from the model in terms of the timing of when a growth project may actually be required, when a project is recommended by the Network Planning Team, a catalyst for the project is always included (for example, when a certain parcel of land begins to develop, when connection numbers exceed a certain value). This means that as a project comes up in an Annual Plan to be constructed, the documented catalyst is reviewed and discussions held with the Network Planning Team to verify that the project is genuinely required to be constructed at that time, or whether it be pushed out further in the budget.

## **District Overview – Growth Forecasts**

The district water connections are predicted to grow by approximately 85% over the 50 year projection period. This is slightly less than the 2021 projections, in which there was a projected 90% increase over the 50 year time period.

It is predicted that in the first 10 year projection (up to 2033/34) the Waimakariri District is to grow on average by 493 new water connections annually. However in the long term (2034/35 to 2073/74), the rate of growth is expected to be approximately 338 new connections annually.

Table 20 presents the growth forecast for the Waimakariri District’s water supply schemes.



**Table 20 Summary of the Growth Forecast for the Waimakariri Districts Water Schemes**

Scheme		District	Rangiora	Kaipoi	Woodend Pegasus	Oxford Urban – Rural No 2	Waikuku Beach	Cust	Mandeville - Fernside	Oxford Rural No 1	West Eyreton – Summerhill- Poyntz	Ohoka	Garrymere
Projected Connections	Current	21,614	8,191	5,866	3,735	1,275	483	133	974	405	376	124	42
	3 yrs (2026)	23,540	8,883	6,231	4,376	1,344	501	135	1,055	430	400	140	45
	10 yrs (2033)	26,547	10,093	6,827	5,204	1,464	529	139	1,156	476	442	167	49
	20 yrs (2043)	29,926	11,447	7,430	6,177	1,602	566	143	1,287	527	490	203	55
	30 yrs (2053)	33,247	12,735	8,038	7,150	1,752	605	146	1,420	572	530	239	59
	50 yrs (2073)	40,048	15,484	9,292	9,051	2,067	678	153	1,670	663	615	307	69
Projected Average Daily Flow	Current	222 L/s	83 L/s	51 L/s	36 L/s	16.8 L/s	9.1 L/s	2.0 L/s	8.4 L/s	7.9 L/s	4.3 L/s	1.6 L/s	1.5 L/s
	10 yrs (2033)	297 L/s	107 L/s	68 L/s	57 L/s	19.8 L/s	9.3 L/s	2.2 L/s	13.3 L/s	10.6 L/s	5.3 L/s	2.8 L/s	1.6 L/s

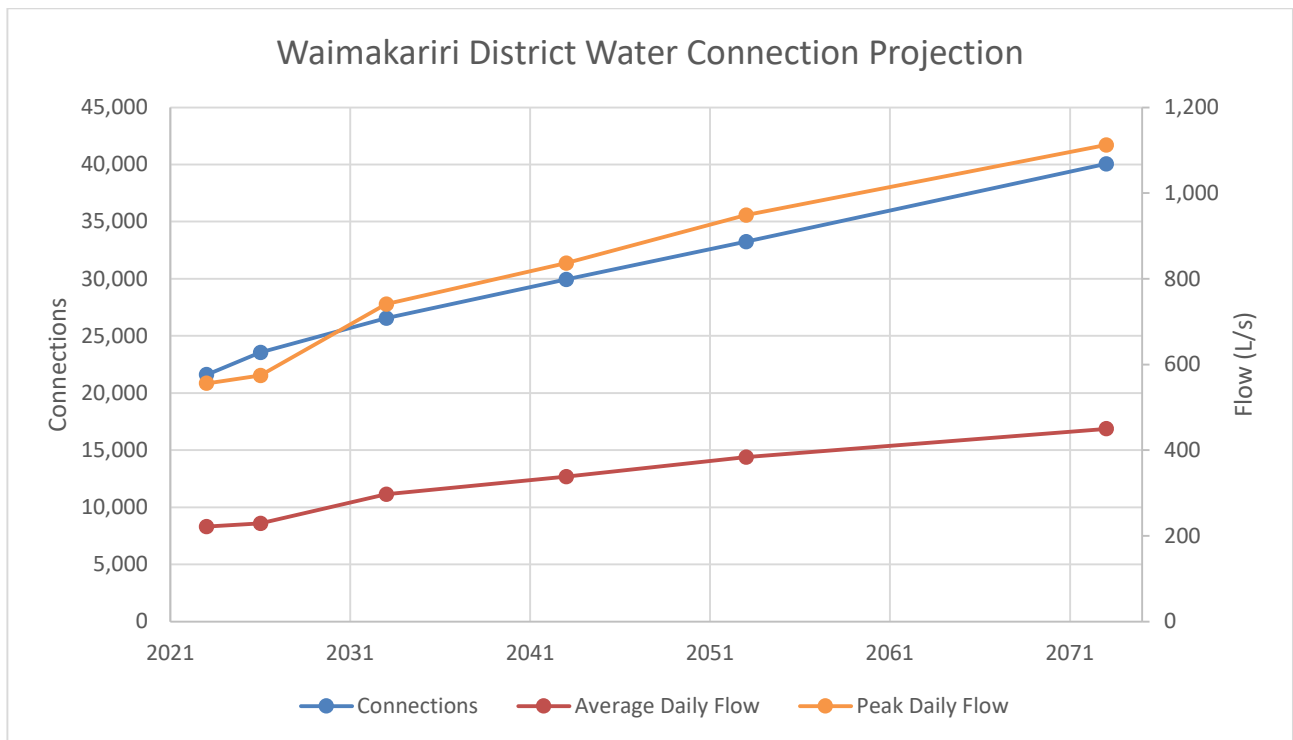
Scheme		District	Rangiora	Kaipoi	Woodend Pegasus	Oxford Urban – Rural No 2	Waikuku Beach	Cust	Mandeville - Fernside	Oxford Rural No 1	West Eyreton – Summerhill- Poyntz	Ohoka	Garrymere
	20 yrs (2043)	338 L/s	128 L/s	73 L/s	61 L/s	24.1 L/s	9.7 L/s	2.2 L/s	14.7 L/s	12.1 L/s	7.4 L/s	3.6 L/s	1.7 L/s
	30 yrs (2053)	384 L/s	143 L/s	81 L/s	78 L/s	25.0 L/s	10.2 L/s	2.3 L/s	16.3 L/s	13.2 L/s	8.4 L/s	4.3 L/s	1.8 L/s
	50 yrs (2073)	450 L/s	176 L/s	92 L/s	92 L/s	27.3 L/s	11.0 L/s	2.4 L/s	18.1 L/s	15.2 L/s	9.3 L/s	4.9 L/s	1.9 L/s
Projected Peak Daily Flow	Current	556 L/s	208 L/s	127 L/s	91 L/s	41.9 L/s	22.7 L/s	5.4 L/s	21.0 L/s	19.8 L/s	10.8 L/s	5.2 L/s	3.3 L/s
	10 yrs (2033)	741 L/s	267 L/s	171 L/s	138 L/s	49.5 L/s	23.3 L/s	5.5 L/s	33.2 L/s	26.6 L/s	16.6 L/s	6.9 L/s	3.3 L/s
	20 yrs (2043)	836 L/s	321 L/s	183 L/s	144 L/s	60.1 L/s	24.3 L/s	5.6 L/s	36.8 L/s	30.4 L/s	18.4 L/s	9.0 L/s	3.3 L/s
	30 yrs (2053)	948 L/s	356 L/s	201 L/s	189 L/s	62.4 L/s	25.5 L/s	5.7 L/s	40.7 L/s	32.9 L/s	21.0 L/s	10.9 L/s	3.3 L/s
	50 yrs (2073)	1,112 L/s	440 L/s	229 L/s	219 L/s	68.4 L/s	27.6 L/s	5.9 L/s	45.3 L/s	37.9 L/s	23.1 L/s	12.3 L/s	3.3 L/s

Note that the above growth forecasts will not necessarily directly match the number of growth connections shown in the LTP or financial sections of the Infrastructure Strategy. The above figures were generated based on growth forecasts provided by the Development Planning Unit, in January 2023, which allows sufficient time to carry out the work necessary reticulation modelling to plan the infrastructure upgrades required to accommodate the growth. Capital budgets are then developed from this planning work, which feed into the recommended capital projects within the AMPs and LTP.

Late in 2023 the Finance department carry out a separate process, using the same base growth data, to estimate the number of connections for rate income forecasts. Not only do Finance have more recent data to base their forecasts on (for example whether a particular subdivision is / is not going ahead) but they also have a different perspective. To be conservative they will tend to minimise the connection numbers (to be conservative in terms of expected rating income), whereas for infrastructure planning, being conservative will tend to maximise the potential numbers to ensure that growth can be accommodated without compromising levels of service.

Figure 3 presents the projected growth for the Waimakariri District’s Water Supply connections.

**Figure 3: Water Connection Projection**



## CAPACITY & PERFORMANCE

This section of the AMP considers the capacity and performance of the Council's Water Supply Schemes, for current demand, and forecast growth. The specific aspects of the scheme that have been considered are the source, treatment, storage, headworks, and reticulation system. All of the upgrades mentioned in the text have been included in the Capital Programme detailed in this AMP and the Long Term Plan budgets

Capacity and performance, and LOS deficiency, are monitored and analysed using hydraulic water models developed and maintained by the Council for each scheme. The demand profiles in the models are based on flow records collected from the Council's SCADA system and analysed by the Project Delivery Unit to obtain peak daily diurnal flow profiles.

The Council models and flow data that supports the models, are updated approximately quarterly and the capacity assessments undertaken for this AMP represent the latest available information.

A Growth report is produced every three years in advance of the AMP reviews, from which the summary information set out below is taken. The report which details the 50 year growth modelling and required upgrades can be viewed on TRIM [231206196569](#)

Future demands are considered across 5 development horizons

- 0 Years (existing)
- 0-10 Years
- 10-20 Years
- 20-30 Years
- 30-50 years

For redundancy purposes Council plans capacity for its water supply sources on the basis that one of the primary wells is out of operation at any given time, and a further contingency is introduced through assuming 10% down time, which increases required source capacity above the Peak Daily Flow.

## Source

Source capacities and growth forecasts are summarised in Table 21 below.

**Table 21: Scheme Capacities and Growth Forecasts**

Scheme		Rangiora	Kaiapoi	Woodend Pegasus	Oxford Urban – Rural No 2	Waikuku Beach	Cust	Mandeville - Fernside	Oxford Rural No 1	West Eyreton – Summerhill- Poyntz	Ohoka	Garrymere
Source Capacity	Total Primary Capacity	320 L/s	333 L/s	185 L/s	89 L/s	61 L/s	8.5 L/s	25 L/s	36 L/s	46 L/s	12.8 L/s	4.5 L/s
	Available Primary Capacity*	270 L/s	255 L/s	148 L/s	44 L/s	35 L/s	8.5 L/s	25 L/s	30 L/s	30 L/s	12.8 L/s	4.5 L/s
	Total Backup Capacity	86 L/s	26 L/s	25 L/s	23 L/s	-	6.1 L/s	14 L/s	40 L/s	8 L/s	18.0 L/s	-
Growth Forecast Required Capacity	Current	229 L/s	140 L/s	100 L/s	46 L/s	25 L/s	5.9 L/s	23 L/s	22 L/s	12 L/s	5.7 L/s	3.6 L/s
	10 yrs (2033)	294 L/s	188 L/s	152 L/s	54 L/s	26 L/s	6.1 L/s	37 L/s	29 L/s	18 L/s	7.6 L/s	3.6 L/s

	20 yrs (2043)	353 L/s	201 L/s	158 L/s	66 L/s	27 L/s	6.2 L/s	40 L/s	33 L/s	20 L/s	9.9 L/s	3.6 L/s
	30 yrs (2053)	392 L/s	221 L/s	208 L/s	69 L/s	28 L/s	6.3 L/s	45 L/s	36 L/s	23 L/s	12.0 L/s	3.6 L/s
	50 yrs (2073)	484 L/s	252 L/s	241 L/s	75 L/s	30 L/s	6.5 L/s	50 L/s	42 L/s	25 L/s	13.5 L/s	3.6 L/s
Projected Upgrades		70 L/s (2024)	70 L/s (2024)	50 L/s (2025)	45 L/s (2024)	45 L/s (2070)	-	2 x 25 L/s (2024)	30 L/s (2025)	-	12.5 L/s (2061)	-
		70 L/s (2050)	70 L/s (2035)	50 L/s (2050)					10 L/s (2040)			
		70 L/s (2060)										
Future 50 yrs Source Capacity		480 L/s	395 L/s	248 L/s	89 L/s	80 L/s	8.5 L/s	50 L/s	46 L/s	30 L/s	25.3 L/s	4.5 L/s

\*Available Primary Source capacity assumes n+1 redundancy is maintained in the primary sources

*Note that during some growth periods the projected source upgrades may significantly exceed the required capacity to reduce operational storage requirements and offset storage upgrades on the scheme*

The theoretical required source capacity is calculated based on the projected peak daily flow for each scheme with the assumption that storage is used to buffer variable demand throughout the day. Due to the availability of significant artesian groundwater sources in Kaiapoi and Waikuku Beach these schemes have minimal or no above ground storage so the projected upgrades to source capacity on these schemes are significantly higher to offset the lack of available storage.

## **Treatment**

Currently all of the Council supplies are chlorinated. Council will continue to explore options for obtaining exemptions to chlorination, but this is likely to be cost prohibitive

UV equipment is being installed at all headworks sites, with completion expected in 2024/25.

Under DWSNZ it was assumed that all water supplies were plumbosolvent, which is defined as water that is able to dissolve lead easily. Water that has low pH tends to be slightly corrosive and therefore plumbosolvent. Risk was mitigated through a requirement for water suppliers to notify customers regularly of the risk, and how to manage it at the consumer level.

That requirement no longer applies, and Councils are now required to have sampling plans in place, and to ensure water is supplied with plumbosolvent metals at less than the MAV.

No budget provision has been made for fluoridation equipment.

## **Storage**

Storage is supplied to meet the level of service target. Required storage is calculated to meet

- Operational Requirements
- Emergency Storage Requirements including
  - Loss of Source
  - Fire Fighting

Table 22 below presents the storage capacity required to meet the level of service, versus the projected increases in available storage over the coming 50 years, taking into account planned storage upgrades.

**Table 22: Scheme Storage Requirements and Capacity**

Scheme		Rangiora	Kaiapoi	Woodend Pegasus	Oxford Urban – Rural No 2	Waikuku Beach	Cust	Mandeville - Fernside	Oxford Rural No 1	West Eyreton – Summerhill-	Ohoka	Garrymere
Current Storage Volume		8,800 m <sup>3</sup>	800 m <sup>3</sup>	4,990 m <sup>3</sup>	830 m <sup>3</sup>	-	162 m <sup>3</sup>	353 m <sup>3</sup>	250 m <sup>3</sup>	304 m <sup>3</sup>	108 m <sup>3</sup>	81 m <sup>3</sup>
Growth Forecast Required Volume	Current	4,830 m <sup>3</sup>	420 m <sup>3</sup>	3,080 m <sup>3</sup>	600 m <sup>3</sup>	-	95 m <sup>3</sup>	285 m <sup>3</sup>	359 m <sup>3</sup>	219 m <sup>3</sup>	74 m <sup>3</sup>	61 m <sup>3</sup>
	10 yrs (2033)	5,940 m <sup>3</sup>	390 m <sup>3</sup>	6,410 m <sup>3</sup>	790 m <sup>3</sup>	-	101 m <sup>3</sup>	319 m <sup>3</sup>	418 m <sup>3</sup>	245 m <sup>3</sup>	107 m <sup>3</sup>	65 m <sup>3</sup>
	20 yrs (2043)	9,870 m <sup>3</sup>	280 m <sup>3</sup>	5,670 m <sup>3</sup>	980 m <sup>3</sup>	-	107 m <sup>3</sup>	353 m <sup>3</sup>	477 m <sup>3</sup>	271 m <sup>3</sup>	140 m <sup>3</sup>	69 m <sup>3</sup>
	30 yrs (2053)	10,770 m <sup>3</sup>	287 m <sup>3</sup>	6,440 m <sup>3</sup>	1,080 m <sup>3</sup>	-	111 m <sup>3</sup>	391 m <sup>3</sup>	517 m <sup>3</sup>	306 m <sup>3</sup>	173 m <sup>3</sup>	73 m <sup>3</sup>
	50 yrs (2073)	12,660 m <sup>3</sup>	430 m <sup>3</sup>	8,860 m <sup>3</sup>	1,250 m <sup>3</sup>	-	122 m <sup>3</sup>	435 m <sup>3</sup>	596 m <sup>3</sup>	340 m <sup>3</sup>	191 m <sup>3</sup>	77 m <sup>3</sup>
Projected Upgrades		4,300 m <sup>3</sup> (2034)	-	2 x 1,350 m <sup>3</sup> (2032)	500 m <sup>3</sup> (2039)	-	-	353 m <sup>3</sup> (2043)	350 m <sup>3</sup> (2029)	30 m <sup>3</sup> (2050)	30 m <sup>3</sup> (2033)	-
		4,300 m <sup>3</sup> (2070)		2 x 1,350 m <sup>3</sup> (2058)						30 m <sup>3</sup> (2060)	200 m <sup>3</sup> (2070)	
Future 50 yrs Storage Capacity		17,400 m <sup>3</sup>	800 m <sup>3</sup>	9,490 m <sup>3</sup>	1,330 m <sup>3</sup>	-	162 m <sup>3</sup>	706 m <sup>3</sup>	600 m <sup>3</sup>	364 m <sup>3</sup>	200 m <sup>3</sup>	81 m <sup>3</sup>



*Note that during some growth periods the required storage volume may decrease in response to planned source upgrades or network amalgamations reducing the operational storage requirement on the scheme*

The 2058 planned storage upgrade on the Woodend Pegasus scheme features the replacement of two existing 450 m<sup>3</sup> tanks at the Chinnerys Road headworks site with two 1,350 m<sup>3</sup> tanks, increasing the total storage by 1,800 m<sup>3</sup>.

The 2070 planned storage upgrade on the Ohoka scheme features the replacement of five 30 m<sup>3</sup> tanks (including the planned 2033 upgrade) with a single 200 m<sup>3</sup> tank.

Oxford Rural No. 1 available volume will be reduced in the short term due to planned decommissioning of existing Chalk Hill storage tanks. Storage upgrade for the scheme has been planned for 2028/29 and a second source and pipe upgrade works is underway to be completed in 2024/25 to maintain level of service and provided redundancy for the supply.

### Peak Demand

Table 23 presents the surface pump capacity required to meet the level of service, versus the projected increases peak hourly flow over the coming 50 years, taking into account planned upgrades.

