WAIMAKARIRI
DISTRICT COUNCIL

Activity Management Plan 2024

Wastewater

3 Waters | July 2024

Prepared by

Waimakariri District Council

215 High Street,

Private Bag 1005

Rangiora 7440,

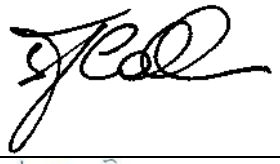
New Zealand

waimakariri.govt.nz

Document Control:

Revision Nº	Description	TRIM	Date
A	Draft for presentation to Council	230516070466	30/01/2023
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	General Manager Utilities and Roading		13/6/2024
Adopted by	Council			25/06/2024

Contents

Tables

Figures

1. EXECUTIVE SUMMARY

What assets do we have?

Waimakariri District Council owns and operates 2 separate wastewater schemes. One of these, the Eastern Districts Sewerage Scheme (EDSS), comprises 10 schemes which have been physically connected together, but still retain elements of financial separation relating to past loans. The other separate scheme is at Oxford.

Altogether the schemes provide wastewater services to approximately 18,800 properties, with just under 18,000 of those serviced by the EDSS. These connections in total service approximately 73% of the population. The remaining 18,000 people in the district are serviced by private wastewater schemes, or privately owned septic tanks on rural properties.

Schemes in the main towns have conventional gravity flow-based collection systems, but in more rural areas, two other scheme types are used. Septic Tank Effluent Pumping systems, whereby effluent treated through individually owned septic tanks, is then pumped into the community based reticulation system, and Pressure Sewer Systems whereby raw sewage is discharged into the community reticulation system via small grinder pumps located on individual properties.

Treatment of the wastewater for the EDSS comprises four treatment plants, at Rangiora, Kaiapoi, Woodend and Waikuku Beach. Treated effluent from all four plants is discharged into a 1.5km long Ocean Outfall pipe.

Oxford has its own treatment plant, which discharges to land.

Consideration of Levels of Service, Growth and the Renewals programme in previous Asset Management Plans have led to the programming of two significant wastewater upgrade projects. Construction of one (multiyear) is now nearly complete and the second of which is in the planning stage.

- Reticulation upgrades in Rangiora (in construction)
- Reticulation upgrade in Kaiapoi (planned)

Completion of these works will enable levels of service to be met (particularly with respect to overflow frequency in wet weather events) and capacity for growth to be available.

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 2021 AMP levels of service were presented to the Council's Utilities and Roading Committee in July 2020, which recommended that the Council include them within the Draft 2021-31 Long Term Plan (refer to report 200406043184).

Table 10 in this document shows performance against the levels of service measured at district level, assessed for 2022/23. All levels of service were met but one, relating to response time to loss of service > 8 hours. There were four occasions, with 2 in Rangiora, 1 in Kaiapoi and 1 in Waikuku. These all related to the flooding events in July 2022.

Asset Condition

The sewerage pipe network is primarily assessed for condition via wastewater CCTV programme started in 2008. On average pipes are inspected every 30 years, but assessment priority is based on criticality, age and operational issues and is also integrated with the road reconstruction programme. The CCTV condition information is complemented with maintenance activity records from the field recording wastewater mains blockage and overflow records.

A condition assessment of all assets at headworks has not yet been carried out, so confidence in asset condition is only moderate. However, a full asset inventory has been compiled for all of the 3 Waters facilities, the scope of which included identifying assets in particularly poor condition. There were less than 15 wastewater assets in this category.

Risk

Historically a range of different types of risk assessments have been carried out for the District's wastewater schemes. The operational risk assessment has previously generated a programme of work to resolve the identified high risks. This work is now largely complete but there are two remaining issues. One is the under capacity of the Kaiapoi network in wet weather events. Investigations are ongoing and $17M has been budgeted for capacity upgrades commencing 2025/26. The second is earthquake risk for the Ocean outfall pipework and drop structure. This needs further work.

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.

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. It is proposed to manage the inherent uncertainty in rate of growth, by carrying out an annual growth review in conjunction with the Development Planning Unit to enable short term capital planning adjustments to be made that respond to changing market requirements. This will avoid unnecessary expenditure on growth works before they are actually needed, or potentially ensure growth related projects are accelerated if growth occurs faster than anticipated.

Capacity and Performance

The existing capacity and performance of the wastewater schemes throughout the district are monitored using hydraulic models constructed and maintained by the Council for each scheme. Where a scheme has been identified as performing below the required levels of service, either currently or with the inclusion of future growth, upgrades have been subsequently modelled and budgets to carry out the upgrades included in the Long-Term Plan.

With the current upgrades either underway or planned for the main towns of Rangiora, Kaiapoi and Woodend, sufficient capacity will be available in both the reticulation and treatment plants until at least 2038.

A review of the of the Ocean Outfall wastewater network was completed in January 2020 (Trim 200214019934). The network has capacity until at least 2069 with opportunities to extend this with better management of storage and pumping control.

The Oxford wastewater treatment plant has limited capacity to deal with wet weather flows, with the storage pond periodically overflowing during heavy rain events. The consent for the plant expires in 2031 and as part of the consent renewal, a treatment plant upgrade has been planned for completion in 2027/28 which will address the existing capacity issues.

Operation and Maintenance

While some asset performance data is captured and analysed, (blockages), operational and maintenance expenditure remains largely based on previous years expenditure carried forward.

With the introduction of the ability to capture data in the field, and the implementation of a works management system associated with the Asset Management Information System (AMIS), a start has been made towards more robust operation and maintenance planning, including both planned and unplanned. Also new is the implementation of the InfoAsset Manager software which allows CCTV data to be analysed to identify and schedule maintenance of serviceability faults.

Renewals

Improvements have been 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. The model includes 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 expected life. Based on these risk profiles the model provides a prioritised list of pipe renewals needed across the district, identified by scheme, which Asset Managers assess and adjust as necessary. The model provides an annual expenditure profile for the next 150 years, and also identifies the annual revenue required that will enable this renewals expenditure to be made without the renewals fund falling into debt. The employment of InfoAsset Manager to manage and analyse CCTV pipe inspection data will improve the modelling of pipe renewals through a better understanding of the remaining asset life.

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 Figure 10.

Future Challenges

The following are the key future challenges relating to wastewater that will require managing:

- **Water Reform:** The operative water reforms include Taumata Arowai having a role to monitor and report on the environmental performance of wastewater networks. What this looks like is not yet known. The wider water reforms to be abandoned or significantly modified under the National led government also create significant uncertainty.
- **Ocean Outfall Discharge Consent:** The Ocean Outfall Discharge Consent Expires in 2039. The process to renew the consent will need to begin well in advance, as there is likely to be opposition to the continued discharge to sea. Decisions regarding the consent also need to be integrated with the proposed pond upgrades planned for the Woodend and Rangiora treatment plants, with greenhouse gas emissions being factored into the decision making.

  Any changes to consent conditions related to effluent quality may have a significant impact to existing treatment plants.
- **Oxford WWTP Discharge Consent:** The Oxford WWTP discharge consent expires in 2031, but upgrades are already required to enable current conditions to be met. Possible changes to future discharge consent conditions may require further work which could result in the Oxford sewer rates increasing.
- **Climate Change:** The potential impact of climate change requires further consideration. Initial screening has been carried out to identify assets at high risk from the effects of climate change, but further detailed work is required on a site-by-site basis to properly quantify the risk and select the most cost effective mitigation option.

  In addition, in the next three years, using the guidance in the Water NZ publication Navigating to Net Zero Council plans to:

  - Confirm the operational emissions boundary that 3 Waters intends to use.
  - Update and refresh the 3 Waters operational emissions inventory, including biogenic emissions.
  - Develop an operational emissions forecast
  - Develop a capital emissions baseline.
  - Set carbon reduction targets.

2. INTRODUCTION

The purpose of this Activity Management Plan (AMP) is to provide an overview of the Councils wastewater assets, outline the issues associated with these assets and show how the Council proposes to manage them in the future, to ensure levels of service are met, growth demand is accommodated, and renewals carried out at the appropriate time.

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.

This document outlines the management approach for all of the schemes, including the Eastern Districts Wastewater Scheme. It describes the processes and asset management practices common to all of the wastewater schemes.

There are 18,756 wastewater connections to serviced properties throughout the District. Of these, 17,851 are properties connected to the EDSS. These connections in total service approximately 73% of the population. The remaining 18,000 people are serviced by private wastewater schemes, or privately owned septic tanks on rural properties.

The Council provides three types of wastewater service connections within the District. These are:

1) Gravity Connections: conveys effluent away from connected properties directly to the council gravity reticulation for treatment and disposal.
2) Septic Tank Effluent Pumping (STEP) systems: raw sewage is collected in privately owned septic tank and pumping systems for primary treatment and filtering, then pumped to a designated community treatment plant for treatment and disposal.
3) Pressure Sewer Systems (PSS): raw sewage is accumulated in a privately owned single storage and pumping unit located on each property, is macerated into slurry and then pumped under pressure to a designated community treatment plant for treatment and disposal.

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 by tables of links to other sources. These include:

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

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 24

Document Review Process

Review of the AMPs has been carried out by a project team comprising the 3 Waters Manager, the 3 Waters Asset Management Advisor, Asset Managers (Water, Wastewater and Drainage), 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 Management Information team occurred during the update of the valuations. Asset Managers worked closely with the Finance Unit 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 Roading Committee at the end of 2023, with an updated version presented to Council in late January 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

There are several major wastewater scheme and facility upgrades programmed over the next 10 years, some of which are now under construction. These are intended to reduce costs, increase resilience, improve environmental compliance and in some cases provide a higher level of service. The key schemes/ facility upgrades for the District are:

Table 1: District Overview – Scheme Upgrades

Scheme(s) / Facility Upgrades	Reason	Timeframe
Treatment Plant Upgrades (Rangiora)	Aeration basin upgrade to cater for growth	2024/25 to 2026/27
Network Upgrades (Rangiora)	Complete capacity upgrade in trunk mains to cater for new growth areas in Rangiora, and to reduce wet weather overflows	2024/25 to 2051/52

Network Upgrade (Kaiapoi)	Investigate and upgrade the network to ensure wet weather overflow levels of service are met	2025/26 to 2030/31
Oxford WWTP plant upgrade	Upgrade the plant and terminal pump station to meet current consent conditions and provide for potentially more stringent conditions at consent renewal (2031)	2024/25 to 2027/28
Commencing work to service Ashley Village and Waikuku townships	No service at present. Community consultation would be required to determine demand before proceeding	2033/34 to 2040/41
WW assets climate change protection	To mitigate increased risks to wastewater assets arising from climate change effects.	2034/35 to 2043/44

3. SCHEME DESCRIPTION (WHAT DO WE HAVE?)

The District's wastewater networks consist of one independent system including a treatment plant at Oxford, and then a much larger interconnected system near the coast called the Eastern Districts Wastewater Scheme (EDSS) servicing all the towns in that part of the district

The Eastern Districts Wastewater Scheme combines ten communities in the eastern portion of the Waimakariri District. The specific communities included within the EDSS are:

- Rangiora
- Kaiapoi
- Woodend
- Pegasus
- Waikuku Beach
- Tuahiwi
- Woodend Beach
- The Pines / Kairaki Beach
- Mandeville (including Millfield and Mandeville Park, Ohoka Meadows and Swannanoa)
- Loburn Lea

The total number of properties on the EDSS was approximately 17,851 on 30 June 2023.

Connection of the original independent schemes to the EDSS has been progressive since 2012/13, with the last two, Fernside and Loburn Lea, being connected onto the EDSS in 2021/22.

The EDSS has the objective of conveying wastewater from all connected customers to its four treatment plants at Rangiora, Kaiapoi, Woodend and Waikuku Beach, and discharging the treated effluent at a single point to the ocean.

Error! Reference source not found. below outlines, for each wastewater scheme in the District, total connection numbers, scheme type (gravity, pressure or Septic Tank Effluent Pumping (STEP) system) and treatment method. Additional tables summarise the district wide network assets.

Asset tables follow which provide pipe, valve and manhole statistics by scheme. The final table (Table 6) shows data references of technical reports and file numbers used to compile the AMP, with links should further details be sought.

Figure 1 Shows a schematic of the EDSS.

An overall map of the District's Council wastewater schemes is shown in the AMP Plans and Figures Viewer. Scheme specific plans are also available in the viewer:

- Network Schematics
- Serviced area

Scheme Statistics

Up to date scheme statistics, are available in document TRIM 121108078891 which is updated quarterly. (The file needs to be opened in "edit" mode not "view").

Table 2: District Overview – Scheme Summary Information

Scheme	**Eastern Districts**										**Oxford**
Sub Scheme	**Rangiora**	**Mandeville**	**Loburn Lea**	**Kaiapoi**	**The Pines/Kairaki Beach**	**Woodend**	**Pegasus**	**Tuahiwi**	**Woodend Beach**	**Waikuku Beach**	**NA**
Level of Service	Urban Gravity / Pressure Sewer (Fernside)	Urban Gravity / Pressure Sewer / STEP System	Urban Gravity / STEP System	Urban Gravity / Pressure Sewer (Beach Grove)	Urban Gravity	Urban Gravity	Urban Gravity / Pressure Sewer / STEP System	Pressure Sewer	Urban Gravity	Urban Gravity / Pressure Sewer	Urban Gravity
Connections (2023/24 Rates Strike)	7,728	611	38	5,360	169	1,743	1,579	80	77	466	905
Total Scheme Connections	17,851										
Treatment Facility	Rangiora WWTP			Kaiapoi WWTP		Woodend WWTP				Waikuku WWTP	Oxford WWTP
Treatment Method	Screens Aeration Basin Facultative ponds Maturation Ponds Pumped to Kaiapoi wetlands			Screens Aeration Basin Oxidation Ponds Wetlands UV Treatment if required		Screens Aeration Basin Oxidation Ponds Wetlands UV Treatment				Screens Oxidation Ponds Discharge to Woodend Plant	Activated Sludge UV Treatment

Table 3 : Gravity Pipe Data Summary

Wastewater Gravity pipe length (m) by pipe material											
Pipe Material	**Rangiora**	**Mandeville**	**Loburn Lea**	**Kaiapoi**	**The Pines/Kairaki Beach**	**Woodend**	**Pegasus**	**Tuahiwi**	**Woodend Beach**	**Waikuku Beach**	**Oxford**
Asbestos Cement	6,774	-	-	1,550	1,170	6,263	-	-	1,009	3,598	-
Concrete	25,456	-	-	15,621	-	148	-	-	-	-	-
Earthenware	9,012	-	-	248	-	107	-	-	-	-	-
PE	561	8	-	187	-	51	3	-	-	135	-
PVC	65,221	37	3,641	40,052	1,993	20,2023	21,115	-	107	2,408	17,779
Other	119	12	-	354	20	880	172	15	10	183	36
Total	**107,143**	**57**	**3,641**	**58,013**	**3,183**	**27,652**	**21,290**	**15**	**1,126**	**6,324**	**17,815**