**Table 23: Scheme Surface Pump Requirements and Capacity**

Scheme		Rangiora	Kaiapoi	Woodend Pegasus	Oxford Urban – Rural No 2	Waikuku Beach	Cust	Mandeville - Fernside	Oxford Rural No 1	West Eyreton – Summerhill-	Ohoka	Garrymere
Total Pump Capacity		700 L/s	340 L/s	272 L/s	-	47 L/s	25.5 L/s	54 L/s	-	35.0 L/s	31.3 L/s	7.5 L/s

Headworks Surface Pump Capacity	Available Pump Capacity*	600 L/s	255 L/s	237 L/s	-	35 L/s	17.0 L/s	36 L/s	-	21.5 L/s	15.3 L/s	5.5 L/s
	Total Backup Capacity	86 L/s	-	-	-	-	-	8 L/s	-	-	-	-
Growth Forecast Required Capacity	Current	408 L/s	220 L/s	172 L/s	55 L/s	33 L/s	8.7 L/s	31 L/s	24 L/s	11.6 L/s	8.1 L/s	4.6 L/s
	10 yrs (2033)	518 L/s	323 L/s	268 L/s	76 L/s	35 L/s	8.9 L/s	33 L/s	27 L/s	12.9 L/s	9.2 L/s	4.6 L/s
	20 yrs (2043)	626 L/s	348 L/s	281 L/s	97 L/s	37 L/s	9.1 L/s	37 L/s	30 L/s	14.2 L/s	11.3 L/s	4.6 L/s
	30 yrs (2053)	703 L/s	386 L/s	366 L/s	101 L/s	39 L/s	9.3 L/s	41 L/s	33 L/s	16.9 L/s	13.2 L/s	4.6 L/s
	50 yrs (2073)	884 L/s	444 L/s	433 L/s	106 L/s	44 L/s	9.7 L/s	45 L/s	38 L/s	18.0 L/s	14.6 L/s	4.6 L/s
Projected Upgrades		100 L/s (2030)	85 L/s (2038)	66 L/s (2026)		45 L/s (2070)		18 L/s (2040)		4.0 L/s (2045)		
		100 L/s (2068)	85 L/s (2038)	44 L/s (2027)								
		100 L/s (2068)	19 L/s (2068)	44 L/s (2032)								
				42 L/s (2043)								
				55 L/s (2048)								

			33 L/s (2058)								
Future 50 yrs Available Pump Capacity	900 L/s	444 L/s	440 L/s	-	80 L/s	17.0 L/s	54 L/s	-	25.5 L/s	15.3 L/s	5.5 L/s

\*Available Pump capacity assumes n+1 redundancy is maintained in the surface pumps at each scheme

Oxford Urban and Oxford No 2 are supplied via reservoirs that fed via gravity into the network. This is supplemented by flow from the Domain Road well pumps. There are no surface pumps on the system other than two sets of booster pumps to boost pressures in the Oxford Rural No 2 part of the scheme. The required capacity figures for the scheme represent the forecast peak hourly flow demand.

Oxford No 1 is supplied directly from well pumps at McPhedrons Road and the deep well at Rockford Road. There are no surface pumps on the scheme other than a booster pumpset to pump water to the Chalk Hill tanks. These booster pumps are programmed to be removed along with the Chalk Hill tanks. The required capacity figures for the scheme represent the forecast peak hourly flow demand.

## **Reticulation**

The capacity of all the water supply headworks and reticulation has been assessed using calibrated reticulation models. The models confirm that all the existing reticulation systems have adequate capacity for the existing demands. However, substantial reticulation upgrades will be required to accommodate future growth on the scheme.

There are 85 growth related reticulation upgrades recommended in the LTP period. The larger reticulation upgrades are the 375mm/300mm diameter Northeast Rangiora Supply Main (URW0123) and the 100mm/200mm diameter Merton and Priors Road upgrades to service the proposed Rangiora Airfield development (URW0290). These are both anticipated to be upgrades triggered by growth, and partly developer and development contribution funded.

Cost estimates have been undertaken for all projects and included in the 2024-34 LTP.

## **Consents**

A consent is required for the water abstraction at each source within the District. The effect on the water source is considered as part of the assessment of environmental effects. This includes an assessment of impact on other users. The conditions of consent also require that the Council has in place measures to conserve water. The consent process, which is the responsibility of the Regional Council (ECan), is intended to ensure that the long-term abstraction and water use by multiple users from water sources is sustainable.

A spreadsheet of the Council's water supply takes for the Council's 11 schemes is available at TRIM [230621091962](#). The Levels Of Service section has LOS related to meeting consent requirements.

## 14 OPERATION AND MAINTENANCE

Operation and maintenance (O&M) expenditure incorporates the day to day running of the water supply network and allows the system to carry on functioning to deliver the agreed levels of service.

The O&M programme includes a combination of reactive and planned tasks. Examples of the differing nature of these tasks is summarised below:

**Table 24: Overview of Planned and Reactive Maintenance Tasks**

Task	Planned	Reactive
Headworks Maintenance	Frequent inspections (typically weekly) and basic maintenance	If required for particular headworks items in response to alarms, or defects noted as part of inspections.
Water Quality Sampling	Planned samples are taken in accordance with DWQAR requirements	If required in response to an event, triggered by planned sampling
Generator Checks	Planned monthly, quarterly and annual checks	If required in response to alarms
Chemical Monitoring	Monitoring and top-ups are part of planned headworks inspections	If required in response to alarms
Restrictor Checks	Planned periodic checks are undertaken to ensure correct flow received.	If required in response to customer complaints
Backflow Preventer Tests	Annual testing is completed in accordance with Water Services Act (2021).	If required in response to a suspected backflow event.
Pipe repairs	No planned repairs	Repairs undertaken in response to service requests / leaks.
Valve repairs	No planned repairs	Repairs undertaken in response to service requests / leaks.

Council has recently implemented additional asset management functionality to its asset register, via the Asset Management Information System (AMIS) project.

Water supply pipe burst costs are now automatically linked to pipe asset ID's and mapped, to help better understand the performance of the network and in particular the performance of the different pipe materials being used throughout the district. The devices field workers use to record these costs, are also configured to enable the field recording of asset data. This automatically updates the asset register, and will allow faulty asset data to be readily corrected directly from the field. It had been expected that in time, this new functionality will enable Council to better understand it's maintenance costs, and move towards more informed asset management decision making. Identifying burst history, critical assets, assessing the risks and replacing mains prior to failure would ultimately reduce operational repair work. Unfortunately there is some doubt about

the continuation of the system as Council's enterprise software, to which the asset management system is linked, is to be replaced.

3 Water has a Service Level Agreement with its in house operations arm, The Water Unit, which includes a fully priced schedule of works. Prices are reviewed annually. Scheduled prices have been incorporated into the works order system associated with the Asset Management Information System.

The SLA includes comprehensive KPI's to be monitored, which are expected to improve accountability and quality assurance, over time.

### **Operation & Maintenance Expenditure**

The operation and maintenance (O&M) budgets are currently set up to automatically account for inflation and growth. Inflation is accounted for with a factor set by the Council's Finance Unit, but this is not used in the development of the graphs and tables in the AMPs to provide a clearer comparative picture of asset O&M costs year to year.

The implication of growth on O&M budgets is accounted for with the inclusion of a formula that increases the O&M costs on a pro rata basis proportionally with the population (as new developments come online). However, depending on asset class the increase in O&M costs may be reduced from being directly proportional.

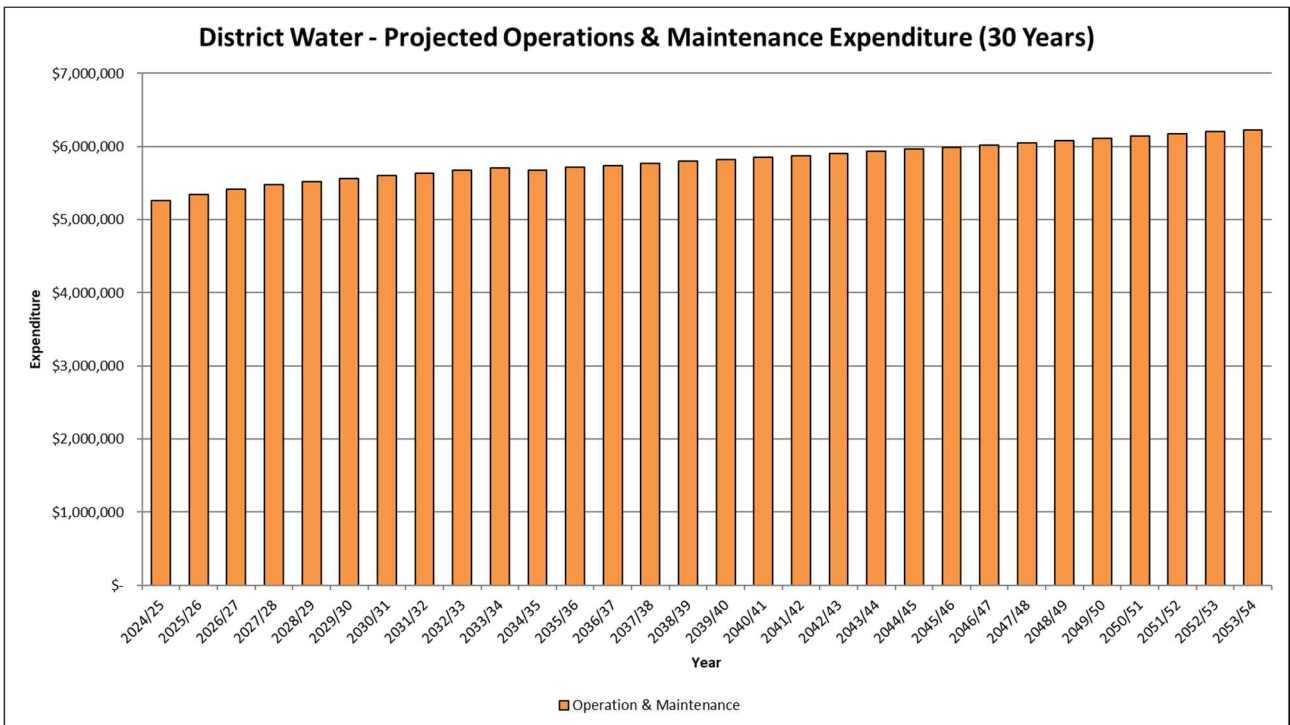
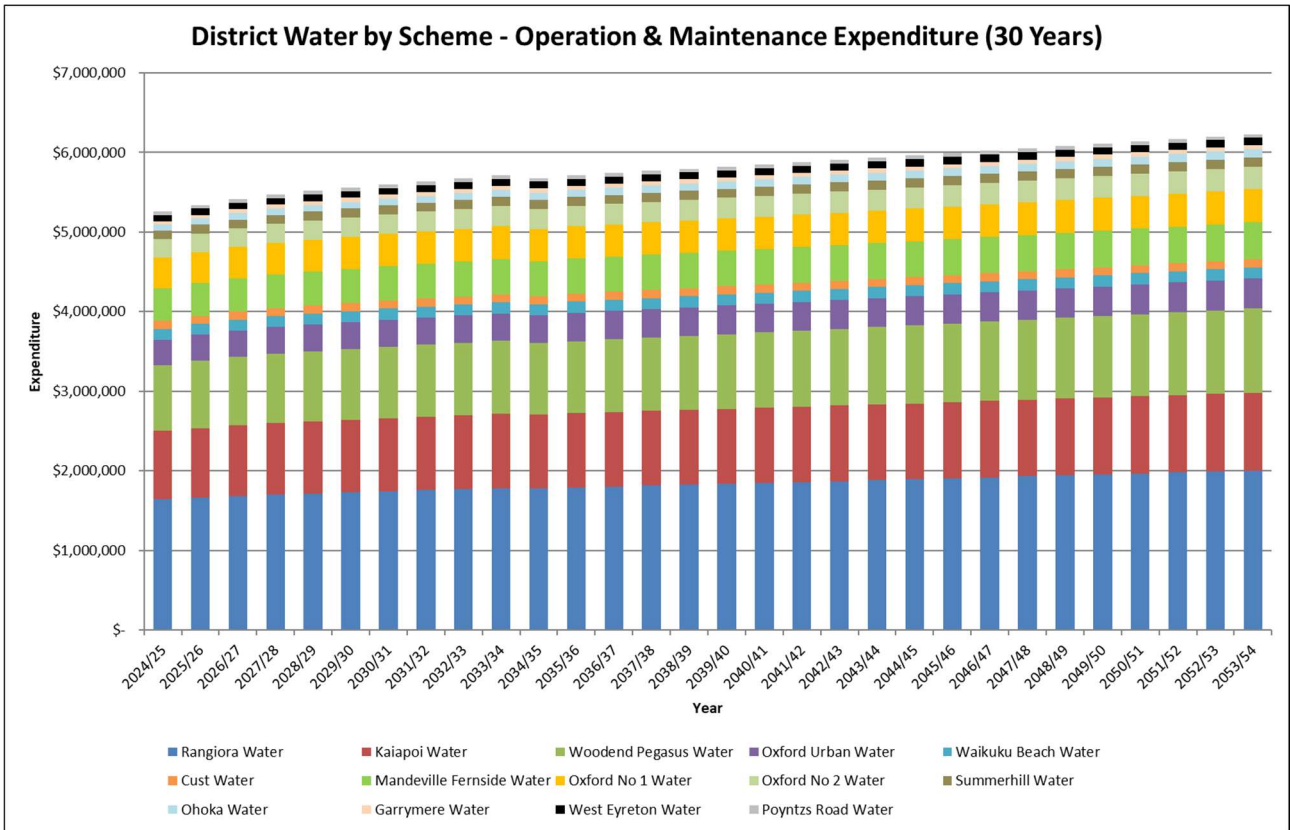
This is adjusted using a 'Demand Factor'. So for example costs for a particular scheme to maintain the network pipes and valves is expected to increase directly in proportion to increasing numbers of connections, but maintenance of pump maintenance costs are only expected to increase at 50% of the rate of the increasing number of connections.

In addition to the automated increases, part of the consideration when setting the O&M budgets across the district's schemes is the potential impact of any new capital projects. These increases are accounted for in two ways:

- **Direct O&M Increases:** Through Asset Managers calculating what areas of the budget may increase, and manually adjusting the appropriate parts of the budgets from the year following when the capital project will be completed. An example of this would be a new headworks being constructed. This would require power costs to be reviewed (as the new headworks would consume power), as well as items related to headworks inspections and maintenance.
- **Depreciation Increases:** Changes in depreciation as a result of new capital projects are accounted for by the Council's Finance team. As a new capital budget is introduced to a scheme, there is a formula to increase the depreciation amount for that scheme based on the size of the capital budget being assumed to represent the value of the assets being added, and the asset life being assigned a representative figure for that scheme (depreciation rates are typically in the order of 1.5% to 2.5% of the value of assets added for example). Normally a comprehensive valuation is carried out every three years, which then assigns accurate valuation rates and base lives to any new assets created in the last years, to refine the accuracy of the depreciation rates further. With increased inflation over the last few years, the most recent valuation was carried out a year earlier

Figure 4 presents the forecast Operations and Maintenance Expenditure across all the Council's water schemes for the following 30 year period. Maintenance budgets are sufficient to carry out maintenance of the system, which remains largely reactive and there are no known items of maintenance which have been deferred from budgetary constraints.

**Figure 4: District Overview - Projected Operation & Maintenance Expenditure**



## 15 CAPITAL WORKS APPROVAL

The Waimakariri District Council has previously developed a process for justifying any new capital works projects being submitted for inclusion in the draft Annual Plan or LTP. However, this has so far not become well embedded in the Council's processes, and so improvements are now being made, and rolled out in time for the 2024-34 LTP.

In particular, projects in years 1-3 of the LTP with value greater than \$500,000 require a "Business Case Light" application, and projects of a greater value than \$4M in years 1-3 require a full business case to be written. Projects in years 4-10 with a value greater than \$500,000 require a slightly less robust 'Justification Form' application.

In general the forms require:

- Project description and scope;
- Strategic case – LOS, growth or renewal. Contribution to Community Outcomes, national programmes and public value benefits;
- Risks and assumptions;
- Economic case – Preferred option and alternatives considered;
- Financial case – Requested budget, (components –LOS, growth, renewal), expensed component, funding sources (DC's if relevant), effect on rates and budget confidence;
- Management Case – ability to deliver and how.

Through each Annual Plan and Long Term Plan process, Project Justification forms are prepared for projects that meet the criteria for requiring them. These require the relevant Department Manager's approval before being presented to the Council's Management Team as part of submitting the overall budget proposal from each service area. Ultimately what is approved by the Management Team is presented to Council to review as the Draft Long Term Plan or Annual Plan budget.



## 16 RENEWALS

Renewal expenditure is work that does not increase the capacity of the existing asset, rather it is work to replace existing assets and maintain the original capacity of the system. Renewal work is funded from a budget generated by the depreciation component of the rates.

Council uses a risk-based renewals programme for pipework which incorporates the following criteria:

- Burst History – the number of bursts in the previous three years collected as part of the new maintenance data collection programme. Includes analysis work explained in the Asset Condition section
- Remaining Useful Life – based on the design life, as used previously.
- Vulnerability – a function of location, material and joint type.
- Criticality – the criticality score calculated for each main which is determined from various factors e.g. pipe material type. Details are shown in Table 14

The process uses a GIS model that incorporates the above factors and utilises existing Asset Management Information System data in the GIS.

The model enables an assessment to be made of the depreciation required to fund future replacement costs, for different levels of risk. This allows risk and affordability to be balanced. Key outputs from the model are a prioritised list of pipe renewals needed across the district, identified by scheme, and an annual expenditure profile for the next 150 years. A schematic of the modelling process is shown below in Figure 6.

A potential emerging pipe renewals risk is the health issue associated with the replacement of asbestos cement pipes in private property that will be coming to the end of their lives in the medium term future. A policy has not yet been established as to the approach to be taken with abandoned pipes, but the potential exists to significantly increase renewal costs above those currently used.

The model developed for headworks uses the same methodology as the pipe renewals model, but as knowledge of the headworks condition is not to as high a standard as the reticulation, standard industry lives for the relevant asset classes have been used as inputs to the headworks renewals model. As the headworks criticality model is still under development, a simplified renewals assessment methodology has been used in the interim, which does not factor in criticality.