Table 4 : Pressure Pipe Data Summary

Wastewater Pressure pipe length (m) by pipe material											
Pipe Material	**Rangiora**	**Mandeville**	**Loburn Lea**	**Kaiapoi**	**The Pines/Kairaki Beach**	**Woodend**	**Pegasus**	**Tuahiwi**	**Woodend Beach**	**Waikuku Beach**	**Oxford**
Asbestos Cement	-	-	-	822	182	713	-	1,178	1,917	1,526	-
PE	9,021	20,831	-	19,332	843	10,551	13,033	7,116	272	2,618	478
PVC	5,970	27,235	324	10,619	1,665	1,705	132	362	-	126	2,572
Other	172	332	-	2,872	10	1,060	-	-	4	27	271
Total	**15,163**	**48,399**	**324**	**33,645**	**2,699**	**14,029**	**13,165**	**8,655**	**2,193**	**4,298**	**3,320**

Table 5 : Valve and Manhole summary

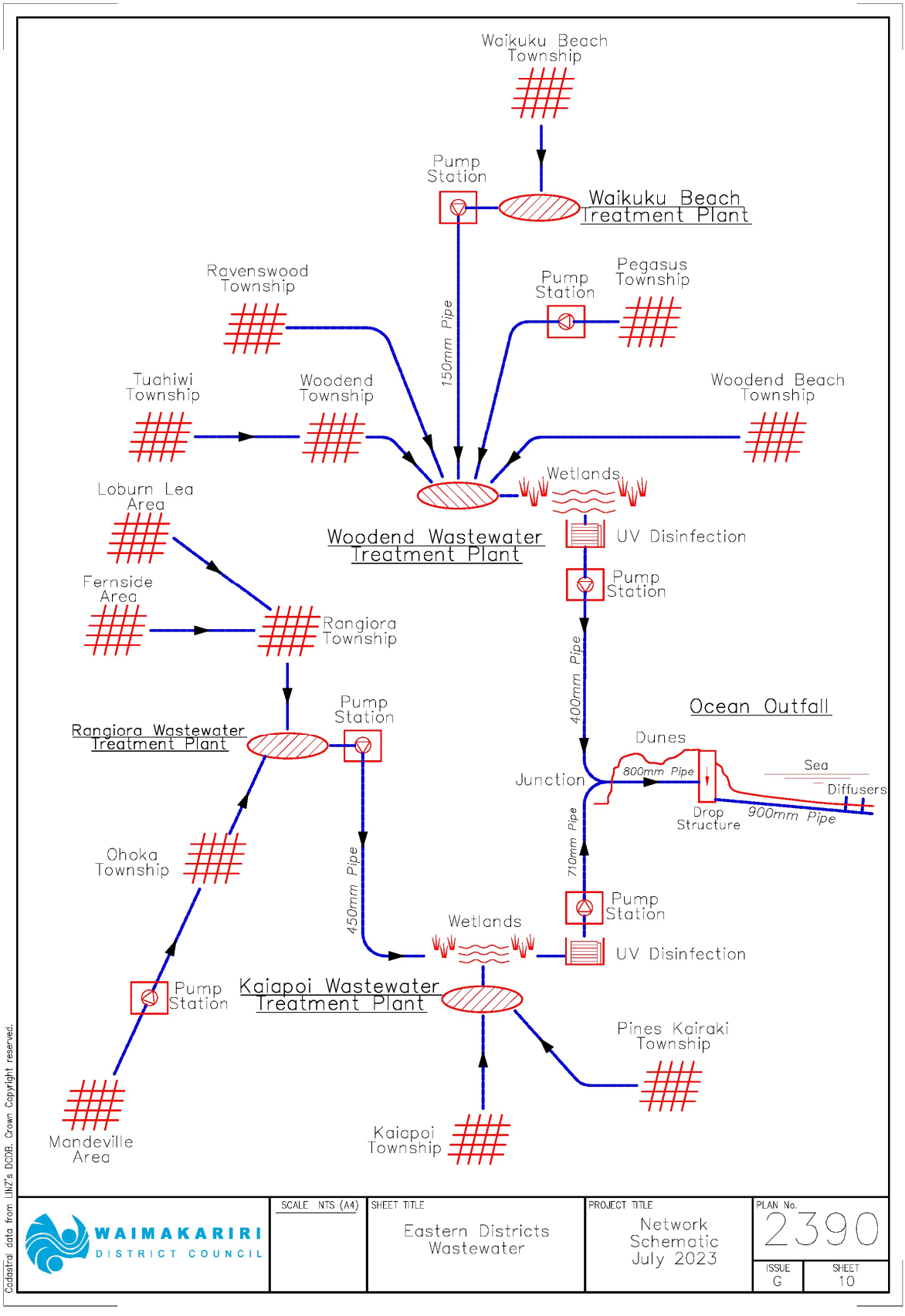
Wastewater Valve and Manhole Data Summary

Item	Rangiora	Mandeville	Loburn Lea	Kaiapoi	The Pines/Kairaki Beach	Woodend	Pegasus	Tuahiwi	Woodend Beach	Waikuku Beach	Oxford
Valve Count	131	276	-	332	7	101	96	28	6	25	42
Manhole Count	1,886	37	50	1,313	63	582	409	9	19	99	267

Table 6 : Data References

Data References - Common	Trim Reference
2021-22 3 Waters Asset Valuation	220803132120
2023 50 Year Water and Sewer Growth Forecast report	230413051831
Sewer flow data analysis	121108078891
2022 Customer Satisfaction Survey	230504063243
Data References – By Scheme	**Trim Reference**
Oxford WWTP – Oxford WWTP Strategic Plan Report	210810131225
Oxford WWTP – Apex review and update of previous GHD upgrade options report	230808120833

Figure 1: Eastern District's Scheme: Overview Schematic



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

Table 7: Summary of Performance Measure Types, and Reporting

	Mandatory Performance Measures	Elective Performance Measures
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 AMP's 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 unchanged from the 2021 AMPs.

Mandatory Performance Measures

In 2010, the Local Government Act 2002 was amended (Section 261B) to require 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.

Error! Reference source not found. sets out the full set of mandatory performance measures and targets for the 2024 AMP.

This 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.

Table 8: Mandatory Performance Measures for 2024 (unchanged from 2021 AMP)

Level of Service	Performance Measure	2024 Target
System Adequacy The sewerage system is adequately sized and maintained	The number of dry weather sewerage overflows from the sewerage system expressed per 1000 sewerage connections to that sewerage system	Less than 1 per 1000 connections
Discharge Compliance The treatment and disposal of sewage is managed in accordance with consent conditions	Compliance with resource consents for discharge from the sewerage system measured by the number of : a) Abatement notices b)Infringement notices c)Enforcement orders, and d) Convictions Received in relation to those resource consents	 a) Nil b) Nil c) Nil d) Nil
Response to Sewerage System Faults The sewerage system is actively maintained and faults promptly attended to	The median response times for attendance to sewerage overflows resulting from a blockage or other fault in the sewerage system: c) Attendance time: from receipt of notification to the time that service personnel reach the site, and b) Resolution time: from receipt of notification to the time that service personnel confirm resolution of the blockage or other fault	 c) Less than 120 minutes b) Less than 480 minutes
Customer Satisfaction The wastewater system is managed to an appropriate quality of service	Number of complaints received about any of the following: a) Sewerage odour b) Sewerage system faults c) Sewerage system blockages, and d) Response to issues with the sewerage system Expressed per 1000 connections to the sewerage system	 Aggregate of a) to d) to be < 5 per 1000 connections
Level of Service	**Performance Measure** **(Non Mandatory but reported quarterly with the Mandatory measures at District level)**	**2024 Target**
Consent Breach – Action Required	Percentage of the total number of wastewater consent conditions that have breaches that result in an Environment Canterbury report identifying compliance issues that require action.	0%
Level of Service	**Performance Measure** **(Non Mandatory but reported at District level)**	**2024 Target**

Level of Service	Performance Measure	2024 Target
Response time -Overflows	Response time to blockage causing overflow from Council system (not private lateral or gully trap) of > 8 hours	Nil/Year

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 wastewater schemes.