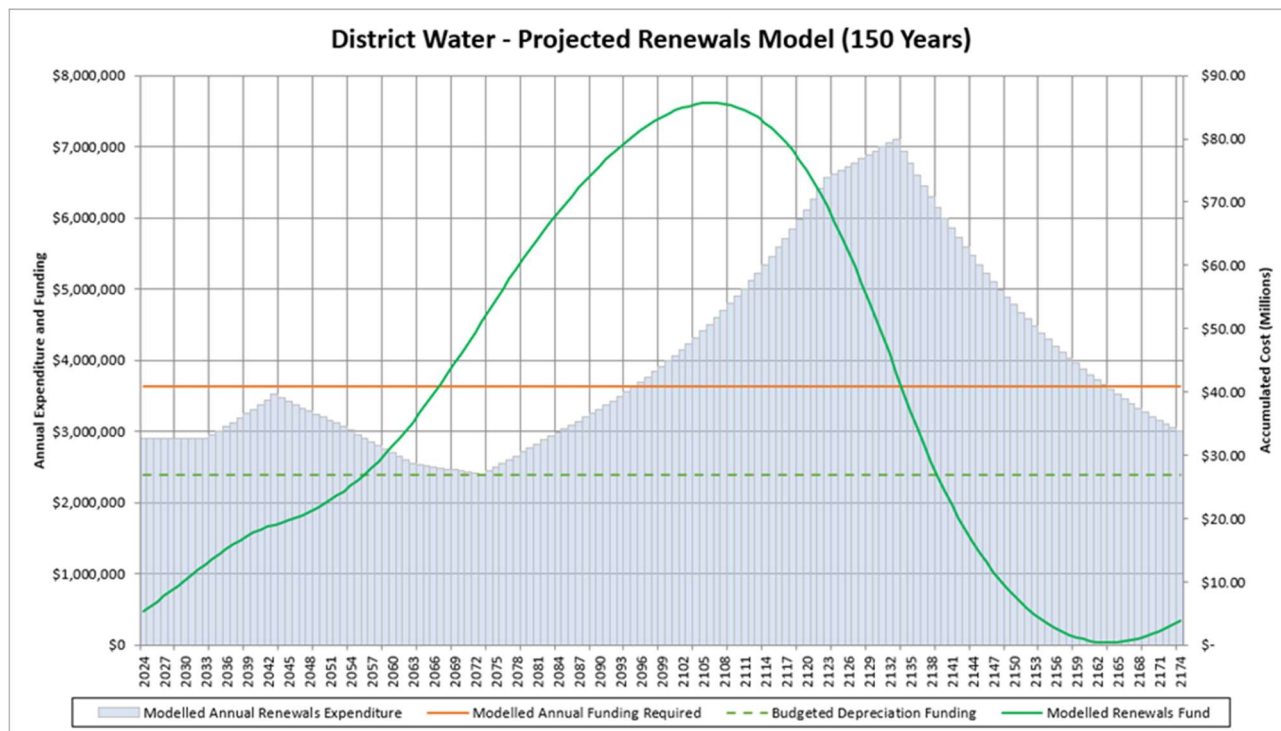
The final decision about pipe renewals to be carried out in a particular year is made by the Asset Manager, taking into account opportunities for coordination of works (i.e. Roading projects and other utilities renewals that may be planned) and any other operational requirements.

### **District Wide – Renewals Expenditure**

Figure 5 presents the forecast Renewals Expenditure across all the Council's water schemes for the following 150 year period. The horizontal line is the required level of funding to ensure that renewals are not deferred, and current levels of service are maintained.

The figure only shows the output from the model, so expenditure shown in the graph for the first ten years may be different from the expenditure shown in the LTP, as adjustments may have been made by the Asset Manager to the direct renewals model outputs.

**Figure 5: District Wide Projected Renewals Expenditure**



The key parameters in the figure above are explained below:

- **Modelled Annual Renewals Expenditure:** This is the direct output from the renewals model, recommending the annual investment to be made in renewals each year.
- **Modelled Annual Funding Required:** This is the amount of annual renewals funding required, to ensure there are sufficient funds available to carry out the recommended annual renewals each year.
- **Budgeted Depreciation Funding:** This is the actual amount of depreciation being collected, which is extracted from the Council’s budgets.
- **Modelled Renewals Fund:** This is the modelled balance in the renewals account, assuming the annual funding and annual expenditure is completed as per the recommendations from the renewals model. As can be seen, this account goes into surplus, peaking at approximately \$50 million in the year 2105, before being drawn down over the following 50 years.

The key point to note is that the Budgeted Depreciation Funding is less than the Modelled Annual Funding Required. The reason for this difference is the use of a discount factor.

- **Depreciation Discount Factor:** Council’s financing of future renewals incorporates the expectation that depreciation funding can be invested at a higher rate of return over the life of the assets than inflation. Further information regarding this approach is provided in the Finance Policy. This concept is embodied in the scheme budgets in the form of a discount rate (referred to in the budgets as the ‘Depreciation Discount Factor’). This reduces the annual depreciation funding required from rates, while still ensuring that there will be sufficient funding available to renew assets at the end of their useful life. The renewals model assumes funds can be invested at a 1% marginal interest rate higher than inflation when considered over the long term.

There are a wide number of factors influencing specific planning for renewals projects, which means that the outputs from the renewals model may not be strictly followed, at least in the first ten years. Where specific projects have not been identified in the first three years of the LTP, the total recommended budget from the first ten years of the model are redistributed over years 4 to 10. Funding can be brought forward if and when specific projects are identified. For water supply the difference between model outputs and the planned budget is shown in the table below

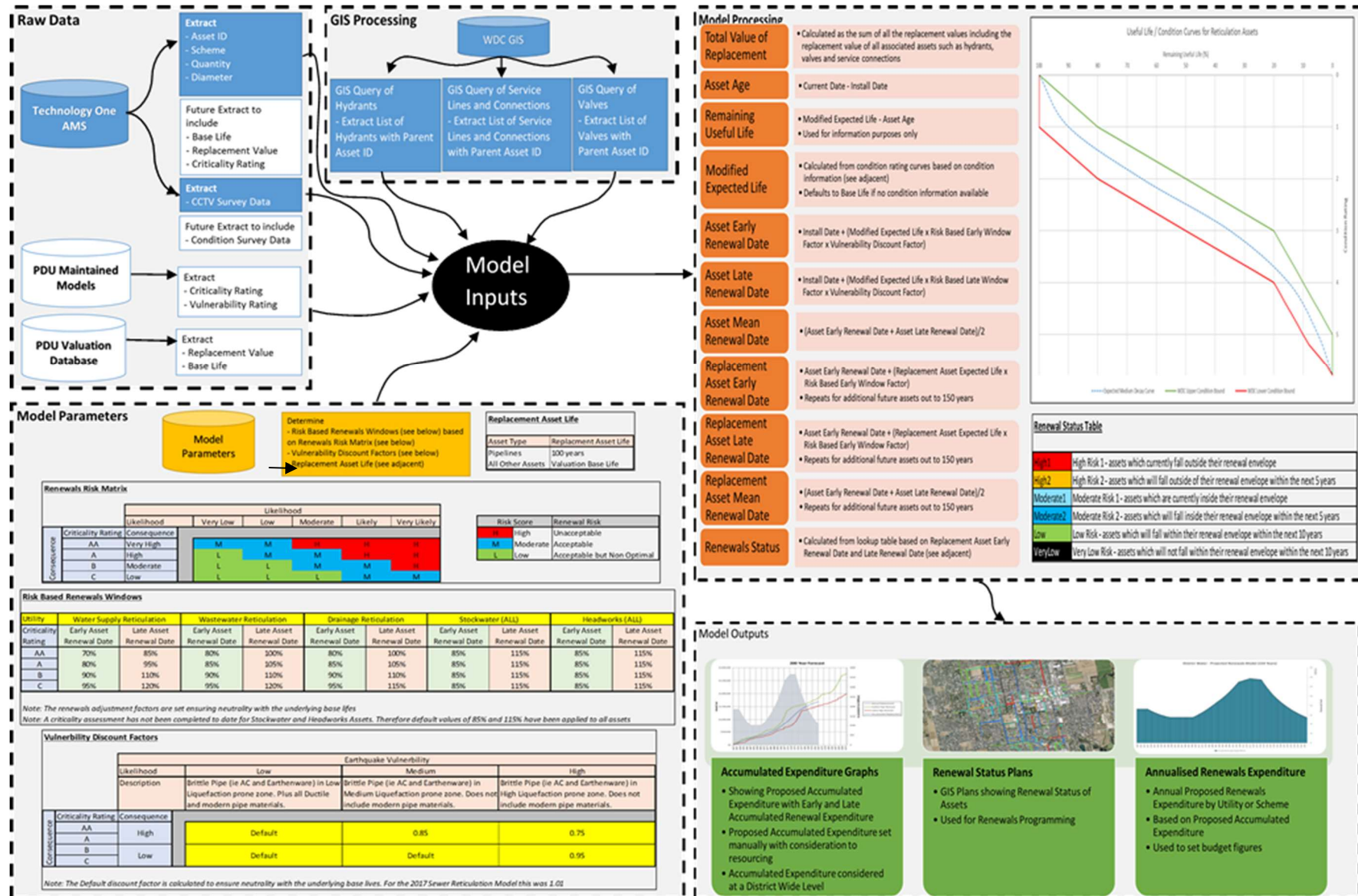
**Table 25: Planned Budget Versus Renewals Model Recommendation 2024-34**

	<b>Renewals model recommendation</b>	<b>Planned Budget</b>	<b>Budget as a percentage of model recommendation</b>
Reticulation	\$18,000,000	18,807,000	104%
Headworks	\$11,000,000	11,453,000	104%
Total	\$29,000,000	30,260,000	104%

Beyond the first 10 year window, the outputs from the renewals model have been fully adopted to inform the renewals budgets for each scheme. There are no known deferred renewals of assets across the district.

The mechanics of the renewals model are outlined further in Figure 6.

**Figure 6: Renewals Expenditure Models**



## **Scheme – Reticulation Renewal Timelines – Spatial view**

The [AMP Plans and Figures Viewer](#) contains plans by scheme of the pipe renewal timeframes generated by the model, in three bands; within 5 years, 15 years and 25 years.

## 17 NEW WORKS

There are a number of drivers for new works in the District that come together to produce the capital works programme, in addition to renewals. These are:

1. The capacity assessments provide details on any shortfall on the schemes and new works are prioritised to address these, the primary influence being growth.
2. The Levels of Service highlight any deficiencies in the quality of service provided to customers, which can then trigger new projects to address any highlighted deficiencies.
3. Risk assessments (including those incorporated in the Water Safety Plans) generate projects and works required to mitigate risk, and ensure drinking water safety standards are met.
4. Works are also identified through the operation of the schemes rather than being identified through the assessment of level of service, capacity, or risk. These works are normally identified by an operator or Asset Manager and include such works as health and safety improvements, and works to ensure assets are maintained in an acceptable condition.

These sources all provide new works projects that provide a budget for the next 50 years.

When any significant project is being planned, the supporting investigations include assessment of the costs and benefits of all practicable options leading to a decision to undertake capital works. The detailed capital works table which is available in the [Asset Management Plans GIS Viewer](#) , shows the project ID for each project. Each project has an entry in the budget spreadsheets [Capital Works Budget Sheets - Water](#), which in turn provide references to supporting documentation.

Table 26 below shows the projected budgets for new works for the next 50 years for all of the District water supply schemes, including renewals. Note that while Oxford Rural Number 2, Summerhill and Poyntzs Rd are physically connected to other schemes, they are shown separately here, as they remain financially separate schemes.

The final row of the table is not a physical scheme. The District Water account was established to fund UV related upgrades equally across the district. The purpose being to manage affordability concerns particularly for small schemes with already high rates, if they were required to fund UV upgrades in addition to existing infrastructure.



**Table 26: New Works across Water Schemes Over 50 Years**

Scheme	2024 - 2033	2034 - 2043	2044 - 2053	2054 - 2073	Total
Rangiora Water	\$22,574,874	\$21,046,683	\$12,288,192	\$22,216,726	\$78,126,476
Kaiapoi Water	\$5,585,442	\$7,054,804	\$5,745,173	\$11,641,103	\$30,026,522
Woodend Pegasus Water	\$9,398,164	\$8,216,756	\$5,246,140	\$11,057,271	\$33,918,331
Oxford Urban Water	\$5,365,676	\$6,497,988	\$2,584,469	\$2,976,967	\$17,425,100
Waikuku Beach Water	\$562,998	\$1,086,706	\$1,663,845	\$3,214,978	\$6,528,527
Cust Water	\$812,273	\$3,797,488	\$662,164	\$3,172,230	\$8,444,154
Ohoka Water	\$1,089,368	\$1,416,218	\$444,260	\$1,183,580	\$4,133,426
Mandeville Fernside Water	\$2,033,085	\$2,086,914	\$1,913,388	\$2,140,417	\$8,173,804
Oxford No 1 Water	\$3,560,962	\$5,630,300	\$3,063,065	\$2,892,284	\$15,146,612
Oxford No 2 Water	\$2,901,304	\$1,576,192	\$2,612,602	\$2,206,762	\$9,296,860
Summerhill Water	\$642,999	\$676,939	\$896,264	\$1,109,835	\$3,326,038
West Eyreton Water	\$390,898	\$147,084	\$206,733	\$572,801	\$1,317,517
Poyntz Road Water	\$136,681	\$149,096	\$464,438	\$335,018	\$1,085,233
Garrymere Water	\$233,942	\$110,681	\$345,601	\$655,335	\$1,345,558
District Water	\$1,724,613	\$2,195,467	\$0	\$0	\$3,920,080
<b>Total</b>	<b>\$57,013,279</b>	<b>\$61,689,316</b>	<b>\$38,136,335</b>	<b>\$65,375,310</b>	<b>\$222,214,240</b>

**Note:** Dates refer to beginning of financial year (e.g. 2024 is 2024/25 financial year).

The figures in the table are based on the assumption that LOS requirements do not change significantly into the future, and that growth forecasts are accurate. Growth projects may be accelerated or delayed to fit actual growth patterns.

All projects are included in a central database of capital works projects, including renewals.

The front end of the data base is configured with the objective of ensuring that relevant data to the projects is captured in one place as a “single source of truth”. Where possible this data will also be used to populate the “WDC Capital Works Project Justification” template that is required to be filled in for any new project of a higher capital value than \$500,000.

When a scheme upgrade is undertaken, the supporting investigations include assessment of the costs and benefits of all practicable options leading to a decision to undertake capital works. These investigative reports are referenced in Table 7: Data References in Section 3, Scheme Description.

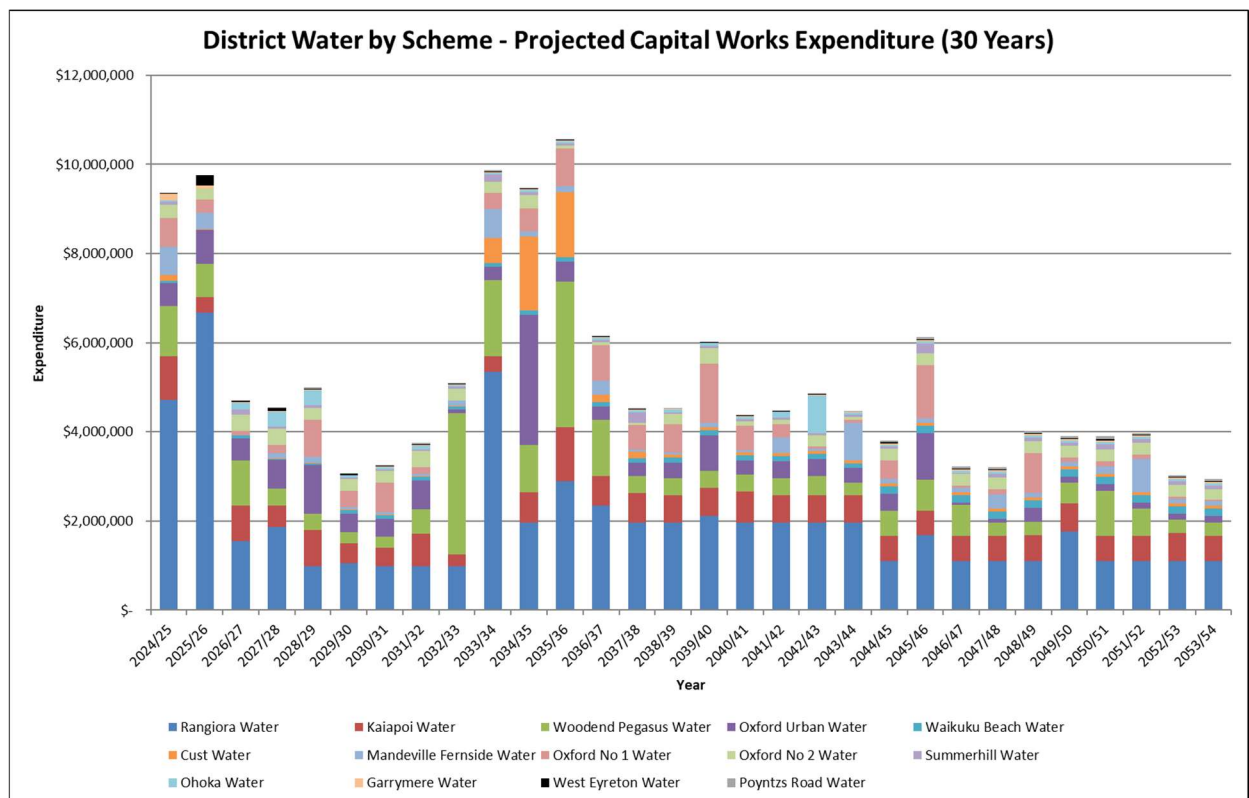
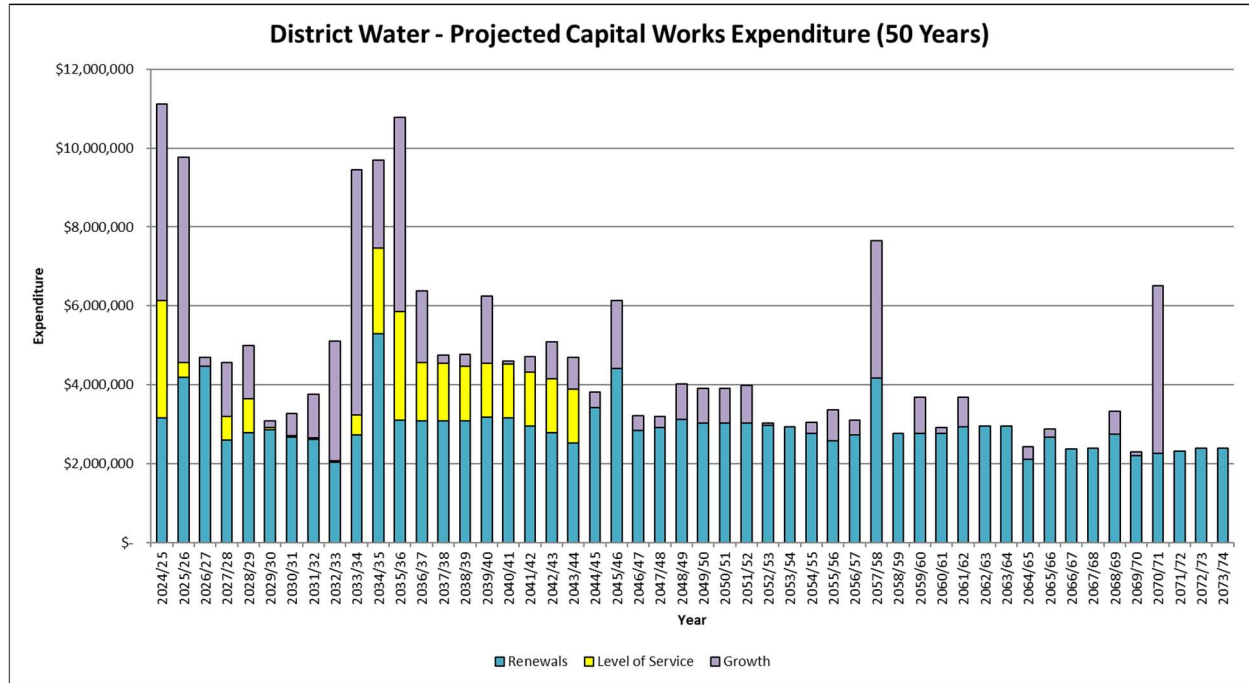
### Works Coordination

Work programmes between a combination of service types and activity areas requires appropriate coordination. Utilities Providers Coordination meetings are held quarterly between 3 Waters, Roding, power and telecommunication providers. This enables opportunities for collaboration to be identified. In addition, Council has a GIS tool where future planned works can be overlaid to optimise the coordination process further.

## District Overview – Capital Works

The following graph shows the 50 year budget for all capital works, including projects driven by growth and levels of service, including carry forwards.

**Figure 7: District Overview - Projected Capital Works Expenditure**



The table available within the [AMP Plans and Figures Viewer](#) shows all of the planned projects over a 50 year time horizon for all of the schemes, and how the cost is spread across the three components - LOS, renewals and growth. The level of confidence in the budget for the works is also presented in the table, as well as references to other documents relevant to the works, such



as options studies. The AMP appendices include maps that show the location of the planned capital works. The figures presented in the table exclude inflation for ease of comparison across years.

For a more complete discussion on the level of optimisation, refer to the introductory chapter of the AMP.

Any programme or project that occurs over a number of years, such as the renewals programme, is only shown within the table for the first year in which it occurs. The Project Value indicates the projected full total cost of the project over the number of years it occurs.

### **Scheme – Capital Upgrade Works – Spatial view**

The [AMP Plans and Figures Viewer](#) contains plans by scheme of the planned capital upgrades in 5 temporal bands over a 50 year time horizon.

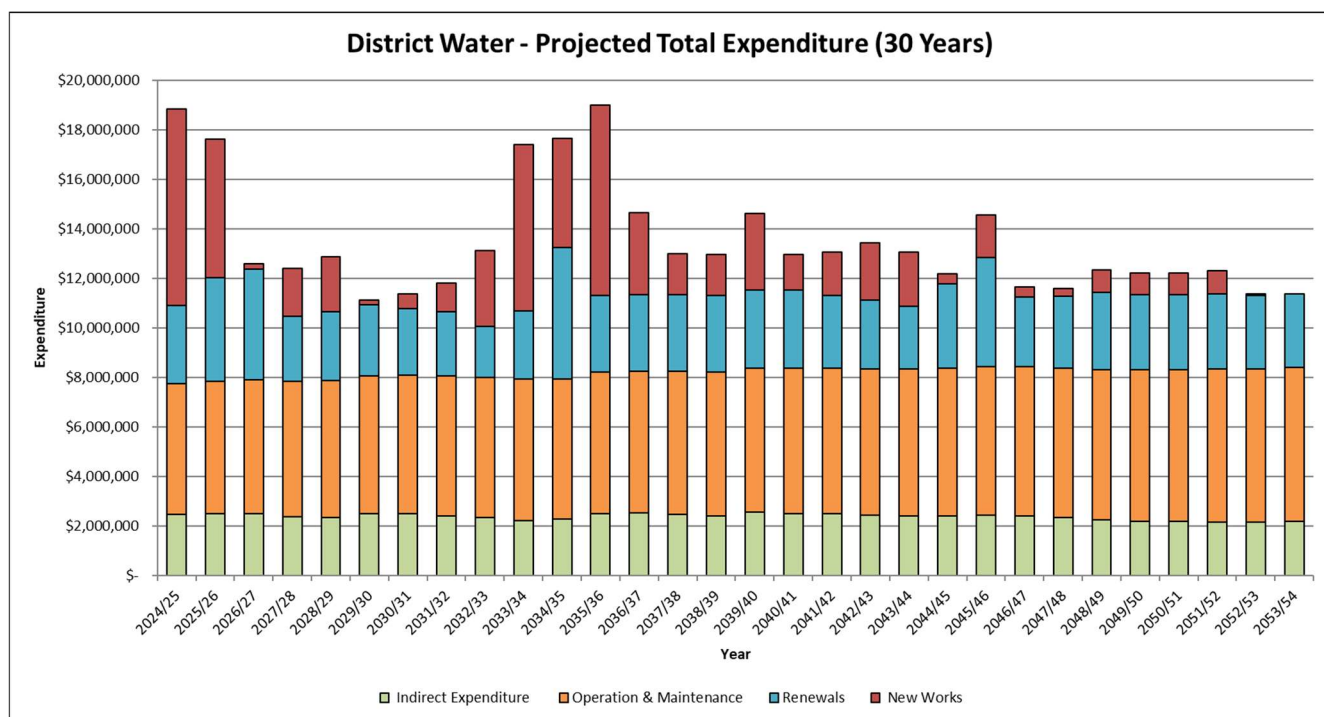
## 18 OVERALL FINANCIAL FORECASTS

The following graph summarises the breakdown of projected total expenditure over a 30 year time horizon. It includes both operational and capital expenditure.

Operational costs include operations and maintenance, and indirect expenditure. Indirect expenditure includes interest rating collection costs, costs associated with maintaining the Asset Register, interest and internal overhead costs.

Capital costs include expenditure for growth, levels of service and renewals, (including carry forwards).

**Figure 8: District Overview - Total Projected Expenditure**



### Financial Forecast Key Assumptions

The following key assumptions have been made in preparing the financial forecasts.

1. Asset data in the asset register is fit for purpose.
2. Asset lives based on nominal material life, are reasonably accurate.
3. LOS will not change, for example required by legislation.
4. WDC does not suffer any major natural disaster during the period of the financial forecasts.
5. Effects of climate change are not felt during the term of this LTP
6. Growth matches the projected profiles.
7. Maintaining Operational and Maintenance costs at current levels is cost effective.

### Funding/Revenue Sources

An explanation of the sources of funding for the activity is fully detailed in the Council’s Revenue and Financing Policy published within the 2024-2034 LTP (TRIM 231114183205). This includes the rationale for each source of funding for each scheme, and an explanation of how the different funding methods are applied to each scheme in relation to the service delivered.

Primary sources of funding for all water supply schemes are targeted rates and Development Contributions for works required to accommodate growth.

All capital works budgets are split into three components, Level of Service, Renewal and Growth. The division may be seen for scheme projects in the Capital Works table contained within the [AMP Plans and Figures Viewer](#)

The growth component is recovered through development contributions (DC's), calculated in accordance with Council's Development Contributions Policy, which can be accessed via the link below. For those projects with a growth component an assessment has been made for the 2024-2034 LTP of the value of the DC required per future connection to the scheme, to fully recover the growth component of the capital work. These assessments are updated as part of the Annual Plan process, and are published on the Council's website at the following link [Development Contributions](#)

Summary calculation sheets for individual schemes can be viewed by clicking on links within the main document.

A further revenue source is the district wide rate that has been set up specifically to fund installation of UV disinfection at all schemes that do not already have it, although it is noted this is simply an alternative type of targeted rate, rather than a separate type of funding source.

## **Valuation**

A full peer reviewed valuation of assets is normally carried out on a three yearly cycle, using the asset data in our asset management information system. Due to the current much more rapid inflation than has been usual, the most recent valuation has been carried out in 2022 ([TRIM 220803132120](#)). The rates from that valuation have been adjusted by the CPI to arrive at "valuation" figures for 2023. Table 27 below provides a summary of the replacement cost, depreciated replacement cost and annual depreciation for the district, broken down by scheme.

**Table 27: Asset Valuation**

Scheme		District	Rangiora	Kaipoi	Woodend Pegasus	Oxford Urban	Waikuku Beach	Cust	Mandeville - Fernside	Oxford Rural No 1	Oxford Rural No 2	Summerhill	West Eyreton	Poyntz Road	Ohoka	Garrymere
Valves and Hydrants	Quantity	9,135	3,127	2,080	2,086	410	196	107	300	316	165	115	48	68	101	16
	Replacement Cost	\$33.7M	\$12.0M	\$7.9M	\$8.2M	\$1.5M	\$656.3k	\$253.5k	\$915.8k	\$940.9k	\$491.2k	\$355.5k	\$121.6k	\$159.5k	\$270.0k	\$20.9k
	Depreciated Replacement Cost	\$26.3M	\$9.0M	\$6.0M	\$7.1M	\$0.9M	\$445.2k	\$214.1k	\$768.1k	\$715.3k	\$347.9k	\$290.4k	\$106.6k	\$148.9k	\$232.3k	\$15.2k
	Annual Depreciation	\$372.0k	\$131.0k	\$90.7k	\$85.8k	\$18.7k	\$7.6k	\$3.0k	\$9.6k	\$10.6k	\$5.4k	\$3.6k	\$1.3k	\$1.8k	\$2.8k	\$0.2k
Main	Quantity	978 km	228 km	152 km	149 km	37.9 km	14.9 km	10.8 km	81.1 km	139 km	79.0 km	46.9 km	12.9 km	15.1 km	6.7 km	4.8 km
	Replacement Cost	\$218.1M	\$77.4M	\$44.0M	\$43.9M	\$10.7M	\$4.0M	\$2.6M	\$8.9M	\$11.7M	\$6.6M	\$4.2M	\$1.6M	\$1.2M	\$1.1M	\$266.8k
	Depreciated Replacement Cost	\$164.6M	\$57.4M	\$32.3M	\$37.7M	\$6.2M	\$2.6M	\$1.8M	\$7.2M	\$8.1M	\$4.5M	\$3.4M	\$1.3M	\$1.1M	\$0.8M	\$194.4k
	Annual Depreciation	\$2,397k	\$846.7k	\$518.9k	\$452.8k	\$133.4k	\$45.4k	\$27.1k	\$94.9k	\$124.8k	\$67.6k	\$42.4k	\$18.1k	\$11.6k	\$10.8k	\$2.7k

Service Lines	Quantity	19,699	7,066	5,189	3,707	853	454	152	944	416	366	205	76	102	126	43
	Replacement Cost	\$24.0M	\$8.4M	\$6.2M	\$4.4M	\$1.0M	\$539.0k	\$180.5k	\$1.4M	\$613.2k	\$539.5k	\$302.2k	\$112.0k	\$150.3k	\$185.7k	\$63.4k
	Depreciated Replacement Cost	\$18.3M	\$6.1M	\$4.7M	\$3.8M	\$0.6M	\$359.8k	\$120.7k	\$1.1M	\$506.1k	\$420.6k	\$248.8k	\$79.6k	\$127.6k	\$146.0k	\$48.7k
	Annual Depreciation	\$264.0k	\$91.7k	\$71.0k	\$45.5k	\$12.4k	\$6.0k	\$1.9k	\$14.8k	\$6.3k	\$5.6k	\$3.0k	\$1.4k	\$1.5k	\$1.9k	\$0.6k
Facilities	Replacement Cost	\$39.9M	\$11.1M	\$5.0M	\$10.4M	\$2.2M	\$1.1M	\$1.1M	\$1.9M	\$2.4M	\$1.4M	\$729.1k	\$523.8k	\$508.0k	\$995.7k	\$554.5k
	Depreciated Replacement Cost	\$26.6M	\$7.5M	\$3.1M	\$7.2M	\$1.3M	\$0.8M	\$0.9M	\$1.2M	\$1.4M	\$0.8M	\$474.8k	\$388.3k	\$324.5k	\$722.7k	\$426.5k
	Annual Depreciation	\$896k	\$190.9k	\$108.0k	\$228.9k	\$52.8k	\$40.4k	\$36.1k	\$50.2k	\$66.1k	\$33.7k	\$18.5k	\$13.8k	\$14.8k	\$23.7k	\$17.5k
Totals	Replacement Cost	\$315.7M	\$108.8M	\$63.1M	\$66.9M	\$15.4M	\$6.3M	\$4.1M	\$13.1M	\$15.6M	\$9.0M	\$5.6M	\$2.4M	\$2.0M	\$2.5M	\$0.9M
	Depreciated Replacement Cost	\$235.9M	\$80.0M	\$46.1M	\$55.8M	\$9.0M	\$4.2M	\$3.0M	\$10.3M	\$10.7M	\$6.0M	\$4.5M	\$1.9M	\$1.7M	\$1.9M	\$0.7M
	Annual Depreciation	\$3,928k	\$1260k	\$788.7k	\$813.0k	\$217.2k	\$99.3k	\$68.1k	\$169.5k	\$207.8k	\$112.3k	\$67.6k	\$34.6k	\$29.7k	\$39.3k	\$21.0k

## 19 DATA CONFIDENCE

Data confidence has been assessed across a range of asset data and processes. The confidence grading used has been taken from the IIMM as follows:

Confidence Grade	Description
<b>A Highly Reliable</b>	Data based on sound records, procedures, investigations and analysis, documented properly and recognised as the best method of assessment. Dataset accuracy $\pm 2\%$
<b>B Reliable</b>	Data based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example some data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation. Data set accuracy $\pm 10\%$
<b>C Uncertain</b>	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample. Up to 50% data is extrapolated and accuracy estimated at $\pm 25\%$
<b>D Very Uncertain</b>	Data based on unconfirmed verbal reports and/or cursory inspection and analysis, Dataset may not be fully complete and most data is estimated or extrapolated. Accuracy estimated at $\pm 40\%$
<b>E Unknown</b>	None or very little data held

Confidence grades have been assessed as:

**Table 28: Data Confidence Levels**

Element	Grade	
Asset Inventory	Reticulation	B
	Headworks	A
Performance and service gap interpretation	B	
Asset condition	Reticulation	B
	Headworks	C
Asset remaining lives	Reticulation	B
	Headworks	C
Demand forecasts	B	
Valuation and depreciation	B	
Financial forecasts	B	

Confidence in headworks assets can be generally seen to be consistently lower than reticulation assets. This is a reflection of more focus being placed historically on network assets rather than facilities, as that is where the majority of the maintenance effort is expended. However confidence in the headworks asset inventory has increased considerably since the last LTP, as a full asset inventory has been carried out, although this did not include asset condition assessment.

It is worth noting that because headworks assets are above ground, any assets in poor condition can be readily identified and the risk associated with asset failure mitigated through regular visual inspections that can be carried out when operations staff are carrying out routine maintenance operations.

Note that demand forecasts and financial forecasts sections have been assessed on the basis of the confidence in our infrastructure planning given a particular growth scenario. Growth predictions themselves are always inherently uncertain, and elastic. If actual growth is faster or slower than the growth scenario selected, projects to cope with the demand, provided they have been well scoped, can be readily brought forward or delayed as necessary.

## 20 ASSET MANAGEMENT SYSTEM

A register of water supply assets is held within the Council’s Financial Management System and referred to as the Asset Management Information System (AMIS). The register is maintained by the Asset Information Management (AIM) Team on behalf of the 3 Waters Team. The platform is the Council’s Finance Management System, Technology One.

The AMIS provides the base data used for the asset criticality model, the water network models and RAMM Roding data, so it is essential that every effort is made to ensure the dataset in the AMIS is accurate. Current process to deliver the required outcome is as follows.

For new assets, built as part of development or as stand-alone capital projects, the AIM team collates as-built data from as-built engineering plans and incorporates this data into the GIS system and asset database. This data then feeds through into the Council’s asset valuation process.

The in-house works order system integrates with the asset management system. Maintenance activity, for example in the form of a pipe fault repair by the Council Water Unit under instruction from a work order is now entered digitally via mobile devices in the field. The field devices record job costs, asset location and any changes to assets, and the information is direct uploaded into asset register. Costs are recorded against the repaired assets.

Service requests are generated out of Council’s Property and Rates System and for certain job types automatically raise a work order to be sent to the Water Unit via email. Other service request types are forwarded to 3 Waters team members for triage.

Unfortunately the Council’s enterprise system, Technology One is in the process of being replaced, as the company advised that it was moving entirely to a cloud based new platform.

### Asset Management Maturity

Asset management maturity assessments (AMMA) have been carried out on two previous occasions, most recently in 2021. The assessment was carried out in house, and a subsequent peer review of the self assessment was carried out. The assessment showed that the water supply activity was generally operating asset management at an intermediate level of maturity, and scored overall a 63 against a target of 78.

The key areas for improvement for water supply were *“improving the asset data for facilities and headworks, updating the risk register content and process and completing and embedding the ability to capture maintenance costs against assets”*. These have all been completed.

The table below shows further high priority improvement recommendations, together with the actions taken since the assessment.

AM Function	Recommendation	Action
<i>Policy and Strategy</i>	Develop an Asset Management Strategy.	No Progress
	Incorporate a workshop with AMP authors early in the AMP development to explain overall themes (in the IS) and ensure they are included in the AMP.	Being integrated with the AMP planning meetings



<b>AM Function</b>	<b>Recommendation</b>	<b>Action</b>
<i>Forecasting Demand</i>	Undertake sensitivity testing for growth or demand change scenarios such as population demographic shifts and climate change. Incorporate the results into the AMP.	The 3 Waters reform process has left insufficient time for sensitivity analysis, on top of the normal growth work required
<i>Asset Register data</i>	Complete the facilities and headworks asset data and condition information improvements.	Will be complete July 2023
<i>Decision Making</i>	Introduce a cross activity project prioritisation process to enable better decision making, focusing on the relative priority of level of service improvements.	No formal process developed. Prioritisation carried out by Management Team and elected members
<i>Managing Risk</i>	Review the format, and content of the risk registers and introduce processes to regularly review them and escalate key risks to the corporate register.	Review under way. Expected to be complete late 2023

The self assessment AMMA is available in TRIM [21050607230](#) and the peer review documents in TRIM [220506071089](#)

## 21 NEGATIVE EFFECTS

At the District level the activity of providing a water supply to the various communities has the following negative effects:

- Demand for continuity of community supplies may have an adverse effect on groundwater resources over time.
- Major industrial or commercial users that use large quantities of water may have their economic potential curtailed by a restriction in the amount of water available

## 22 SERVICE DELIVERY

Delivery of most capital works is via competitive tendering practice in accordance with the Council's procurement policy ([TRIM 220303030172](#)). Design is usually carried out in house, or where resources are insufficient, via external consultants, again engaged in accordance with the procurement policy.

Routine maintenance is carried out by Council's in house Water Unit. A Service Level Agreement exists that defines the relationship between 3 Waters and the Water Unit. Some specific challenges faced by the Water Unit relate to carrying out maintenance in rural areas over a widely dispersed geographical area. With the District having a particularly high number of lifestyle and rural residential properties there is a considerable network of small bore pipes providing the water service, and the GIS location of assets in some instances is less than desirable. Locating breaks in the field, when service has been lost, can be a time consuming and inefficient process.