Elective LoS are motivated by either legislative requirements (for example, compliance with resource consent conditions) or by established best practice (for example, the number of events that lead to complaints from the wastewater treatment plants). 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 wastewater schemes, with key stakeholders being Community Boards, 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 principle 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 wastewater AMP's, 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 any significant changes to the scheme are proposed, and particularly when rates may be affected. In such circumstances, options, costs and risks associated with each option are presented to the affected community and their feedback taken into account in making a decision about which option to select.
- The general satisfaction of customers with the level of service 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.

- 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 TRIM 200406043184[v1] for the changes made and the motivation for those changes.

Error! Reference source not found. shows the 2024 AMP set of performance measures, unchanged since the 2021 AMP.

The district level performance results are shown in Table 10. The performance results as assessed for the 2022/23 year for each scheme, plus historical results back to 2008, 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 9: Elective Performance Measure for 2024

Level of Service	Performance Measure (2024)	Target	Community Outcome that this LoS Contributes to
Complaints – Odour – Treatment	Number of events that lead to complaints about odour at treatment plants	< 5 per year	***Infrastructure and services are sustainable, resilient, and affordable.***
Complaints – Odour – Reticulation	Number of events that lead to complaints about odour from the reticulation	< 5 per year	***Infrastructure and services are sustainable, resilient, and affordable.***
Complaints – Midges & Insects – Treatment	Number of events that lead to complaints about midges and insects at treatment plants	Nil per year	***Infrastructure and services are sustainable, resilient, and affordable.***
Outages – Events >8 hours	Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	***Infrastructure and services are sustainable, resilient, and affordable.***
Overflows – Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 year	***The natural and built environment in which people live is clean, healthy and safe.***
Overflows – New Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 year	***The natural and built environment in which people live is clean, healthy and safe.***
Overflows – Private Property	Number of recorded overflows on private property found to be the result of (a) blockage in the main caused by insufficient maintenance or asset failure (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2 year event, for areas designed prior to 1999. © Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5 year event for areas designed after 1999.	Nil per year	***The natural and built environment in which people live is clean, healthy and safe.***

Level of Service	Performance Measure (2024)	Target	Community Outcome that this LoS Contributes to
Customers - % Satisfied	Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service “s "Satisfact”ry" “r "Very Satisfact”ry"	> 90%	***Infrastructure and services are sustainable, resilient, and affordable.***

District Overview: 2022/2023 Levels of Service Performance

Error! Reference source not found. shows both the mandatory and elective recent levels of service achievement for those measures that are assessed at the district level. Appendices to this document can be referred to for the performance results for the individual schemes, which also show performance history.

Table 10: District Overview 2022/23 : Levels of Service Performance

Performance Measure	Target	Target met 2022/23	Commentary	Action to Address
The number of dry weather sewerage overflows from the sewerage system expressed per 1000 sewerage connections to that sewerage system	Less than 1 per 1000 connections	Yes	There were a total of 8 dry weather overflows in 2022/23. This equates to a total of 0.45 per 1,000 connections. Overflows were predominantly caused by pipe blockages from wet wipes	N/A
Compliance with resource consents for discharge from the sewerage system measured by the number of : a) Abatement notices b) Infringement notices c) Enforcement orders, and d) Convictions Received in relation to those resource consents	a) Nil b) Nil c) Nil d) Nil	Yes	No abatement or infringement notices, or any enforcement orders or convictions were received from Environment Canterbury in the 2022/23 year	N/A

Performance Measure	Target	Target met 2022/23	Commentary	Action to Address
The median response times for attendance to sewerage overflows resulting from a blockage or other fault in the sewerage system: a) a)Attendance time: from receipt of notification to the time that service personnel reach the site, and b) b) Resolution time: from receipt of notification to the time that service personnel confirm resolution of the blockage or other fault	a) Less than 120 minutes b) Less than 480 minutes	Yes	a) Average time achieved 60 minutes b) Average time achieved 198 minutes	N/A
Number of complaints received about any of the following: a) Sewerage odour b) Sewerage system faults c) Sewerage system blockages, and d) Response to issues with the sewerage system Expressed per 1000 connections to the sewerage system	< 5 per 1000 connections for each category	Yes	Results per 1000 connections: a) No complaints b) 1.32 c) 2.75 d) No complaints Total : 4.07%	N/A
The percentage of the total number of wastewater consent conditions that have breaches that result in an Environment Canterbury report identifying compliance issues that require action	0%	Yes	There were no breaches of consent this year leading to significant adverse effects, as noted in Environment Canterbury compliance reports.	N/A

Performance Measure	Target	Target met 2022/23	Commentary	Action to Address
Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service “s "Satisfact”ry" “r "Very Satisfact”ry"	>90%	Yes	91 % customer satisfaction level from 2022 survey across all schemes	N/A
Response time to blockage causing overflow from Council system (not private lateral or gully trap) of > 8 hours	Nil/Year	No	4 loss of service, with 2 in Rangiora, 1 in Kaiapoi and 1 in Waikuku. These are related to the flooding events in July 2022.	Reticulation upgrade planned for Rangiora to be completed in 25/26, Increased planned pipeline maintenance in Kaiapoi.

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. By addressing the relevant schemes where the scheme specific performance measures are not met, improvements will flow up into the district measure.

Table 11 below shows the 2022/23 elective performance measures for each scheme.

The scheme appendices contain tables that show both the 2022/23 results, and scheme performance history going back to 2008, and any corrective action proposed.

Table 11 : 2022/23 Scheme Performance - Elective Levels of service

Level of Service	Target	Rangiora (incl Fernside)	Kaiapoi	Woodend	Pegasus	Waikuku Beach	Tuahiwi	Woodend Beach	The Pines/ Kairaki Beach	Mandeville	Loburn Lea	Oxford
Number of events that lead to complaints about odour at treatment plants	< 5 per year	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
Number of events that lead to complaints about odour from the reticulation	< 5 per year	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
Number of events that lead to complaints about midges and insects at treatment plants	Nil per year	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	Not Achieved - 2 events	Not Achieved - 1 event	Achieved	Achieved	Not Achieved - 1 event	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 year	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved
Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 year	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved	Achieved

Number of recorded overflows on private property found to be the result of (a) blockage in the main caused by insufficient maintenance or asset failure (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2 year event, for areas designed prior to 1999. (c) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5 year event for areas designed after 1999.	Nil per year	1	1	0	0	0	0	0	0	0	0	0
Percentage of respondents to a three-yearly community survey that have an opinion, that rates the service “s "Satisfact”ry" “r "Very Satisfact”ry"	> 90%	Achieved	Achieved	Achieved	Achieved	Achieved	Result incorrectly mixed with Fernside which is a different scheme	Achieved	Not Achieved 50%	Achieved	Achieved	Achieved

5. ASSET CONDITION

The current assessment of asset condition is based on theoretical remaining useful life derived from component age and adopted useful life. Adjustments to the remaining life are made to individual components where information is available to suggest the theoretical remaining life is inappropriate.

A wastewater CCTV programme was started in 2008 to survey the reticulation network and assign evidence based condition ratings. These surveys have identified a number of mains faults that have led to remedial actions including immediate or scheduled repair, decreased remaining useful life or, increased renewal priority.