**23 IMPROVEMENT PLAN**

Table 29 below summarises the planned AMP improvements applicable district wide, identified as each section has been reviewed. Many of these have been carried forward from the 2021 AMPs. The 3 Waters reform programme meant that little focus was provided on the Improvement Programme from the 2021 AMP.

Projects will be managed under the 2024-27 AMP Improvement Programme full details of which are provided in [2024 Improvement Programme](#) . The summary table below shows which section the AMP that the improvement project was derived from and includes projects that have been completed since the 2021 AMP.

**Table 29: 2024 AMP Improvement Plan**

Project Ref	AMP Section	Project Description	Priority	Status	Comment
IP002	Asset Management System	Carry out asset inventory check at all facility sites. Record key attributes and condition, and functional descriptions	High	Largely complete	Asset inventory complete. Plan to use TRAKK software to start collecting condition data
IP004	Asset Management System	Integrate Rooding & 3 Waters Renewals Programmes	High	Planned for 2024/25	Physical works layer in GIS now used for planning, but further Rooding/3 Waters work needed to complete
IP006	Asset Management System	Verify location of critical assets	Medium	Planned 2024-2026	Higher priority now - arising from the Utilities Code of Practice
IP008	Asset Management System	Unify various existing documents into a 3 Waters Emergency Response Plan or Business Continuity Plan	Medium	Planned 2024-2026	A cascading hierarchy of documents for emergency response is required for Council. At 3 Waters a "Business Continuity Plan" is required
IP011	Disaster Resilience	Confirm natural hazard information at facilities sites as part of the site by site asset risk assessment for climate change effects.	High	Incorporated into IP054	Original site risk assessment project now incorporates climate change risk and priority has been increased
IP020	Asset Management System	Ensure AMIS functionality transferred over to new Asset Management System/Council Enterprise system	High	2024/25 onwards	Necessitated by Council's enterprise system changing from Tech One to Datacom
IP022	Asset Management System	Develop system to store and manage consent information	High	2024/25 onwards	Dedicated staff member has been engaged to implement and maintain
IP027	Asset Management System	Establish documentation that specifies asset data that must be included in As Built information supplied to AIM team	High	Planned for 2024/25 onwards	Multi faceted project including updating the Engineering Code of Practise, and them promulgating Council's requirements
IP028	Demand	Review and define appropriate average and peak water use targets for urban schemes to support LoS & WCS reporting, and future water take applications	Medium	On hold	Linked to test case investigation of what would be required to gain chlorine exemption. See IP059

Project Ref	AMP Section	Project Description	Priority	Status	Comment
IP033	Operations and Maintenance	Develop and implement a process for sampling and storing water mains for condition assessment (incl AC and PVC data)	Medium	2025/26	Current ad hoc system needs update to ensure data more readily available
IP034	Asset Management System	3 Waters Strategy	High	2025/26	What do WDC water services look like in 2053 and 2073?
IP045	Risk Assessment	Update DRA in parallel with Risk Assessment Update using common risk approach. Develop high level framework, seek update of hazard information.	High	Planned for 2024/25	PDU have progressed . To be followed up
IP048	Operations and Maintenance	Standardise operational and maintenance items used in the budget to enable better expenditure monitoring	Medium	On hold	Still nice to have but only medium priority
IP049	Asset Management System	Review costs and benefits of universal water metering and charging for water	High	On hold	Linked to test case investigation of what would be required to gain chlorine exemption. See IP059
IP050	Risk Assessment	Dwelling floor level surveys Kaiapoi and Rangiora (Phase 1 scoping only )	High	2025/26	Needs sensitive management
IP053	Climate groundwater modelling	Work with the Regional Council regarding GW modelling and consideration of effects of SL rise on their infrastructure	High	Planned for 2024/25 onwards	Ongoing
IP054	Risk Assessment	Carry out an assessment of the likely operational and asset management risks associated with climate change in affected areas.	High	Phase 1 complete	Initial screening carried out. Further more detailed work on site by site basis to follow
IP059	Asset Management System	Carry out investigation of changes needed to secure a chlorine exemption for Cust. Will involve elements of IP028 and IP049	Medium	2026/27	Elected member requested ongoing work to establish what would be required and the cost

As an adjunct to this section the 10 key questions that Audit NZ have advised should be responded to, as a high level check on the adequacy of Asset Management Plans, has been reproduced below with responses. Additional improvement projects are included in the Improvement Plan table that fill gaps identified through this process.

**Table 30: Audit NZ Questions and Responses**

Audit NZ Question	Response
1. Have you got a strategy for the long-term sustainability of your assets?	Council has Activity Management Plans that are reviewed in house, at three yearly intervals, that include a well-developed renewals assessment and funding model that ensures the long term sustainability of its 3 waters assets. The Council does not have an Asset Management Strategy document however
2. Have you set an asset management policy?	Yes. <a href="#">TRIM link to policy</a>
3. Do you have good quality up-to-date asset management plans for achieving your strategy?	Yes. These are comprehensively reviewed every three years and submitted for peer review.
4. Does your organisation have appropriate asset management skills and experience?	Yes. For 3 Waters each of the activity areas – water supply, wastewater and drainage, has a dedicated asset manager responsible for the management of the relevant assets
5. Do you know the reliability of your asset information?	Reasonably well. Asset data for our reticulation network is reliable and being improved through analysis of maintenance data. Facility asset data is also reliable, with a comprehensive facilities asset inventory just having been completed
6. Do you have a structured approach to assessing the condition and performance of your assets?	<p>Yes. Noting that the average age of its network assets is relatively young, the condition of water supply reticulation assets has been the subject of recent analysis through examination of pipe performance. This has enabled condition to be inferred in more detail than has previously been the case. For gravity pipes, Council has recently invested in InfoAssets software, which will enable improved management of gravity pipe condition data.</p> <p>A facility assets condition assessment has not yet been carried out.</p> <p>The system that records repair costs against assets, would have improved understanding of performance, especially as it was further developed, but unfortunately it's future is in jeopardy. This is because the Council's enterprise system is to be replaced.</p>
7. Have you defined a clear and comprehensive set of service levels to be delivered or supported by the assets?	Yes. These are generally reviewed and approved by Council in conjunction with the three yearly AMP review. As noted in the LoS section this has not been possible for the 2024 AMP

Audit NZ Question	Response
8. How well do you forecast future demand for the services that are delivered or supported by your assets?	Demand forecast is largely based on growth projections. Improvements could be made by considering other factors such as for example demographic changes, and changing technologies
9. Do you report, and get reports, on achievement of your asset management plan(s)?	Key Levels of Service are reported quarterly to Council, and other LOS are reported annually to Council.  Asset Management Plans themselves are generally peer reviewed, although this has not been carried out for the 2024 AMP due to the effect of the 3 Waters Review on AMP timing.
10. Do you have a backlog of repairs, maintenance, and asset renewals? And what are you doing about it?	No. The Asset Management Plan process delivers approved budgets that to date have been sufficient to ensure that there is no appreciable maintenance backlog, and that fully funds future renewals



## 24 CHANGES TO AMP AS A RESULT OF LONG TERM PLAN CONSULATION

This section outlines any significant changes to the AMP as a result of the 2024-34 Long Term Plan consultation period.

Some changes to budgets have arisen as a consequence of a staff submission report to Council during LTP hearings 21-22 May (TRIM 240404051976).

Note that the projects themselves have not changed, but budgets have been modified as a consequence of detailed designs progressing.

The table below provides a summary of the changes to capital budgets across the various district schemes.

<b>Budget Name</b>	<b>Draft 2024-34 LTP (2024/25)</b>	<b>Proposed Revised Budget (2024/25)</b>	<b>Difference</b>	<b>Notes</b>
South Belt Link Main	\$164,379	\$249,375	\$85,000	Cost estimates revised based on more current information
Ohoka WTP Upgrade	\$350,000	\$250,000	-\$100,000	Project timeframe extended to allow for land acquisition for the WTP upgrade.
Ohoka UV Upgrade	\$900,000	\$600,000	-\$300,000	Project timeframe extended to allow for land acquisition for the WTP upgrade
Total	\$1,414,379	\$1,099,375	-\$315,000	

## APPENDIX 1: RANGIORA SCHEME PERFORMANCE

**Table 31: A1 - Rangiora Elective LoS Performance - Assessed June 2023**

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Resource Consents	Consent Breach – Action Required	Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	50%	(Rangiora Backup Wells: CRC160704) - Minor non-compliance questions to be answered on the flow meters and consent requirements.	Not Achieved	Follow up with ECan. Project to install flow meter in Western wells	Y	N	Y	Y	Y
DWSNZ	DWSNZ - Aesthetic Compliance	Water is supplied that is within the guideline range in the DWSNZ for aesthetic parameters, with the exception of pH.	95% of samples comply	N/A	Unchlorinated scheme	N/A	N/A	Y	Y	Y	N	N
	DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/year	Nil		Achieved	N/A	Y	Y	Y	Y	Y
	DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of DWSNZ	Complies	N	No protozoa treatment in place	Not Achieved	UV installation 2023/24	Y	Y	Y	N	N
	DWSNZ - Radiological Compliance	Water supply delivers water that achieves a standard suitable for compliance with the	Complies	Y		Achieved	N/A					

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#					
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008	
		radiological requirements of DWSNZ											
	DWSNZ - Chemical Compliance	Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of DWSNZ	Complies	Y		Achieved	N/A						
	DWSNZ – Bacterial Compliance (Previously all sampling non-compliance)	Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of DWSNZ	Complies	N	No chlorine treatment in place	Not Achieved	Supply to be chlorinated last quarter 2023	Y	Y	Y	Y		N
Fire Fighting	Fire CoP - Hydrant Placement - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for placement of hydrants	100%	97%	From Fire Hydrant Analysis Tool last updated early 2022. 220304031019	Achieved	N/A	N	N	N	N		N
Fire Fighting	Fire CoP – System Flow - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for flow from system	95%	100%		Achieved	N/A	Y	Y	Y	Y		Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Water Losses	Water losses as determined by measured or calculated minimum flow	Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR; b) For schemes with an ILI of "C" or "D", an economic assessment shall be carried out to determine the value in further leak detection work	B	15.6%. Scheme divided in seven sectors with two Orange and Grey_A exhibiting the lowest performance (C).	Achieved	N/A	Y	Y	Y	N	Y
Service Outages	Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil/year	Nil		Achieved	N/A	N	Y	N	Y	Y
Water Pressure	Pressure - Point of Supply - On Demand	Water pressure at the point of supply in On Demand and Semi-Restricted schemes, excluding outages, as demonstrated by a reticulation model or audits.	>250kPa for 100% of the time >300kPa for 99% of the time	100%		Achieved	N/A	Y	Y	Y	Y	Y
Scheme Capacity	Scheme Capacity - On Demand	Actual peak capacity of the scheme for domestic use - On Demand	>2500 litres/ connection/day	100%		Achieved	N/A	Y	Y	Y	Y	Y
Storage Volume	Storage - On Demand	Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme-by-scheme basis, depending on resiliency and redundancy of source infrastructure	167%	Requires 7.34 hours at ADF/ 5285 m3 total. Have 8800 m3	Achieved	N/A	Y	Y	N	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Water Usage	Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed reasonable water use	71%	Calculated as part of Water conservation strategy last generated 2020	Achieved	N/A	Y	Y	Y	Y	NA
Water Usage	Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	103%	Calculated as part of Water conservation strategy last generated 2020	Achieved	N/A	Y	Y	N	Y	N
Customer satisfaction	Customer satisfaction	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory".	>90%	98%	Customer satisfaction is expected to drop, with the increase in water quality complaints. Chlorination in schemes is considered the main cause of water quality complaints.	Achieved	N/A					

\* Note for previous results "Y" indicates that the LOS has been met, and "N" indicates it has not been met. Blank cells indicate measures were not recorded for that year. ( the measure was likely not a LOS at that time)

\* Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment. For the 2022/23 assessment, the measures from the 2021 AMP have been used.

## APPENDIX 2: KAIAPOI SCHEME PERFORMANCE

**Table 32: Kaiapoi Elective LoS Performance - Assessed June 2023**

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Resource Consents	Consent Breach – Action Required	Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	0%	There were no breaches of consent this year, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
DWSNZ	DWSNZ - Aesthetic Compliance	Water is supplied that is within the guideline range in the DWSNZ for aesthetic parameters, with the exception of pH.	95% of samples comply	100%		Achieved	N/A	Y	Y	Y	Y	Y
	DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/year	Nil		Achieved	N/A	Y	Y	Y	N	Y
	DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of DWSNZ	Complies	N	No protozoa treatment in place	Not Achieved	UV installation 2023/24	Y	Y	Y	Y	Y
	DWSNZ - Radiological Compliance	Water supply delivers water that achieves a standard suitable for compliance with the radiological requirements of DWSNZ	Complies	Y		Achieved	N/A					

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#					
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008	
	DWSNZ - Chemical Compliance	Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of DWSNZ	Complies	Y		Achieved	N/A						
	DWSNZ – Bacterial Compliance (Previously all sampling non-compliance)	Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of DWSNZ	Complies	N	Plant offline for month with reservoir repairs  Only plant operating for month, impacting T3.2 and T3.4	Not Achieved	Improve water compliance processes	Y	Y	Y	Y		N
Fire Fighting	Fire CoP - Hydrant Placement - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for placement of hydrants	100%	97.5%		Achieved	N/A	N	N	N	N		N
Fire Fighting	Fire CoP – System Flow - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for flow from system	95%	100%		Achieved	N/A	Y	Y	Y	Y		Y
Water Losses	Water losses as determined by measured or calculated	Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR;  b) For schemes with an ILI of "C" or "D",	A		Achieved	N/A	Y	Y	Y	Insuf. data		Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	minimum flow		an economic assessment shall be carried out to determine the value in further leak detection work									
Service Outages	Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil/year	Nil		Achieved	N/A	Y	Y	Insuf. data	Y	Y
Water Pressure	Pressure - Point of Supply - On Demand	Water pressure at the point of supply in On Demand and Semi-Restricted schemes, excluding outages, as demonstrated by a reticulation model or audits.	>250kPa for 100% of the time >300kPa for 99% of the time	100%		Achieved	N/A	Y	Y	Y	Y	Y
Scheme Capacity	Scheme Capacity - On Demand	Actual peak capacity of the scheme for domestic use - On Demand	>2500 litres/connection/day	100%		Achieved	N/A	Y	Y	Y	Y	Y
Storage Volume	Storage - On Demand	Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme-by-scheme basis, depending on resiliency and redundancy of source infrastructure	189%	Requires 0 hours at ADF (aquifer storage)/ 422 m3 total (working storage). Have 798 m3	Achieved	N/A	Y	Y	N	Y	Y



Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Water Usage	Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed reasonable water use	61%		Achieved	N/A	Y	Y	Y	Y	NA
Water Usage	Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	97%		Achieved	N/A	Y	Y	Y	Y	N
Customer satisfaction	Customer satisfaction	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory".	>90%	78%	Customer satisfaction is expected to drop, with the increase in water quality complaints. Chlorination in schemes is considered the main cause of water quality complaints.	Not achieved						

\* Note for previous results "Y" indicates that the LOS has been met, and "N" indicates it has not been met. Blank cells indicate measures were not recorded for that year. ( the measure was likely not a LOS at that time)

\* Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment. For the 2022/23 assessment, the measures from the 2021 AMP have been used.

## APPENDIX 3: WOODEND-PEGASUS SCHEME PERFORMANCE

**Table 33: Woodend-Pegasus Elective LoS Performance - Assessed June 2023**

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Resource Consents	Consent Breach – Action Required	Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	0%	There were no breaches of consent this year, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
DWSNZ	DWSNZ - Aesthetic Compliance	Water is supplied that is within the guideline range in the DWSNZ for aesthetic parameters, with the exception of pH.	95% of samples comply	100%		Achieved	N/A	Y	Y	Y	Y	Y
	DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/year	Nil		Achieved	N/A	Y	Y	Y	Y	Y
	DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of DWSNZ	Complies	N	No treatment for protozoa and bore heads do not meet sanitary criteria.	Not Achieved	UV installation 2023/24	Y	Y	Y	Y	Y
	DWSNZ - Radiological Compliance	Water supply delivers water that achieves a standard suitable for compliance with the radiological requirements of DWSNZ	Complies	100%		Achieved	N/A					

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	DWSNZ - Chemical Compliance	Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of DWSNZ	Complies	100%		Achieved	N/A					
	DWSNZ – Bacterial Compliance (previously all sampling non-compliance)	Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of DWSNZ	Complies	N	Distribution Zone is compliant. Bacterial treatment was compliant 98% of time.	Not Achieved	Supply to be chlorinated last quarter 2023	Y	Y	Y	Y	N
Fire Fighting	Fire CoP - Hydrant Placement - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for placement of hydrants	100%	97%	From Fire Hydrant Analysis Tool last updated early 2022. 220304031019	Achieved	N/A	N	N	N	N	N
Fire Fighting	Fire CoP – System Flow - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for flow from system	95%	100%		Achieved	N/A	Y	Y	Y	Y	Y
Water Losses	Water losses as determined by measured or calculated minimum flow	Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR; b) For schemes with an ILI of "C" or "D" , an economic assessment shall be carried out to	A		Achieved	N/A	Y	Y	N	N	N

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#					
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008	
			determine the value in further leak detection work										
Service Outages	Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil/year	Nil		Achieved	N/A	Y	Y	Insuf. Data	Y	Y	
Water Pressure	Pressure - Point of Supply - On Demand	Water pressure at the point of supply in On Demand and Semi-Restricted schemes, excluding outages, as demonstrated by a reticulation model or audits.	>250kPa for 100% of the time >300kPa for 99% of the time	100%		Achieved	N/A	Y	Y	Y	Y	Y	Y
Scheme Capacity	Scheme Capacity - On Demand	Actual peak capacity of the scheme for domestic use - On Demand	>2500 litres/connection/day	100%		Achieved	N/A	Y	Y	Y	Y	Y	Y
Storage Volume	Storage - On Demand	Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme-by-scheme basis, depending on resiliency and redundancy of source infrastructure	162%	Requires 6.99 hours at ADF/3080 m3 total. Have 4990 m3	Achieved	N/A	Y	N	N	Y	Y	Y
Water Usage	Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed	73%	Calculated as part of Water conservation strategy last	Achieved	N/A	Y	Y	Y	Y	Y	NA

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
			reasonable water use		generated 2020							
Water Usage	Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	87%	Calculated as part of Water conservation strategy last generated 2020	Achieved	N/A	Y	N	N	Y	N
Customer satisfaction	Customer satisfaction	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory".	>90%	77%		Not achieved	Customer satisfaction is expected to drop, with the increase in water quality complaints. Chlorination in schemes is considered the main cause of water quality complaints.					

\* Note for previous results "Y" indicates that the LOS has been met, and "N" indicates it has not been met. Blank cells indicate measures were not recorded for that year. ( the measure was likely not a LOS at that time)

\* Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment. For the 2022/23 assessment, the measures from the 2021 AMP have been used.

## APPENDIX 4: OXFORD URBAN SCHEME PERFORMANCE (INCLUDES OXFORD RURAL NO 2)

**Table 34: Oxford Urban Elective LoS Performance - Assessed June 2023**

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Resource Consents	Consent Breach – Action Required	Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	0%	There were no breaches of consent this year, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
DWSNZ	DWSNZ - Aesthetic Compliance	Water is supplied that is within the guideline range in the DWSNZ for aesthetic parameters, with the exception of pH.	95% of samples comply	98%		Achieved	N/A	Y	Y	Y	Y	Y
	DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/year	Nil		Achieved	N/A	Y	Y	Y	N	Y
	DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of DWSNZ	Complies	N	No protozoa treatment in place	Not Achieved	UV installation 2023/24	Y	Y	Y	Y	Y
	DWSNZ - Radiological Compliance	Water supply delivers water that achieves a standard suitable for compliance with the radiological requirements of DWSNZ	Complies	Y		Achieved	N/A					

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	DWSNZ - Chemical Compliance	Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of DWSNZ	Complies	Y		Achieved	N/A					
	DWSNZ – Bacterial Compliance (Previously all sampling non-compliance)	Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of DWSNZ	Complies	N	Unchlorinated Oxford Urban supply, pending outcome of Cl exemption application	Not Achieved	Supply to be chlorinated last quarter 2023	Y	Y	Y	Y	N
Fire Fighting	Fire CoP - Hydrant Placement - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for placement of hydrants	100%	91%	From Fire Hydrant Analysis Tool last updated early 2022. 220304031019	Not Achieved	Capital projects in the long term capital works program to increase protection in the medium-term.	N	N	N	N	N
Fire Fighting	Fire CoP – System Flow - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for flow from system	95%	99%	A few properties at edges of Oxford Urban network not meeting	Achieved		N	N	N	N	N
Water Losses	Water losses as determined by measured or calculated minimum flow	Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR; b) For schemes with an ILI of "C" or "D", an economic assessment shall be	C	Oxford Urban scores (C). Oxford Rural No. 2 scores (B)	Not Achieved	Assessment planned. Increase the leak detection budget	N	N	Y	N	N

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
			carried out to determine the value in further leak detection work				throughout the district.					
Service Outages	Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil/year	Nil		Achieved	N/A	Y	Y	Insuf Data	Y	Y
Water Pressure	Pressure - Point of Supply - On Demand	Water pressure at the point of supply in On Demand and Semi-Restricted schemes, excluding outages, as demonstrated by a reticulation model or audits.	>250kPa for 100% of the time >300kPa for 99% of the time	100%		Achieved	N/A	Y	Y	N	N	N
Scheme Capacity	Scheme Capacity - On Demand	Actual peak capacity of the scheme for domestic use - On Demand	>2500 litres/ connection/day	100%		Achieved	N/A	Y	Y	Y	Y	Y
Storage Volume	Storage - On Demand	Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme-by-scheme basis, depending on resiliency and redundancy of source infrastructure	135%	Requires 9.52 (weighted average of 2 schemes by number of connections) hours at ADF/ 672 m3 total.  Have 904 m3	Achieved	N/A	N	N	Y	Y	Y



Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Water Usage	Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed reasonable water use	70%	Calculated as part of Water conservation strategy last generated 2020	Achieved	N/A	Y	Y	Y	Y	NA
Water Usage	Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	111%	Calculated as part of Water conservation strategy last generated 2020	Not Achieved		N	N	N	N	N
Customer satisfaction	Customer satisfaction	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory".	>90%	Oxford Urban 95% Oxford Rural No 2 68%		Not achieved	Customer satisfaction is expected to drop, with the increase in water quality complaints. Chlorination in schemes is considered the main cause of water quality complaints.					

\* Note for previous results "Y" indicates that the LOS has been met, and "N" indicates it has not been met. Blank cells indicate measures were not recorded for that year. ( the measure was likely not a LOS at that time)

\* Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment. For the 2022/23 assessment, the measures from the 2021 AMP have been used.

## APPENDIX 5: WAIKUKU BEACH SCHEME PERFORMANCE

**Table 35: Waikuku Beach Elective LoS Performance - Assessed June 2023**

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Resource Consents	Consent Breach – Action Required	Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	0%	There were no breaches of consent this year, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
DWSNZ	DWSNZ - Aesthetic Compliance	Water is supplied that is within the guideline range in the DWSNZ for aesthetic parameters, with the exception of pH.	95% of samples comply	100%	Unchlorinated Scheme	Achieved	N/A	N	Y	N	N	N
	DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/year	Nil		Achieved	N/A	Y	Y	Y	Y	Y
	DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of DWSNZ	Complies	N	Kings' Av complaint for treatment 99.9% of time. Campground complaint for treatment 100% of time.	Not Achieved	UV installation 2023/24	Y	Y	N	N	N
	DWSNZ - Radiological Compliance	Water supply delivers water that achieves a standard suitable for compliance with the	Complies	Y		Achieved	N/A					

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
		radiological requirements of DWSNZ										
	DWSNZ - Chemical Compliance	Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of DWSNZ	Complies	Y		Achieved	N/A					
	DWSNZ – Bacterial Compliance (Previously all sampling non-compliance)	Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of DWSNZ	Complies	N	No chlorine in place in distribution zone	Not Achieved	Supply to be chlorinated last quarter 2023	Y	Y	Y	Y	N
Fire Fighting	Fire CoP - Hydrant Placement - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for placement of hydrants	100%	95.5%	From Fire Hydrant Analysis Tool last updated early 2022. 220304031019 Despite the scheme not being classified as an urban fire district, a protection level of 95.5% is provided	N/A	N/A	N	Y	Y	Y	Y
Fire Fighting	Fire CoP – System Flow - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code	95%	94%	Some hydrants at extremities of network can't deliver 25 l/s from 2 hydrants.	N/A	N/A	Y	N	Y	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
		of Practice for flow from system			Despite the scheme not being classified as an urban fire district, a protection level of 94% is provided							
Water Losses	Water losses as determined by measured or calculated minimum flow	Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR; b) For schemes with an ILI of "C" or "D", an economic assessment shall be carried out to determine the value in further leak detection work	A		Achieved	N/A	Y	N	N	N	Y
Service Outages	Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil/year	Nil		Achieved	N/A	Y	Y	Insuf. Data	Y	Y
Water Pressure	Pressure - Point of Supply - On Demand	Water pressure at the point of supply in On Demand and Semi-Restricted schemes, excluding outages, as demonstrated by a reticulation model or audits.	>250kPa for 100% of the time >300kPa for 99% of the time	100%		Achieved	N/A	Y	Y	Y	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Scheme Capacity	Scheme Capacity - On Demand	Actual peak capacity of the scheme for domestic use - On Demand	>2500 litres/ connection/day	100%		Achieved		Y	Y	Y	Y	Y
Storage Volume	Storage - On Demand	Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme-by-scheme basis, depending on resiliency and redundancy of source infrastructure	N/A	Doesn't have or require storage (aquifer storage)  From Growth work. Total includes all required volume – emergency, operational, working, and dead.	N/A		Y	Y	Y	Y	Y
Water Usage	Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed reasonable water use	104%	Calculated as part of Water conservation strategy last generated 2020	Not Achieved		N	Y	Y	Y	NA
Water Usage	Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	159%	Calculated as part of Water conservation strategy last generated 2020	Not Achieved		N	N	N	N	N

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Customer satisfaction	Customer satisfaction	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory".	>90%	91%		Achieved						

\* Note for previous results "Y" indicates that the LOS has been met, and "N" indicates it has not been met. Blank cells indicate measures were not recorded for that year. ( the measure was likely not a LOS at that time)

\* Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment. For the 2022/23 assessment, the measures from the 2021 AMP have been used.

## APPENDIX 6: CUST SCHEME PERFORMANCE

**Table 36: Cust Elective LoS Performance - Assessed June 2023**

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Resource Consents	Consent Breach – Action Required	Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	0%	There were no breaches of consent this year, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
DWSNZ	DWSNZ - Aesthetic Compliance	Water is supplied that is within the guideline range in the DWSNZ for aesthetic parameters, with the exception of pH.	95% of samples comply	100%		Achieved	N/A	Y	Y	Y	Y	Y
	DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/year	Nil		Achieved	N/A	Y	Y	Y	Y	Y
	DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of DWSNZ	Complies	N	Compliant 34% of time. The UV upgrade took place recently	Not Achieved	Improve water compliance processes	Y	N	N	Y	Y
	DWSNZ - Radiological Compliance	Water supply delivers water that achieves a standard suitable for compliance with the radiological requirements of DWSNZ	Complies	Y		Achieved	N/A					

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	DWSNZ - Chemical Compliance	Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of DWSNZ	Complies	Y		Achieved	N/A					
	DWSNZ – Bacterial Compliance (Previously all sampling non-compliance)	Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of DWSNZ	Complies	N	Compliant 91% of time. The UV upgrade related works contributed to low FAC related non-compliances.	Not Achieved	Improve water compliance processes	Y	Y	Y	Y	Y
Fire Fighting	Fire CoP - Hydrant Placement - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for placement of hydrants	100%	49%	From Fire Hydrant Analysis Tool last updated early 2022. 220304031019	Not Achieved	Network upgrades are budgeted in the medium future, but funding issues prevent likely construction.	N	N	N	N	N
Fire Fighting	Fire CoP – System Flow - Urban	Percentage of properties within a Fire District serviced by a reticulated system that complies with the Fire Service Code of Practice for flow from system	95%	2%	Have hydrants but network is not sized for fire flow so only properties next to headworks meeting requirement	Not Achieved	Network upgrades are budgeted in the medium future, but funding issues prevent likely construction.	N	N	N	N	N



Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Water Losses	Water losses as determined by measured or calculated minimum flow	Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR;  b) For schemes with an ILI of "C" or "D", an economic assessment shall be carried out to determine the value in further leak detection work	B		Achieved	N/A	Y	Y	Y	Y	Y
Service Outages	Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil/year	1	After hours request not passed on time to the water unit. Attendance time out of target.	Not Achieved		Y	Y	Insuf. Data	Y	Y
Water Pressure	Pressure - Point of Supply - On Demand	Water pressure at the point of supply in On Demand and Semi-Restricted schemes, excluding outages, as demonstrated by a reticulation model or audits.	>250kPa for 100% of the time >300kPa for 99% of the time	100%		Achieved	N/A	Y	Y	Y	Y	Y
Scheme Capacity	Scheme Capacity - On Demand	Actual peak capacity of the scheme for domestic use - On Demand	>2500 litres/ connection/day	100%		Achieved	N/A	Y	Y	Y	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Storage Volume	Storage - On Demand	Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme-by-scheme basis, depending on resiliency and redundancy of source infrastructure	160%	Requires 9.15 hours at ADF/101 m3 total. Have 162 m3	Achieved	N/A	N	N	N	N	N
Water Usage	Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed reasonable water use	68%	Calculated as part of Water conservation strategy last generated 2020	Achieved	N/A	Y	Y	Y	N	NA
Water Usage	Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	135%	Calculated as part of Water conservation strategy last generated 2020	Not achieved		N	N	N	N	N
Customer satisfaction	Customer satisfaction	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory".	>90%	71%		Not achieved						

\* Note for previous results "Y" indicates that the LOS has been met, and "N" indicates it has not been met. Blank cells indicate measures were not recorded for that year. (the measure was likely not a LOS at that time)

\* Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment. For the 2022/23 assessment, the measures from the 2021 AMP have been used.

## APPENDIX 7: MANDEVILLE - FERNSIDE SCHEME PERFORMANCE

**Table 37: Mandeville-Fernside Elective LoS Performance - Assessed June 2023**

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Resource Consents	Consent Breach – Action Required	Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	0%	There were no breaches of consent this year, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
DWSNZ	DWSNZ - Aesthetic Compliance	Water is supplied that is within the guideline range in the DWSNZ for aesthetic parameters, with the exception of pH.	95% of samples comply	100%		Achieved	N/A	N	Y	Y	Y	Y
	DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/year	Nil		Achieved	N/A	Y	Y	N	Y	Y
	DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of DWSNZ	Complies	N	Treatment compliant 99.9% of time	Not Achieved	Improve water compliance processes	Y	Y	N	Y	Y
	DWSNZ - Radiological Compliance	Water supply delivers water that achieves a standard suitable for compliance with the	Complies	Y		Achieved	N/A					

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
		radiological requirements of DWSNZ										
	DWSNZ - Chemical Compliance	Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of DWSNZ	Complies	Y		Achieved	N/A					
	DWSNZ – Bacterial Compliance (Previously all sampling non-compliance)	Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of DWSNZ	Complies	N	Treatment compliant 99.9% of time. Residual disinfectant in Distribution zone compliant 33% of time due to Scada data outages	Not Achieved	Supply to be chlorinated last quarter 2023	N	Y	Y	N	Y
Flow	System Flow - Restricted	Percentage of properties where flow received is consistent with allocated units at the point of supply in Restricted or Semi Restricted schemes, (excluding outages) as demonstrated by restrictor checks completed at not more than 5 yearly intervals	100% of restrictors tested at no more than 5 yearly intervals	N	21.4%	Not Achieve		N	N	-		
Water Losses	Water losses as determined by measured or calculated minimum flow	Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR; b) For schemes with an ILI of "C" or "D", an economic assessment shall be carried out to determine the value	D	Mandeville graded D, Fernside graded B.	Not Achieve	Assessment planned. Increase the leak detection budget throughout the district.	N	N	Y	Insuf. data	N

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#					
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008	
			in further leak detection work										
Service Outages	Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil/year	0		Achieved	N/A	Y	Y	Insuf. data	Y	Y	
Water Pressure	Pressure - Point of Supply - Restricted	Water pressure at the point of supply of Restricted connections, excluding outages, as demonstrated by a reticulation model or reactive audits	>150kPa for all connections 100% of the time at peak demand	99%	A few properties along boundary Rd below 150 kPa	Not Achieved		Y	Y	Y	Y	Y	
Scheme Capacity	Scheme Capacity - Restricted	Actual peak capacity of the scheme for domestic use - Restricted	>1150 litres/allocated unit/ day	100%		Achieved	N/A	Y	Y	Y	Y	Y	
Storage Volume	Storage - On Demand	Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme-by-scheme basis, depending on resiliency and redundancy of source infrastructure	129%	Requires 4.94 hours at ADF/ 273 m3 total. Have 353 m3	Achieved	N/A	N	N	-			
Water Usage	Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed reasonable water use	59%	Calculated as part of Water conservation strategy last generated 2020	Achieved	N/A	Y	Y	Y	Y	NA	

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Water Usage	Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	64%	Calculated as part of Water conservation strategy last generated 2020	Achieved	N/A	Y	Y	Y	N	Y
Customer satisfaction	Customer satisfaction	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory".	>90%	100%		Achieved	N/A					

\* Note for previous results "Y" indicates that the LOS has been met, and "N" indicates it has not been met. Blank cells indicate measures were not recorded for that year. ( the measure was likely not a LOS at that time)

\* Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment. For the 2022/23 assessment, the measures from the 2021 AMP have been used.

## APPENDIX 8: WEST EYRETON-SUMMERHILL SCHEME PERFORMANCE

**Table 38: West Eyreton-Summerhill LoS Performance - Assessed June 2023**

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Resource Consents	Consent Breach – Action Required	Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	0%	There were no breaches of consent this year, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
DWSNZ	DWSNZ - Aesthetic Compliance	Water is supplied that is within the guideline range in the DWSNZ for aesthetic parameters, with the exception of pH.	95% of samples comply	96%		Achieved	N/A	Y	Y	Y	Y	N
	DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/year	Nil		Achieved	N/A	Y	Y	Y	Y	Y
	DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of DWSNZ	Complies	N	No protozoa treatment in place.	Not Achieved	UV installation 2023/24	Y	Y	Y	Y	N
	DWSNZ - Radiological Compliance	Water supply delivers water that achieves a standard suitable for compliance with the radiological requirements of DWSNZ	Complies	Y		Achieved	N/A					

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	DWSNZ - Chemical Compliance	Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of DWSNZ	Complies	Y		Achieved	N/A					
	DWSNZ – Bacterial Compliance (Previously all sampling non-compliance)	Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of DWSNZ	Complies	N	No treatment compliance achieved, reservoir size unable to comply; distribution zone bacterial and residual compliance achieved 80% and 75% of the time respectively, this is due to Scada outages.	Not Achieved	Supply to be chlorinated last quarter 2023	Y	Y	Y	Y	Y
Flow	System Flow - Restricted	Percentage of properties where flow received is consistent with allocated units at the point of supply in Restricted or Semi Restricted schemes, (excluding outages) as demonstrated by restrictor checks completed at not more than 5 yearly intervals	100% of restrictors tested at no more than 5 yearly intervals	24%		Not Achieved		N	Insuf. Data	-		
Water Losses	Water losses as determined by measured or calculated minimum flow	Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR; b) For schemes with an ILI of "C" or "D" , an economic assessment shall be	B		Achieved	N/A	N	N	Insuf. Data	Insuf. data	Insuf. Data



Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
			carried out to determine the value in further leak detection work									
Service Outages	Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil/year	Nil		Achieved	N/A	Y	Y	Insuf. data	Y	Y
Water Pressure	Pressure - Point of Supply - Restricted	Water pressure at the point of supply of Restricted connections, excluding outages, as demonstrated by a reticulation model or reactive audits	>150kPa for all connections 100% of the time at peak demand	100%		Achieved	N/A	Y	N	Y	Y	Y
Scheme Capacity	Scheme Capacity - Restricted	Actual peak capacity of the scheme for domestic use - Restricted	>1150 litres/allocated unit/ day	100%		Achieved	N/A	Y	Y	Y	Y	Y
Storage Volume	Storage - On Demand	Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme-by-scheme basis, depending on resiliency and redundancy of source infrastructure	>100%	System connected to Poyntz Rd. Combined system meets requirements. See table 27 for detail	Achieved	N/A	Summerhill – Y West Eyreton - Y	Y	-		
Water Usage	Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed reasonable water use	68%	Calculated as part of Water conservation strategy last generated 2020	Achieved	N/A	Y	Y	Y	Y	NA

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Water Usage	Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	83%	Calculated as part of Water conservation strategy last generated 2020	Achieved	N/A	Y	Y	Y	Y	
Customer satisfaction	Customer satisfaction	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory".	>90%	Summer hill 100% West Eyreton 58% (Note, includes Poyntz Rd)		Not achieved	Customer satisfaction is expected to drop, with the increase in water quality complaints. Chlorination in schemes is considered the main cause of water quality complaints.					

\* Note for previous results "Y" indicates that the LOS has been met, and "N" indicates it has not been met. Blank cells indicate measures were not recorded for that year. ( the measure was likely not a LOS at that time)

\* Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment. For the 2022/23 assessment, the measures from the 2021 AMP have been used.