Nominally wastewater pipes are inspected on average every 30 years, but criticality and age are modifying factors as set out below

AA – Every 10 years from 50% life remaining
A – Every 10 years from 40% life remaining
B – Every 10 years from 30% life remaining
C – Every 20 years from 20% life remaining

As noted in the 2021 AMP Council had not previously had appropriate software to effectively carry out analysis of the CCTV results, which is critical to assess the condition of the gravity network. The analysis has previously been outsourced, the outcome from which had been unsatisfactory. InfoAsset Manager has now been implemented which allows more efficient importing of CCTV data, and proper analysis of that data. When installed it had been the intention to integrate the data that will be imported into InfoAsset Manager with the main asset management system (Technology One) data. This project has been put on hold due to the Council commencing a process to replace the Technology One system, which is also the Council's enterprise wide business platform

Remaining Useful Lives

The useful lives of asset groups as indicated by the valuation are consistent with the asset life assumptions used to develop the renewal forecasts. The assumptions about remaining useful lives of the sewer assets are progressively informed by the ongoing collection and analysis of the asset maintenance and repair data, in conjunction with further CCTV surveys. Full details of the assumptions pertaining to the remaining useful lives of each asset category are included in the Valuation report (TRIM 220803132120).

Assets are normally revalued on a three yearly valuation cycle, to coincide with the three yearly LTP cycle. However with increased inflation over the last few years, the most recent valuation was carried out a year earlier in 2022. The 2022 figures have been adjusted for 2023 using CPI factors.

- ***Reticulation***

  The approach of compiling better condition and maintenance information over time, has been considered relatively low risk for reticulation as the average age relative to asset life is reasonably young. The majority of reticulation assets have more than 50% remaining useful life and are considered to be in good condition.

  As noted a CCTV programme is in place to assess the condition and expected life of gravity sewer assets. The programme is funded to enable a 20 year cycle of inspection to take place, which is considered reasonable given the average age of these assets.

In addition the vulnerability assessment (see section 6) assesses the risk of failure of brittle pipes in areas of the reticulation where the ground is prone to liquefaction, and when incorporated into the renewals model (section 15), has the effect of accelerating the replacement of these pipes. It is expected that within 15 years these vulnerable pipes will have been replaced.

- ***Headworks***

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 12 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 maintenance contractor. Works identified from these assessments are programmed and budgets incorporated in the ten year plan

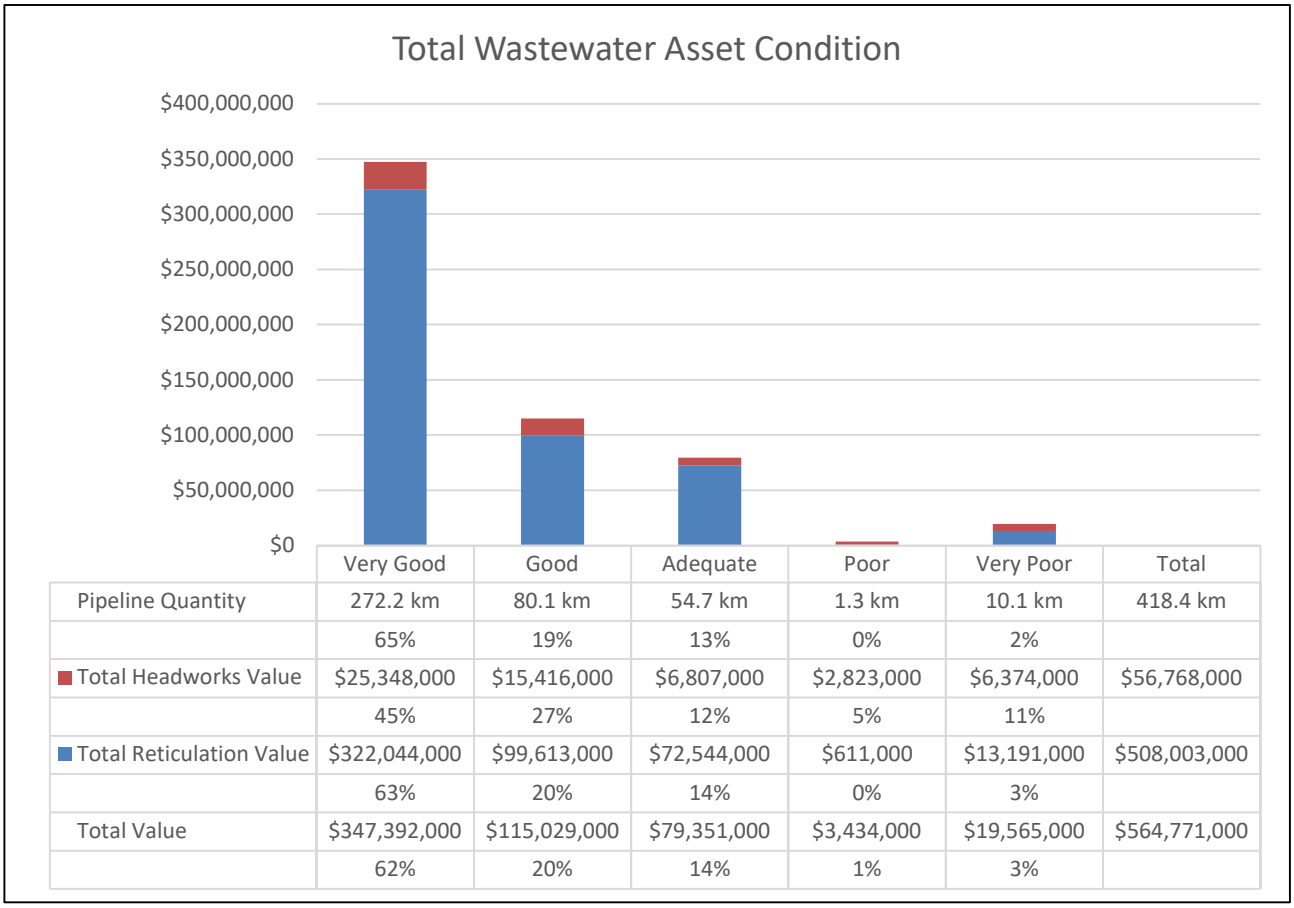
- ***Useful Lives on GIS***

The AMP Plans and Figures Viewer contains GIS plans for each scheme that spatially illustrate the remaining useful life of the reticulation assets within the network. Included on each plan is the location of any blockages repair activity recorded since 2007. This provides a useful picture of the relative asset age and performance.

- ***District Overview***

Error! Reference source not found. and **Error! Reference source not found.** below summarise assessed asset condition for the 2023 AMP reviews. 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.

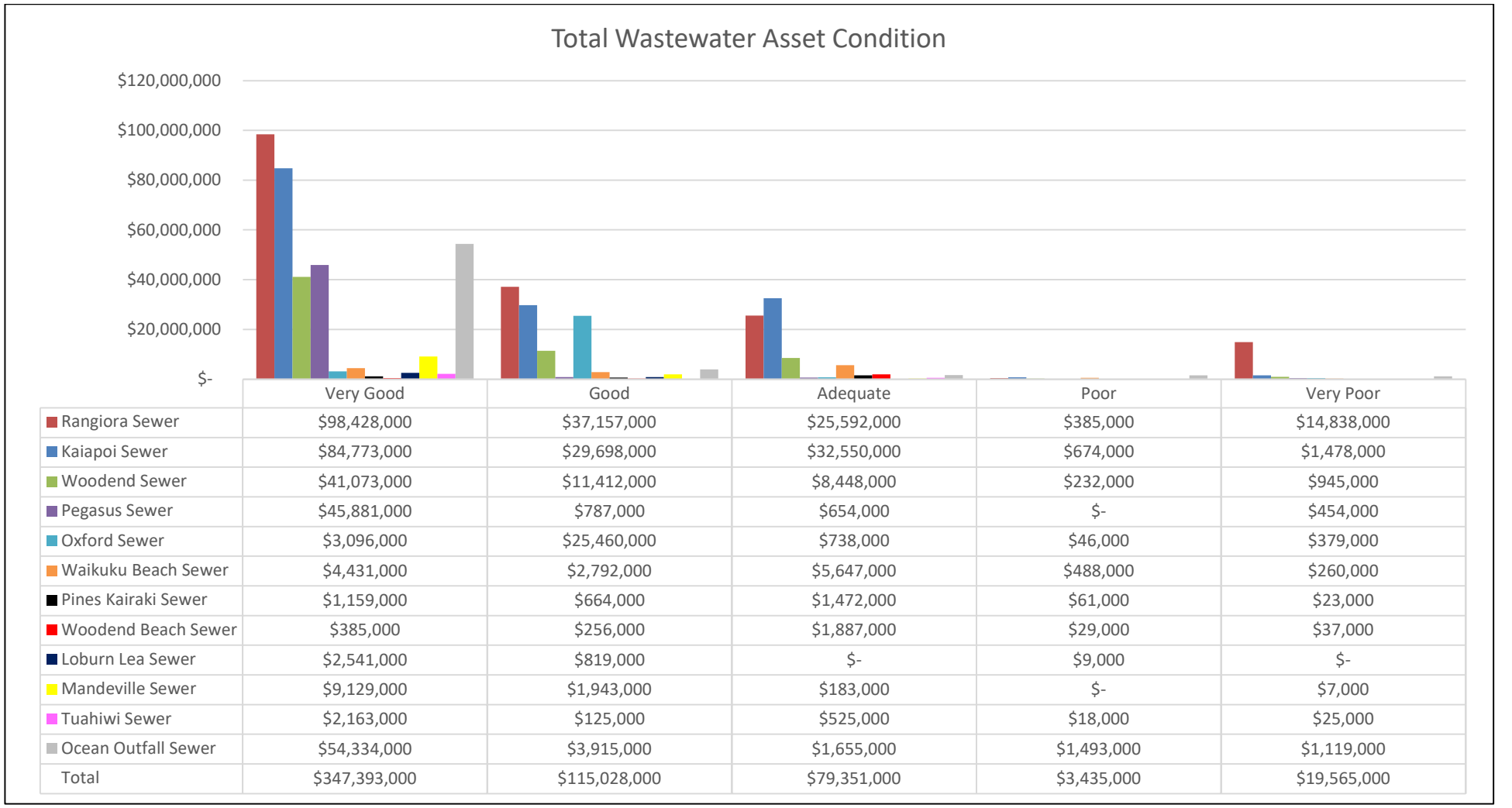
Figure 2: District - Asset Condition Summary



	Very Good	Good	Adequate	Poor	Very Poor	Total
Pipeline Quantity	272.2 km	80.1 km	54.7 km	1.3 km	10.1 km	418.4 km
	65%	19%	13%	0%	2%	
Total Headworks Value	$25,348,000	$15,416,000	$6,807,000	$2,823,000	$6,374,000	$56,768,000
	45%	27%	12%	5%	11%	
Total Reticulation Value	$322,044,000	$99,613,000	$72,544,000	$611,000	$13,191,000	$508,003,000
	63%	20%	14%	0%	3%	
Total Value	$347,392,000	$115,029,000	$79,351,000	$3,434,000	$19,565,000	$564,771,000
	62%	20%	14%	1%	3%	

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 3: Asset Condition Summary - Schemes



	Very Good	Good	Adequate	Poor	Very Poor
Rangiora Sewer	$98,428,000	$37,157,000	$25,592,000	$385,000	$14,838,000
Kaiapoi Sewer	$84,773,000	$29,698,000	$32,550,000	$674,000	$1,478,000
Woodend Sewer	$41,073,000	$11,412,000	$8,448,000	$232,000	$945,000
Pegasus Sewer	$45,881,000	$787,000	$654,000	$-	$454,000
Oxford Sewer	$3,096,000	$25,460,000	$738,000	$46,000	$379,000
Waikuku Beach Sewer	$4,431,000	$2,792,000	$5,647,000	$488,000	$260,000
Pines Kairaki Sewer	$1,159,000	$664,000	$1,472,000	$61,000	$23,000
Woodend Beach Sewer	$385,000	$256,000	$1,887,000	$29,000	$37,000
Loburn Lea Sewer	$2,541,000	$819,000	$-	$9,000	$-
Mandeville Sewer	$9,129,000	$1,943,000	$183,000	$-	$7,000
Tuahiwi Sewer	$2,163,000	$125,000	$525,000	$18,000	$25,000
Ocean Outfall Sewer	$54,334,000	$3,915,000	$1,655,000	$1,493,000	$1,119,000
Total	$347,393,000	$115,028,000	$79,351,000	$3,435,000	$19,565,000

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 critically 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 wastewater assets “Failure” is defined as any single component malfunctioning causing a loss of service or significant impact to others under normal operating circumstances. “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 wastewater mains is assessed using up to eight key criteria (eight criteria for gravity mains, five criteria for pressure sewer mains).

Table 12: Criticality Assessment Criteria

Criteria	Assessment Notes
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 wastewater 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 pipes 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. For pressure mains this category was also used to consider the likely impact of raw sewerage discharging to land due to a mains failure.
CBD	Pipes within CBD or retail shopping areas were given a higher criticality rating to reflect the financial impact of undertaking wastewater main repairs 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.
Overflow Locations	For gravity mains a blocked pipe will cause an overflow in an upstream manhole. The location of this manhole determined the criticality for the section of main. Consideration was given to overflows on private land, CBD areas, parks and sensitive sites such as schools. These pipes were identified using model data to determine the overflowing manhole and GIS queries to determine the location of the manhole. For pressure mains the location of the main determined the overflow location. GIS queries were used to determine the location of the pressure mains.
Overflow Volume	For gravity mains the volume of overflow due to a mains failure was determined using sewer modelling data based on the average dry weather flow in each pipe length. The impact of an overflow on the receiving environment plus the difficulty in managing the overflow (such as providing bypass pumping) were both considered here. For the majority of pressure mains the flow can be managed at the upstream end by limiting the operation of pumps. The overflow volume was therefore not specifically considered for pressure systems but it was given consideration under the diameter criteria.
Groundwater, Depth and Soil Type	For gravity mains, the combination of depth, groundwater and soil type were considered. Pipes that are especially deep, in high groundwater or in poor soil are more expensive and time consuming to repair. Pipes with these attributes are given a higher criticality rating to reflect the difficulty in making repairs to these mains. GIS queries are used to determine the location of sewer mains in relation to the groundwater table and soil type. Pressure mains were not considered under this category as all pressure mains are generally constructed at a similar depth and the soil conditions are normally not a significant factor in making repairs to these mains.

Each individual main is then graded between AA and C categories.

Note that while the number of customers affected would seem to be an obvious criticality criteria, a decision has been made not to use this as a criteria. In the event of a pipe failure, it is considered that there would be no discernible impact on upstream individual customers as they would still be able to discharge into the network regardless of the pipe failure downstream. The effect of the pipe failure would instead be felt in the vicinity of the downstream overflowing manhole or where the repair was being undertaken, and this effect is already included in other criteria.

Table 13: Criticality Score Categories

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

Table 14 shows the mains criticality by percentage across the district. **Error! Reference source not found.** contains links to criticality maps.