## APPENDIX 9: OXFORD RURAL NO 1 SCHEME PERFORMANCE

**Table 39: Oxford Rural No1 Elective LoS Performance - Assessed June 2023**

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Resource Consents	Consent Breach – Action Required	Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	0%	There were no breaches of consent this year, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
DWSNZ	DWSNZ - Aesthetic Compliance	Water is supplied that is within the guideline range in the DWSNZ for aesthetic parameters, with the exception of pH.	95% of samples comply	100%		Achieved	N/A	Y	N	N	N	N
	DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/year	Nil		Achieved	N/A	Y	Y	Y	Y	Y
	DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of DWSNZ	Complies	N	No protozoa treatment in place.	Not Achieved	UV installation 2023/24	Y	N	N	N	N
	DWSNZ - Radiological Compliance	Water supply delivers water that achieves a standard suitable for compliance with the radiological requirements of DWSNZ	Complies	Y		Achieved	N/A					

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	DWSNZ - Chemical Compliance	Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of DWSNZ	Complies	Y		Achieved	N/A					
	DWSNZ – Bacterial Compliance (Previously all sampling non-compliance)	Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of DWSNZ	Complies	N	Chlorine in place at plant, but no reservoir so unable to comply with contact time.  High turbidity incidents 31 May and 27 Jun, with BWN issued.	Not Achieved	Supply to be chlorinated last quarter 2023	Y	Y	Y	Y	Y
Flow	System Flow - Restricted	Percentage of properties where flow received is consistent with allocated units at the point of supply in Restricted or Semi Restricted schemes, (excluding outages) as demonstrated by restrictor checks completed at not more than 5 yearly intervals	100% of restrictors tested at no more than 5 yearly intervals	27%		Not Achieved		N	Insuf Data	-		
Water Losses	Water losses as determined by measured or calculated minimum flow	Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR; b) For schemes with an ILI of "C" or "D", an economic assessment shall be carried out to determine the value	C		Not Achieved	Assessment planned.  Increase the leak detection budget throughout the district. Desktop exercise to	N	Y	Y	Insuf. data	Insuf Data

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
			in further leak detection work				review and refine water losses methodology for restricted schemes.					
Service Outages	Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil/year	0		Achieved	N/A	Y	Y	Insuf data	Y	Y
Water Pressure	Pressure - Point of Supply - Restricted	Water pressure at the point of supply of Restricted connections, excluding outages, as demonstrated by a reticulation model or reactive audits	>150kPa for all connections 100% of the time at peak demand	100%	a few lower pressure locations in the model but these are where we are modelling laterals. They are all >150kPa at street	Achieved	N/A	Y	Y	Y	Y	Y
Scheme Capacity	Scheme Capacity - Restricted	Actual peak capacity of the scheme for domestic use - Restricted	>1150 litres/allocated unit/ day	100%		Achieved	N/A	Y	Y	Y	Y	Y
Storage Volume	Storage - On Demand	Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme-by-scheme basis, depending on resiliency and redundancy of source infrastructure	101%	Requires 7.8 hours at ADF/ 356 m3 total.  Current storage at Chalk Hill to be decommissioned soon, which	Achieved	Interim measure to maintain LOS until new storage provided in 2029 is a generator at Rockford Rd HW	Y	Y	-		

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
					will create a shortfall		and Woodstock Rd pipe upgrade					
Water Usage	Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed reasonable water use	60%	Calculated as part of Water conservation strategy last generated 2020	Achieved	N/A	Y	Y	Y	Y	NA
Water Usage	Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	61%	Calculated as part of Water conservation strategy last generated 2020	Achieved	N/A	Y	Y	Y	Y	N
Customer satisfaction	Customer satisfaction	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory".	>90%	78%	Customer satisfaction is expected to drop, with the increase in water quality complaints. Chlorination in schemes is considered the main cause of water quality complaints.	Not Achieved						

\* Note for previous results "Y" indicates that the LOS has been met, and "N" indicates it has not been met. Blank cells indicate measures were not recorded for that year. ( the measure was likely not a LOS at that time)

\* Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment. For the 2022/23 assessment, the measures from the 2021 AMP have been used.

## APPENDIX 10: OHOKA SCHEME PERFORMANCE

**Table 40: Ohoka Elective LoS Performance - Assessed June 2023**

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Resource Consents	Consent Breach – Action Required	Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	0%	There were no breaches of consent this year, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	N	Y	Y	Y
DWSNZ	DWSNZ - Aesthetic Compliance	Water is supplied that is within the guideline range in the DWSNZ for aesthetic parameters, with the exception of pH.	95% of samples comply	100%		Achieved	N/A	Y	Y	Y	Y	Y
	DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/year	Nil		Achieved	N/A	Y	Y	Y	Y	Y
	DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of DWSNZ	Complies	N	No protozoal treatment.	Not Achieved	UV installation 2023/24	Y	Y	N	N	N
	DWSNZ - Radiological Compliance	Water supply delivers water that achieves a standard suitable for compliance with the radiological requirements of DWSNZ	Complies	Y		Achieved	N/A					

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	DWSNZ - Chemical Compliance	Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of DWSNZ	Complies	Y		Achieved	N/A					
	DWSNZ – Bacterial Compliance (Previously all sampling non-compliance)	Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of DWSNZ	Complies	N	Distribution zone not yet assessed. Chlorine in place at plant, but inadequate contact time. SCADA outage on 30th April. Not all continuous data recovered.	Not Achieved	Supply to be chlorinated last quarter 2023	Y	Y	Y	Y	Y
Flow	System Flow - Restricted	Percentage of properties where flow received is consistent with allocated units at the point of supply in Restricted or Semi Restricted schemes, (excluding outages) as demonstrated by restrictor checks completed at not more than 5 yearly intervals	100% of restrictors tested at no more than 5 yearly intervals	17%		Not Achieved		N	Insuf. Data	-		
Water Losses	Water losses as determined by measured or calculated minimum flow	Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR; b) For schemes with an ILI of "C" or "D" , an economic assessment shall be carried out to determine the value	A		Achieved	N/A	Y	Y	Insuf. Data	Insuf. data	Insuf. Data



Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
			in further leak detection work									
Service Outages	Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil/year	1	After hours request not passed on time to the water unit. Attendance time out of target	Not Achieved		Y	Y	Insuf. data	Y	Y
Water Pressure	Pressure - Point of Supply - Restricted	Water pressure at the point of supply of Restricted connections, excluding outages, as demonstrated by a reticulation model or reactive audits	>150kPa for all connections 100% of the time at peak demand	100%		Achieved	N/A	Y	Y	Y	Y	NA
Scheme Capacity	Scheme Capacity - Restricted	Actual peak capacity of the scheme for domestic use - Restricted	>1150 litres/allocated unit/ day	100%		Achieved	N/A	Y	Y	Y	Y	Y
Storage Volume	Storage	Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme-by-scheme basis, depending on resiliency and redundancy of source infrastructure	117%	Requires 8.12 hours at ADF/ 92 m3 total. Have 108 m3	Achieved	N/A	N	N	N	N	N
Water Usage	Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed	68%		Achieved	N/A	Y	N	Y	Y	NA

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
			reasonable water use									
Water Usage	Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	190%		Not achieved		N	N	N	N	N
Customer satisfaction	Customer satisfaction	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory".	>90%	71%		Not achieved						

\* Note for previous results "Y" indicates that the LOS has been met, and "N" indicates it has not been met. Blank cells indicate measures were not recorded for that year. ( the measure was likely not a LOS at that time)

\* Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment. For the 2022/23 assessment, the measures from the 2021 AMP have been used.

## APPENDIX 11: POYNTZS SCHEME PERFORMANCE

**Table 41: Poyntzs Elective LoS Performance - Assessed June 2023**

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Resource Consents	Consent Breach – Action Required	Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	0%	There were no breaches of consent this year, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	-	Y	Y
DWSNZ	DWSNZ - Aesthetic Compliance	Water is supplied that is within the guideline range in the DWSNZ for aesthetic parameters, with the exception of pH.	95% of samples comply	100%		Achieved	N/A	N	Y	N	Y	Y
	DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/year	Nil		Achieved	N/A	Y	Y	Insuf. Data	Y	Y
	DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of DWSNZ	Complies	N	No protozoa treatment in place	Not Achieved	UV installation 2023/24	N	N	Y	N	N
	DWSNZ - Radiological Compliance	Water supply delivers water that achieves a standard suitable for compliance with the radiological requirements of DWSNZ	Complies	Y		Achieved	N/A					

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	DWSNZ - Chemical Compliance	Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of DWSNZ	Complies	Y		Achieved	N/A					
	DWSNZ – Bacterial Compliance (Previously all sampling non-compliance)	Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of DWSNZ	Complies	N	No treatment compliance achieved, not able to provide contact time. Distribution zone compliant 83% of time, and residual compliant 50% of time.	Not Achieved	UV installation 2023/24	Y	Y	Y	Y	Y
Flow	System Flow - Restricted	Percentage of properties where flow received is consistent with allocated units at the point of supply in Restricted or Semi Restricted schemes, (excluding outages) as demonstrated by restrictor checks completed at not more than 5 yearly intervals	100% of restrictors tested at no more than 5 yearly intervals	59%		Not Achieved		N	Insuf. Data	N		
Water Losses	Water losses as determined by measured or calculated minimum flow	Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR; b) For schemes with an ILI of "C" or "D" , an economic assessment shall be carried out to determine the value in further leak detection work	B		Achieved	N/A	N	Y	N	Y	N

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Service Outages	Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil/year	Nil		Achieved	N/A	Y	Y	Insuf data	Y	Y
Water Pressure	Pressure - Point of Supply – OnDemand and Semi Restricted	Water pressure at the point of supply in On Demand and Semi-Restricted schemes, excluding outages, as demonstrated by a reticulation model or audits.	>250kPa for all connections at peak demand >300kPa for 99% of connections at peak demand	60%	There are 5 semi restricted connections left. 3 meet the requirement , 2 do not	Not Achieved	The response in the long term is to convert the 5 semi-restricted connections to fully restricted.	N	N	N	N	N
Water Pressure	Pressure - Point of Supply - Restricted	Water pressure at the point of supply of Restricted connections, excluding outages, as demonstrated by a reticulation model or reactive audits	>150kPa for all connections 100% of the time at peak demand	100%		Achieved	N/A	Y	Y	Y	Y	Y
Scheme Capacity	Scheme Capacity - Restricted	Actual peak capacity of the scheme for domestic use - Restricted	>1150 litres/allocated unit/ day	100%		Achieved	N/A	Y	Y	Y	Y	Y
Storage Volume	Storage	Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme-by-scheme basis, depending on resiliency and redundancy of source infrastructure. 91 m3 required	148% Have 135 m3	Requires 9.72 hours at ADF/ 91 m3 total. Have 135 m3 (81 m3 of this is shared with Summerhill and West Eyreton)	Achieved		N	N	N	N	N

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Water Usage	Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed reasonable water use	74%	Calculated as part of Water conservation strategy last generated 2020	Achieved	N/A	Y	Y	Y	Y	NA
Water Usage	Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	94%	Calculated as part of Water conservation strategy last generated 2020	Achieved	N/A	Y	N	N	Y	N
Customer satisfaction	Customer satisfaction	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory".	>90%	58% (Note, included with West Eyreton)	Customer satisfaction is expected to drop, with the increase in water quality complaints. Chlorination in schemes is considered the main cause of water quality complaints.	Not achieved						

\* Note for previous results "Y" indicates that the LOS has been met, and "N" indicates it has not been met. Blank cells indicate measures were not recorded for that year. ( the measure was likely not a LOS at that time)

\* Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment. For the 2022/23 assessment, the measures from the 2021 AMP have been used.

## APPENDIX 12: GARRYMERE SCHEME PERFORMANCE

**Table 42: Garrymere Elective LoS Performance - Assessed June 2023**

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Resource Consents	Consent Breach – Action Required	Percentage of the total number of WS consent conditions that have breaches that result in an ECan report identifying compliance issues that require action.	0%	0%	There were no breaches of consent this year, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
DWSNZ	DWSNZ - Aesthetic Compliance	Water is supplied that is within the guideline range in the DWSNZ for aesthetic parameters, with the exception of pH.	95% of samples comply	100%		Achieved	N/A	Y	N	N	N	N
	DWSNZ – E. Coli Presence	Number of instances where the presence of E coli was detected at the headworks or within the reticulation	Nil/year	Nil		Achieved	N/A	Y	Y	Y	Y	Y
	DWSNZ - Protozoa Compliance	Water supply delivers water that achieves a standard suitable for compliance with the protozoal requirements of DWSNZ	Complies	Y		Achieved	N/A	N	N	N	N	N
	DWSNZ - Radiological Compliance	Water supply delivers water that achieves a standard suitable for compliance with the radiological requirements of DWSNZ	Complies	Y		Achieved	N/A					

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	DWSNZ - Chemical Compliance	Water supply delivers water that achieves a standard suitable for compliance with the chemical requirements of DWSNZ	Complies	Y		Achieved	N/A					
	DWSNZ – Bacterial Compliance (Previously all sampling non-compliance)	Water supply delivers water that achieves a standard suitable for compliance with the bacterial requirements of DWSNZ	Complies	Y		Achieved	N/A	Y	Y	Y	Y	Y
Flow	System Flow - Restricted	Percentage of properties where flow received is consistent with allocated units at the point of supply in Restricted or Semi Restricted schemes, (excluding outages) as demonstrated by restrictor checks completed at not more than 5 yearly intervals	100% of restrictors tested at no more than 5 yearly intervals	16%		Not Achieved		N	N	-		
Water Losses	Water losses as determined by measured or calculated minimum flow	Water losses as determined by the Infrastructure Leakage Index (ILI) based on an annual assessment	Scheme shall either: a) achieve an ILI of "A" or "B", OR. b) For schemes with an ILI of "C" or "D", an economic assessment shall be carried out to determine the value in further leak detection work	B		Achieved	N/A	N	Y	Y	Y	No Data



Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Service Outages	Outages - Events >8 hours	Number of events that cause water not to be available to any connection for >8 hours	Nil/year	Nil		Achieved	N/A	Y	N	Insuf data	Y	Y
Water Pressure	Pressure - Point of Supply – OnDemand and Semi Restricted	Water pressure at the point of supply in On Demand and Semi-Restricted schemes, excluding outages, as demonstrated by a reticulation model or audits.	>250kPa for all connections at peak demand >300kPa for 99% of connections at peak demand	0%	Current policy is to convert to restricted when subdivision occurs, so may take a long time to resolve	Not Achieved	The response in the long term is to convert semi-restricted connections to fully restricted.	N	N	N	N	N
Water Pressure	Pressure - Point of Supply - Restricted	Water pressure at the point of supply of Restricted connections, excluding outages, as demonstrated by a reticulation model or reactive audits	>150kPa for all connections 100% of the time at peak demand	68%	When all connections are restricted the headworks will be capable of meeting the LOS	Not Achieved	No immediate action	N	N	N	N	N
Scheme Capacity	Scheme Capacity - Restricted	Actual peak capacity of the scheme for domestic use - Restricted	>1150 litres/allocated unit/ day	100%	Met for all schemes. For some schemes (e.g., Garrymere) we can deliver enough flow, but pressure will be below our LoS	Achieved	N/A	Y	Y	Y	Y	Y
Storage Volume	Storage -	Volume of available and usable storage for On Demand and Semi-Restricted schemes meets the calculated scheme specific value	Target calculated on scheme-by-scheme basis, depending on resiliency and redundancy of source infrastructure	119%	Requires 11.33 hours at ADF/ 68 m3 total. Have 80.7 m3	Achieved	N/A	Y	N	N	N	N

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2023				Previous Results <sup>#</sup>				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Water Usage	Usage - Average Day	Actual usage on average day	Maintain the average daily water use below 100% of the assessed reasonable water use	149%		Not Achieved		N	N	N	N	NA
Water Usage	Usage - Peak Day	Actual usage on Peak Day	Reduce the peak daily usage to below 110% of the assessed reasonable water use	208%		Not Achieved		N	N	N	N	N
Customer satisfaction	Customer satisfaction	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service as "Satisfactory" or "Very Satisfactory".	>90%	Data not recorded separately		N/A						

\* Note for previous results "Y" indicates that the LOS has been met, and "N" indicates it has not been met. Blank cells indicate measures were not recorded for that year. ( the measure was likely not a LOS at that time)

\* Details of performance measures may have been modified between various revisions of the AMP. The Previous Results reported are as assessed against the most relevant performance measure at the time of assessment. For the 2022/23 assessment, the measures from the 2021 AMP have been used.

## APPENDIX 13: GLOSSARY OF TERMS

The following terms and acronyms (in brackets) may have been used in this Activity Management Plan

Activity	As defined in the Local Government Act 2002: 'Goods or services provided by, or on behalf of a local authority or council-controlled organisation and includes: a) The provision of facilities and amenities; b) The making of grants; and The performance of regulatory and other governmental functions.
Activity Management Plan (AM Plan)	Activity Management Plans are key strategic documents that describe all aspects of the management of assets and services for an activity (including technical and financial) over the lifecycle of the asset in the most cost-effective manner to provide a specified level of service. The documents are an information source for the Council's LTP and IS, and place an emphasis on long term financial planning, community consultation, and a clear definition of service levels and performance standards.
Asset Management (AM)	The combination of management, financial, economic, engineering and other practices applied systematically to physical assets with the objective of providing the required level of service in the most cost-effective and sustainable manner.
Advanced Asset Management	Asset management, which employs predictive modelling, risk management and optimised renewal decision-making techniques to establish asset lifecycle treatment options and related long term cash flow predictions.
Asset Management System (AMS) (also known as asset register)	A system (usually computerised) for collecting analysing and reporting data on the utilisation, performance, lifecycle management and funding of existing assets.
Asset Management Planning	A set of interrelated or interacting elements of an organisation, including the AM policy, AM objectives, AM Strategy, AM Plans, and the processes to achieve these objectives.
Asset Management Plan (AMP)	In the Waimakariri District Council's context, this is referred to as an activity management plan.
Aesthetic Determinant	A constituent or property of the water that can adversely affect the taste, odour, colour, clarity or general appearance of the water. These include substances such as manganese and iron compounds that can stain washing and utensils.
Aggressiveness	A measure of the tendency of water to corrode pipes and fittings, which can cause heavy metal concentrations to rise above 50% of their MAV.
Alkalinity	Alkalinity is a measure of the buffering capacity. A buffer limits the change in pH that occurs when water comes into contact with acidic or alkaline substances.
Annual Plan	The Annual Plan has the meaning given to it in the Local Government Act 2002.
Asset	A physical item that enables provision of services and has an economic life of greater than 12 months, has value of at least \$250 and is recorded in the asset register.
Asset condition	This describes an asset's structural integrity or ability to deliver the service required from it. The condition can deteriorate slowly over the life of an asset or rapidly if it is damaged.