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

Operations

Criticality is used as an input to the CCTV programme, and also to determine if a “stand over” is necessary by our in-house operations contractor, when external contractors are working on or near WDC assets

District Overview – Criticality

Table 14 summarises the percentage of mains in each of the criticality classes:

Table 14: District Overview – Mains Criticality % by Category

Scheme	AA	A	B	C
Kaiapoi Sewer	20%	14%	31%	34%
Loburn Lea Sewer	0%	10%	19%	71%
Mandeville Sewer	2%	24%	73%	1%
Ocean Outfall Sewer	84%	16%	0%	0%
Oxford Sewer	7%	14%	28%	51%
Pegasus Sewer	11%	12%	36%	41%
Pines Kairaki Sewer	12%	10%	30%	48%
Rangiora Sewer	25%	13%	25%	38%
Tuahiwi Sewer	0%	4%	96%	0%
Waikuku Beach Sewer	2%	8%	44%	46%
Woodend Beach Sewer	0%	44%	28%	28%
Woodend Sewer	28%	12%	21%	39%
All Schemes	***21%***	***14%***	***33%***	***31%***

Note: *% shown are by length*

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 wastewater schemes is to identify any risks to the scheme which need to be mitigated, and to prioritise implementation of any mitigation plans.

A number of different risk assessment 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 wastewater system are examined, together with the consequences of that failure. Failure includes overflows, 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 originally the intention that a review of these operational risks be carried out in time for this AMP, but as it was subsequently 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)****:* Assesses the risk to above ground assets from a broad range of potential natural disasters. See Section 9.

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 Renewals in Section 16.

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

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 previous risk assessments, particularly the DRA work as a check.

8. OPERATIONAL RISK ASSESSMENT

The table below details the risks considered under the previous assessment methodology, which was last carried out for the 2015 AMPs. Natural disaster risks were also considered across all asset types: earthquake, tsunami, extreme weather events, and vandalism/terrorism.

Table 15: Risk Events Considered

	Event	Cause
Collection	Overflow or discharge of raw sewage from gravity reticulation	Insufficient reticulation capacity
		Poor reticulation condition (blockages)
		Insufficient grades or flow to achieve self cleansing velocities
		Chemical damage of pipes
		Third party damage of pipes
	Overflow or discharge of raw sewage from pump station (Worst score only, from all pump stations on the network being assessed.)	Pump failure
		Electrical / Power failure
		Rising main failure & 3rd party damage
		Wet Well failure
Treatment	Overflow or discharge of partially or untreated sewage	Electrical /Mechanical/Structural Failure
		Blockage
	Sewage not sufficiently treated	Overloaded STP
		Electrical /Mechanical Failure
		Shock loading
		Extreme climatic conditions
		Treatment Process inadequate
	Event	**Cause**
Disposal	Overflow or discharge of raw sewage from Discharge Pump Station	Pump failure
		Electrical / Power failure
		Rising main failure & 3rd party damage
		Wet Well failure
	Effluent unable to be discharged or discharged uncontrollably	Failure of discharge system

General	Operations / management failures	Operator or management error
		Incorrect or no data - Flows - Pump data - Effluent quality - Consent compliance - etc.
		Inappropriate work planning & management

Risk Matrix

Each of the causes are rated for consequence (1 to 5) and likelihood (A to E) and then combined to give a risk score using the matrix shown in Figure 4. 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.

Figure 4: WDC Risk Matrix

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 15 high risks remaining across all the wastewater schemes in the district, with all the extreme risks having been previously attended to. These high risks have largely been dealt with now.

Error! Reference source not found. summarises the current status of the high operational risks identified in 2015 across all the wastewater schemes.

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 16: District Overview – High Risks remaining (Operational)

Scheme	2015 Risk Assessment	Operational Risk Assessment Update	Comment
Fernside	2	0	Both risks related to insufficient treatment at the plant which has now been de-commissioned, and the network connected to the EDSS
Kaiapoi	4	2	Two related to wastewater overflow from insufficient reticulation capacity or poor condition pipes. The Kaiapoi Network Capacity upgrade programmed for 2025-2031, will resolve under capacity. The newly implemented InfoAsset Manager programme will enable targeting and renewal of poor condition pipes. The third risk is generic pipe joint susceptibility to earthquake, which will be re-assessed with the new risk methodology. The fourth risk was associated with a now de-commissioned pump station
Loburn Lea	0	0	
Mandeville	0	0	
Ocean Outfall	4	4	Three risks relate to pipeline failure of pipeline in liquefaction prone ground. Pipe material is PE, which is the most appropriate material to mitigate this risk. New risk assessment likely to accept this as a residual risk. Fourth risk is the drop structure failure in earthquake, which needs further assessment
Oxford	3	0	All three risks related to overloaded treatment plant in wet weather. Risk mitigated with construction of a holding pond, but risk needs to remain included in the new risk assessment, and re-evaluated.
Pegasus	0	0	
Pines Kairaki	0	0	
Rangiora	2	0	Overflow from network under capacity, is being resolved with the capacity upgrade programme completion due 2025/26. Overflow from poor condition pipes mitigated from implementation of InfoAsset Manager
Tuahiwi	0	0	
Waikuku Beach	0	0	
Woodend	0	0	
Woodend Beach	0	0	
District	15	6	

For each scheme AMP, where the assessment shows unresolved extreme or high risks, a table is provided that shows more details of the nature and response to those risks. Improvement projects have been assigned to each risk event. In some cases multiple projects are required to address a wide ranging risk. Improvement projects take the form of either capital works (ref URS) or process improvement (ref IP) projects.

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 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 **Error! Reference source not found.** 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 one of three improvement projects to be actioned over the following three years. Limited progress has been made on these improvements since the 2015 AMP revision, due to resource 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 & 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.

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 ≥25°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°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 stopbank crest.

This report validates the approach 3 waters has been taking with it's 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.

Design and modelling work carried out by WDC for it's 3 Waters infrastructure allow for both increased rainfall intensity and sea level rise using the RCP8.5 scenario, but wastewater modelling has not yet incorporated the effect on ground water infiltration (GWI) that will be a potential consequence of the increased groundwater levels indicated by the above studies. Initial studies indicates that the effect will be minor, but monitoring of shallow groundwater levels is being undertaken which will assist with correlating increasing groundwater levels with GWI.

Overall, the effects of climate change are expected to increase the potential for wastewater overflows in wet weather events.

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 17 below provides an update on progress made against those actions.

Table 17: Climate Change Actions from 2021 AMP

Item	2023 Update for Wastewater Supply.
Investigate technology and improvements which help reduce greenhouse gas emissions from treatment plants and other 3 Waters infrastructure via energy efficiency improvements.	Beca report commissioned (TRIM 210603089252[v1]) and provides recommendations. Budget has been allowed to further investigate options to reduce carbon emissions associated with the use of geobags to manage sludge onsite.
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.	A Beca report identified the key GHG emitting processes from WDC wastewater treatment plants, and made recommendations for action on the "low hanging fruit". Reported to U and R Committee (TRIM 210603089252[v2]) via Management Team
Report progress quarterly on preparation and process for installation and initial operation of solar power array project (Rangiora WWTP)	No Progress made
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_4 and N_2O. 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 wastewater 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 wastewater services. 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 wastewater schemes, population increases were applied to planned growth areas at a 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. Wastewater 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)

Growth 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 uncertainly 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 as a whole therefore, there are no 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, or 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 wastewater connections are predicted to grow by approximately 86% over the 50 year projection period. The connection increase lines up with the water connections, although it is noted that there may be a slight lag in connections for wastewater. This is due to the fact that water connections are counted upon the service becoming available (and rated accordingly) while sewer connections are not counted until the homeowner makes a connection (at which point rates are charged).