Asset Register	A record of asset information considered worthy of separate identification including inventory, historical, financial, condition, construction, technical and financial information about each.
Average Daily Flow (ADF)	The recorded flow over a year divided by the number of days in a year and generally expressed as volume/day or litres/second.
Brownfields	Previously developed land with potential for new development.
Chlorination	Part of a water treatment process that involves the injection of chlorine into the water supply to kill potentially harmful micro-organisms.
Capital Expenditure (CAPEX)	Expenditure used to create new assets, renew assets, expand or upgrade assets or to increase the capacity of existing assets beyond their original design capacity or service potential. CAPEX increases the value of an asset.
Community Drinking Water Supply	A publicly or privately owned drinking water supply which serves more than 25 people for at least 60 days of the year.
Compliance	A drinking water is said to be in compliance with the standards when the results of monitoring of bacteriological and chemical determinants show that the water supply satisfies the requirements of the Drinking Water Standards for New Zealand 2005 (revised 2008) (DWSNZ).
Condition Monitoring	The inspection, assessment, measurement and interpretation of the resultant data, to indicate the condition of a specific component so as to determine the need for some preventive or remedial action
Connection	From the point of view of the utility provider this relates to the physical connection of a particular customer to the service.
Consumer	The owner or resident of a property who has a connection to a water supply and is provided with potable water at an agreed level of service
Contaminant	A substance or organism in the water which can cause undesirable public health or aesthetic effects.
CPH	Community and Public Health. An organisation working for the Ministry of Health. Health Protection Officers are engaged by CPH.
Critical Assets	Assets for which the financial, business or service level consequences of failure are sufficiently severe to justify prioritisation for inspection, rehabilitation or replacement ahead of other assets.
Customer	A customer is an individual or business that creates the demand for and is the recipient of goods or services. Customers can be internal or external.
Current Replacement Cost	The cost of replacing an existing asset with an appropriate modern equivalent asset to deliver the same level of service.
Deferred Maintenance	The shortfall in maintenance or rehabilitation work required to maintain the service potential of an asset.
Demand Management	The active intervention to influence demand for services and assets with forecast consequences, usually to avoid or defer CAPEX expenditure. Demand management may be 'SUPPLY-SIDE' demand management (for example minimising wastage through pipe leak detection) or customer DEMAND-SIDE management, to reduce demand for over-utilised assets or vice versa (for example, through pricing, regulation, education and incentives).

Depreciation	The annual sum budgeted to enable the assets to be replaced at the end of their economic life. It is generally based on the value of the asset divided by its remaining life at that point in time.
Depreciated Replacement Cost (DRC)	The replacement cost of an existing asset after deducting an allowance for wear or consumption to reflect the remaining economic life of the existing asset.
Disaster Resilience Assessment (DRA)	An assessment first carried out in 2007 and updated in 2011/12 to determine the risk to assets from natural hazards.
Disinfection	The process used to inactivate micro-organisms in a drinking water supply. Council uses chlorination and UV at all of its supplies
Disinfection Residual	The amount of disinfection that is still present in the water at any time. After disinfection is added to drinking water it is used up by the disinfection process and other chemical reactions. More disinfection is usually added than is initially needed so that enough disinfectant remains to guard against post treatment contamination.
Disposal	Activities necessary to decommission and dispose of assets that are no longer required.
Distribution system	All the trunk main, storage, and distribution system components which follow a treatment facility at the treatment station.
Diurnal Pattern	The variation in daily flow pattern generated within the system related to varying demands throughout the day.
Drinking-water	Potable water intended to be used for human consumption, food preparation, utensil washing, oral hygiene or personal hygiene.
DWS or DWSNZ	The Drinking Water Standards for New Zealand 2005 (revised 2008). The yardstick to assess the quality of drinking water. The Standards define the MAVs of health significance and specify methods for determining whether a drinking water supply complies with the standards.
E coli	A bacterium used as an indicator that faecal Coliform contamination of the water may have occurred and that, therefore there is a possibility that pathogens are present. The ratio of E.coli to harmful bacteria is on the order of 10,000 to 1 and its concentration in liquids is easily determined. Therefore E.coli is the principle indicator for the presence of harmful bacteria.
Economic life	The period from the acquisition of the asset to the time when the asset, while physically able to provide a service, ceases to be the lowest cost alternative to satisfy a particular level of service. The economic life is at the maximum when equal to physical life, however obsolescence will often ensure that the economic life is less than the physical life.
Facility	A complex comprising many assets (eg. swimming pool complex, sewage treatment plant etc.) which represents a single management unit for financial, operational, maintenance or other purposes.
Faecal coliforms	A subgroup of total coliforms, which will grow on a specific selective medium. The presence of faecal coliforms indicates that faecal contamination may have occurred and that steps need to be taken to ensure pathogens are not present.
Free Available Chlorine (FAC)	The residual chlorine left in the water at any point in time.
Fully Chlorinated Water Supply	Water in which the FAC concentration exceeds the equivalent of 0.2 mg /L free available chlorine at pH 8.0

Geographic Information System (GIS)	Software which provides a means of spatially viewing, searching, manipulating, and analysing an electronic data-base.
Greenfield Development Area	Existing undeveloped land with potential for development or newly rezoned land that has yet to be developed with the appropriate infrastructure to support a residential or commercial land use.
Infrastructure Assets	Stationary systems forming a network and serving whole communities, where the system as a whole is intended to be maintained indefinitely at a particular level of service potential by the continuing replacement and refurbishment of its components.
Key Performance Indicator (KPI)	A qualitative or quantitative measure of a service or activity used to compare actual performance against a standard or other target. Key performance indicators commonly relate to statutory limits, safety, responsiveness, cost, comfort, asset performance, reliability, efficiency, environmental protection and customer satisfaction. Some of these may be mandatory performance measures as prescribed by central government. Also referred to as performance indicators (PI) or performance measures (PM).
Guideline value	The value for an aesthetic determinant specified in the DWSNZ, which if exceeded will render the water unattractive to consumers.
Headworks	Headworks are the heart of a water supply system and fall into two categories. They may be combined on one site or at two separate locations. The first category contains all the pumps, treatment processes, electrical controls and switchboards and is normally housed in a pump station building. Any flow control/storage reservoirs are commonly at the sites.  The second category contains the well(s), their associated pump(s), electrical controls and switchboards and if at a separate location deliver the water to the first category headworks.
Health Drinking Water Amendment Act 2007 (HDWAA)	This Act is aimed at ensuring communities have safe water to drink. A key requirement of the HDWAA will be that all water suppliers must take all practicable steps to comply with the DWSNZ.
Iron (Fe)	This is a metal (often associated with manganese) that can be found dissolved in water sourced from underground. It can cause aesthetic problems in reticulated water supplies, but it can be removed with appropriate treatment.
Level of service (LoS)	A measure of the standard of service that the Council intends to provide. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental acceptability and cost.
LGA	Local Government Act 2002.
Life	A measure of the anticipated life of an asset or component; such as time, number of cycles, distance intervals etc.
Life Cycle Cost	The total cost of an asset throughout its life including planning, design, construction, acquisition, operation, maintenance, rehabilitation and disposal costs.
Life Cycle Maintenance	All actions necessary for retaining an asset as near as practicable to its original condition, but excluding rehabilitation or renewal.
Life Cycle Maintenance	All actions necessary for retaining an asset as near as practicable to its original condition, but excluding rehabilitation or renewal.
Long Term Plan (LTP)	The Long Term Plan (LTP) has the meaning given to it in the Local Government Act 2002.

Maintenance Plan	Details the specific planned or reactive maintenance actions for the optimum maintenance of an asset, or group of assets.
Manganese (Mn)	This is a metal (often associated with iron) that can be found dissolved in water sourced from underground. It can cause odour, taste and aesthetic problems in reticulated water supplies, but it can be removed with appropriate treatment.
Maximum Acceptable Value (MAV)	The concentration of a determinant (specified in the DWSNZ), below which the presence of the determinant does not result in any significant risk to the consumer over a lifetime of consumption. For carcinogenic chemicals, the MAVs set in the New Zealand Drinking Water Standards generally represent a risk of one additional incidence of cancer per 100,000 people ingesting the water at the concentration of the MAV for 70 years.
Maintenance Plan	Details the specific planned or reactive maintenance actions for the optimum maintenance of an asset, or group of assets.
Medical Officer of Health (MOH)	The Medical Officer of Health appointed for a health district under the Health Act 1956, and includes any Deputy Medical Officer of Health; and, for the purposes of Part IV of the act, includes any medical Practitioner acting under the direction of the Medical Officer of Health.
Micro-organism	A very small (microscopic) organism, including viruses, bacteria, protozoa, algae and helminthes.
Ministry of Health (MoH)	The government agency responsible for implementing the Health Act 1956.
Network Utility Operator	A person or in many cases a local authority that provides a reticulated water supply.
NTU	See turbidity.
NZ Treasury Asset Management Maturity Assessment Tool (AMMA)	A tool (in spreadsheet format) that allows organisations to assess the maturity of their current Asset Management Plans, and to define a target maturity to which future Asset management Plans can aspire to, that is appropriate to the activity under consideration.
Optimised Renewal Decision Making (ORDM)	An optimisation process for considering and prioritising all options to rectify performance failures of assets. The process encompasses NPV analysis and risk assessment.
Peak Daily Flow	The highest recorded daily flow in a year generally expressed as volume/day or litres/second or litres/connection/day.
Performance Monitoring	Quantitative and qualitative assessments of the actual performance compared with specific objectives, measures, targets or standards.
pH	A measure of the concentration of hydrogen ions in water. It is the negative logarithm to base of 10 of the concentration H+1 in the water. A low pH indicates an acidic water, a high pH shows the water is alkaline. A pH of 7 is neutral. The pH of the water is particularly important in water treatment processes such as disinfection.
pH Correction	Potable water has a narrow acceptable range on the acidity/alkalinity scale. Too high alkalinity can cause scale build-up in the reticulation and digestion problems and too high acidity can erode parts of the reticulation system. pH correction is a treatment process that shifts a water supply into the correct range if necessary.
Potable water	Drinking water that does not contain contaminants, which exceed the Maximum Acceptable Values (MAVs) given in the DWSNZ.

Planned Maintenance	Day to day operational activities to keep the asset operating (fixing potholes, clearing drains, greasing pumps and motors, mowing etc.) and which form part of the annual operating budget. These may be cyclic, e.g. on specific timeframe, or needs-based, i.e. where a fault is monitored until it reaches a point at which some action must be taken to ensure continued performance/life of asset.
Presumptive Coliforms	Bacteria whose identification in the early stages of bacteriological examination highlight the need for further identification of coliform organisms.
Protozoa	One of several types of micro-organism found in water, some of which can be harmful if ingested. Protozoa are larger than bacteria and include species like Giardia and Cryptosporidium.
Rating Charges	The annual amount charged to a customer for the provision of a reticulated water supply. In the Waimakariri District a fixed amount is charged on each rating unit or separately used or inhabited parts of a rating unit in the Rangiora, Kaiapoi, Woodend (including Tuahiwi), Waikuku Beach, Pines-Kairaki, Cust, Oxford township, Ohoka, Garrymere, Fernside, Mandeville, Pegasus and West Eyreton supplies. A fixed amount per unit of water allocated to the property is charged on the Oxford Rural No 1 and Oxford Rural No 2 supplies. A combination of a fixed amount per rating unit (to collect 75% of costs) plus a fixed amount per unit of water (to collect 25% of costs) allocated to the property is charged on the Summerhill Rural Water Supply and the Poyntzs Road Water Supply.
Raw water	Water, which has not received any treatment to make it suitable for drinking.
Renewal	Works to upgrade, refurbish, rehabilitate or replace existing assets with ones of equivalent capacity or performance capability.
Renewal Programme	This is the programmed replacement of like asset with like asset (as opposed to an upgrade), when it reaches the end of its useful life due to deterioration of its condition.
Remaining Economic Life	The time remaining until an asset ceases to provide the required level of service or economic usefulness.
Repair	Action to restore an item to its previous condition after failure or damage.
Replacement	The complete replacement or renewal of an asset that has reached the end of its life, so as to provide a similar, or agreed alternative, level of service.
Reservoir	A storage facility present in the network reticulation for the purpose balancing peak demands, maintaining a constant pressure, and providing storage for emergency and fire-fighting purposes.
Risk Cost	The assessed annual cost or benefit relating to the consequence of an event. Risk cost equals the costs relating to the event multiplied by the probability of the event occurring.
Risk Assessment	The process of looking at all possible events that might cause the failure of a given asset or component. The risk assessment considers both the probability and consequences of an event occurring. Risks are assessed and prioritised, and appropriate reduction or mitigation measures are implemented.
Risk Management	Risk management is the identification, assessment, and prioritisation of risks (defined in ISO 31000 as the effect of uncertainty on objectives) followed by coordinated and economical application of resources to minimise, monitor, and control the probability and/or impact of unfortunate events.
Restrictor	A flow control device fitted to the service pipe to limit the flow rate of water to a customer's premises. This device is owned and maintained by the Council. The device



	maintains a constant flow over the normal operating pressure of the scheme, allowing a fixed volume of water to be delivered over a 24 hour period. Restrictors are designed to deliver differing volumes of water to suit differing allocations (units of water) to customers.
Reticulation	The network of pipes that delivers drinking water from the treatment plant to the customer's point of supply. It includes pumps, pipes, and reservoirs.
Routine Maintenance (can be planned or unplanned)	Day to day operational activities to keep the asset operating such as replacement of minor equipment, oil and greasing pumps and motors, cleaning of equipment, repairing leaks, etc. It forms part of the annual operating budget, including preventative maintenance.
Semi-Restricted Supply	A rural water supply that has restrictors to limit the peak flow of water at each connection. Each connection receives normal urban pressures and is not required to have an individual tank. Each connection is restricted to 13 litres per minute (this is a supply of up to 19 units per day per property, where 1 unit is equivalent to 1,000 litres per 24 hours).
Service Potential	The total future service capacity of an asset. It is normally determined by reference to the operating capacity and economic life of an asset.
Restricted Supply / Rural Restricted Supply	A rural or rural-residential water supply that has restrictors at each connection to limit the total volume of water supplied over a 24 hour period. Each connection is required to have its own tank. Residential properties are normally restricted to two cubic metres per day. On some Rural Schemes customers are able to purchase additional units for stock use.
Rural Water Supply (RWS)	Rural water supplies are designed to deliver potable water to rural areas. Each consumer is provided with a restricted connection and required to provide onsite storage for peak flows.
Secure Groundwater	<p>Water contained beneath the land surface which is abstracted via a secure well head or similarly proven structure. It must not be under the direct influence of surface water or demonstrate any significant and rapid shift in characteristics such as turbidity, temperature, conductivity or pH which closely correlate to any climatological conditions, surface water conditions or land use practices, as demonstrated by :</p> <p>Less than 0.005 percent of the water having been present in the aquifer for less than one year as demonstrated by the tritium and CFC methods.</p> <p>Variations in the groundwater characteristics not exceeding a coefficient of variation of more than:</p> <ul style="list-style-type: none"> <li>3.0 percent in conductivity</li> <li>4.0 percent in chloride concentration</li> <li>2.5 percent in nitrate concentration (standardised variance)</li> </ul> <p>There must also be no insects, other macro-organisms such as algae/ organic debris, large diameter pathogens, or E-coli in 12 successive monthly samples.</p>
Surface Water	The water on the land surface. Surface water is produced by rainfall runoff and by groundwater seeping through the top layers of soil. Surface water can also be defined as all water open to the atmosphere.
Secure Well Head	<p>A well head that incorporates appropriate measures to prevent or minimise risk of groundwater contamination. Measures include:</p> <ol style="list-style-type: none"> <li>1) Sealed pumping and piping system including backflow prevention.</li> <li>2) Seals between the well casing, pipework and surrounding ground.</li> <li>3) Restrictions on any potentially contaminating land use in the vicinity of the well head.</li> </ol>

Surrogate	A determinant used to assess the likely presence or concentrations of another determinant which is difficult to determine directly. For example, E-coli is used to assess the likely presence of specific pathogen organisms, as they are good indicator organisms and are easier to test for than pathogens themselves.
Total Coliforms	Genera in the family enterobacteriaceae, the total coliforms are bacteria which will grow on a specific selective medium when incubated at 35 degrees centigrade + or – 0.2 degrees centigrade. They are used to indicate the probable contamination of water by organic material, and that the possibility of faecal contamination needs to be checked. Total coliforms include the genera; Erwinia, Klebsiella, Escherichia, Citrobacta and Enterobacta.
Transgression	A drinking-water sample is said to transgress the Standards when a determinant of any priority class that is present in the sample exceeds the Maximum Acceptable Value (MAV) or the compliance criteria requirements.
Turbidity (NTU)	A measure of the clarity of water. High turbidity means low clarity (poor aesthetics) and is generally caused by very fine suspended particles in the water (as opposed anything dissolved in the water). It is not harmful. Suitable treatment processes can reduce turbidity. NTU is the measure of turbidity, higher values mean the water is more cloudy or has lower clarity.
Unit of Water	One cubic metre (1,000 litres) of water per day delivered over a 24 hour period. The normal minimum is two units for domestic consumption but additional water units can be purchased on some restricted water schemes to supplement a properties water demand.
Unplanned Maintenance (or repair)	Corrective work required in the short term to restore an asset to working condition so it can continue to deliver the required service or to maintain its level of security and integrity.
Upgrade	The addition or replacement of an asset, or component of that asset, that materially improves its original service potential.
Urban Supply	An on-demand supply that has no flow restriction. Connections receive normal urban pressures and are not required to have their own tank. Fire Fighting capacity is normally also provided.
Valuation	The process of determining the worth of an asset or liability. Assessed asset value, which may depend on the purpose for which the valuation is required, i.e. replacement value for determining maintenance levels, market value for life cycle costing or replacement plus a percentage for insurance purposes.
Water Conservation Strategy (WCS)	A strategy adopted by Waimakariri District Council in 2010 to adopt appropriate water conservation measures throughout the district.
Water Information New Zealand (WINZ)	A computer database that assesses compliance of monitoring results of water supplies with the DWSNZ 2000.
Water Safety Plan (WSP)	A document written by the Water Supply Authority to assess all potential risks in the process of abstracting, treating and distributing water to the consumers in a particular water supply. The plans identify events, their cause/s, preventative measures and the corrective action to be undertaken. The preparation of a WSP is a requirement of the HDWAA.  Water Safety Plans were previously described as Public Health Risk Management Plans in earlier versions of the Council's AMP's.
Water Supply Authority	Any person or entity that owns, or is responsible for operating, a drinking-water supply. For example, the Waimakariri District Council is the principal Water Supply Authority in the Waimakariri district.

Water Treatment Plant	The point where raw water is treated to make it potable. Note that not all raw waters require treatment (for example, secure groundwater often requires no treatment).
Well Head	The physical structure, facility or device at the land surface from which groundwater is abstracted.
WHO	World Health Organisation
Wholesome Drinking Water	Potable water which does not contain any determinants which exceed the Guideline Values for Aesthetic Determinants given in the DWSNZ 2000.

The following acronyms may also appear in Council activity management plans.

<b>AM</b>	Asset management
<b>AMMA</b>	NZ Treasury asset management maturity assessment
<b>CAPEX</b>	Capital expenditure
<b>CE</b>	Chief Executive
<b>GIS</b>	Geographic Information System
<b>IIMM</b>	International Infrastructure Management Manual
<b>KPI</b>	Key performance indicator
<b>LGA</b>	<i>Local Government Act</i>