It is predicted that in the first 10 year projection (up to 2033/34) the Waimakariri District will grow on average by 437 new wastewater connections annually. However in the long term (2034/35 to 2073/74), the rate of growth is expected to reduce to approximately 290 new connections annually.

Table 18 and Figure 5 present the growth forecast for the Waimakariri Districts wastewater schemes.

Table 18: Summary of the Growth Forecast for the Waimakariri Districts Wastewater Schemes

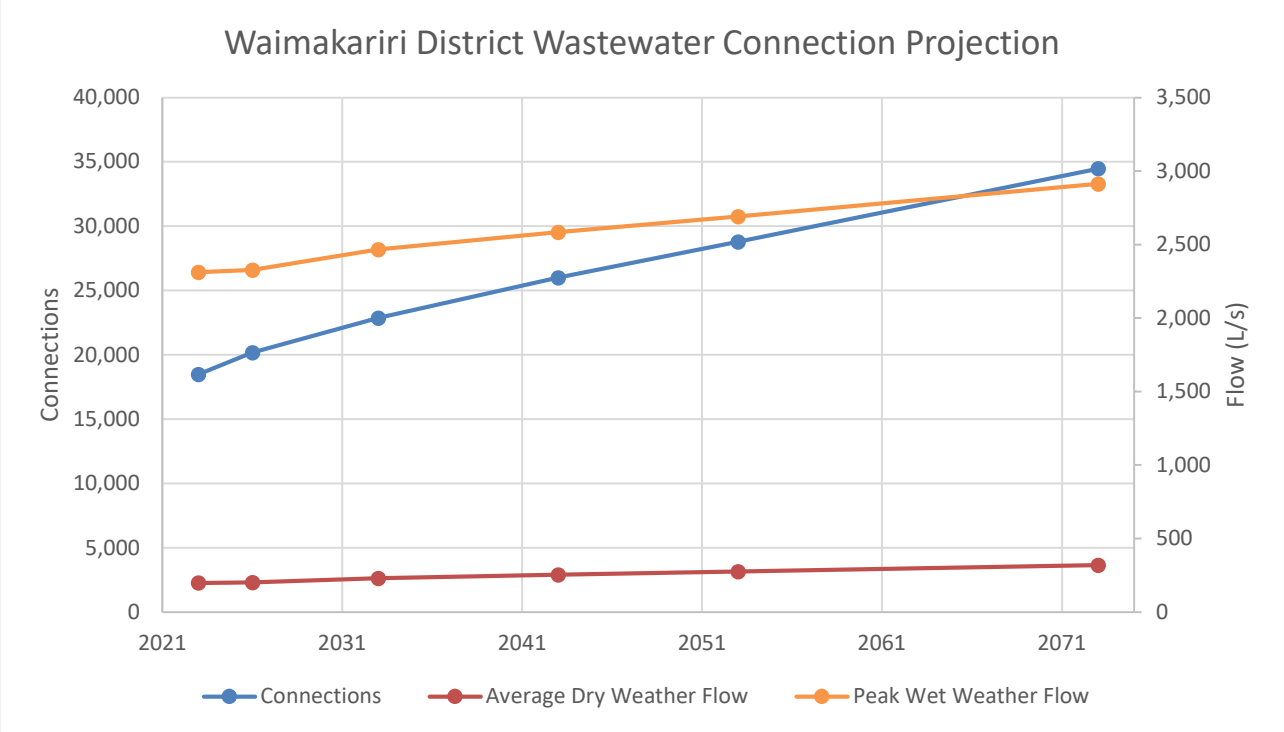
Scheme		District	Rangiora (incl Fernside)	Kaiapoi	Woodend	Pegasus	Waikuku Beach	Tuahiwi	Woodend Beach	The Pines/ Kairaki Beach	Mandeville	Loburn Lea	Oxford
Projected Connections	Current	18,490	7,643	5,171	1,883	1,480	460	76	77	168	593	38	901
	3 yrs (2026)	20,161	8,283	5,488	2,259	1,650	478	123	83	171	643	40	943
	10 yrs (2033)	22,864	9,530	6,014	2,776	1,855	506	193	93	176	730	45	946
	20 yrs (2043)	25,994	10,972	6,541	3,448	2,026	543	268	105	172	843	49	1,027
	30 yrs (2053)	28,778	12,199	7,073	4,115	2,026	582	341	117	188	959	54	1,124
	50 yrs (2073)	34,482	14,812	8,167	5,438	2,026	655	476	138	200	1,181	62	1,327
Projected Average Dry Weather Flow	Current	199 L/s	104 L/s	61 L/s	10 L/s	6.4 L/s	3.9 L/s	0.4 L/s	0.7 L/s	2.6 L/s	2.9 L/s	0.3 L/s	6.4 L/s
	10 yrs (2033)	230 L/s	117 L/s	68 L/s	16 L/s	8.8 L/s	4.3 L/s	1.3 L/s	0.8 L/s	2.7 L/s	3.9 L/s	0.3 L/s	6.8 L/s
	20 yrs (2043)	253 L/s	127 L/s	72 L/s	21 L/s	10.1 L/s	4.6 L/s	1.9 L/s	0.9 L/s	2.7 L/s	4.8 L/s	0.4 L/s	7.4 L/s
	30 yrs (2053)	275 L/s	137 L/s	76 L/s	26 L/s	10.1 L/s	4.9 L/s	2.5 L/s	1.0 L/s	2.8 L/s	5.7 L/s	0.4 L/s	8.1 L/s
	50 yrs (2073)	320 L/s	157 L/s	85 L/s	37 L/s	10.1 L/s	5.5 L/s	3.5 L/s	1.1 L/s	2.8 L/s	7.5 L/s	0.5 L/s	9.7 L/s
Projected Peak Wet Weather Flow	Current	2,312 L/s	1,575 L/s	554 L/s	58 L/s	17.9 L/s	23.5 L/s	2.1 L/s	8.0 L/s	22.4 L/s	14.0 L/s	1.9 L/s	35.4 L/s
	10 yrs (2033)	2,467 L/s	1,640 L/s	585 L/s	90 L/s	29.7 L/s	25.3 L/s	6.7 L/s	8.6 L/s	22.7 L/s	19.3 L/s	2.1 L/s	37.1 L/s
	20 yrs (2043)	2,583 L/s	1,691 L/s	606 L/s	115 L/s	36.4 L/s	26.7 L/s	9.6 L/s	9.1 L/s	22.9 L/s	23.8 L/s	2.3 L/s	40.3 L/s
	30 yrs (2053)	2,691 L/s	1,739 L/s	626 L/s	141 L/s	36.4 L/s	28.2 L/s	12.5 L/s	9.6 L/s	23.2 L/s	28.3 L/s	2.5 L/s	44.1 L/s
	50 yrs (2073)	2,913 L/s	1,841 L/s	669 L/s	192 L/s	36.4 L/s	31.1 L/s	17.8 L/s	10.4 L/s	23.6 L/s	37.0 L/s	2.8 L/s	52.0 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 are based on growth forecasts provided by the Development Planning Unit, in January 2023, which allows sufficient time to carry out the work necessary to plan the infrastructure required to accommodate the growth. Capital budgets are then developed from this planning work.

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 5 presents the projected growth for the Waimakariri District's Wastewater connections

Figure 5: Wastewater Connection Projection



13. CAPACITY & PERFORMANCE

This section of the AMP considers the capacity and performance of the Council's Wastewater Schemes, for current demand, and forecast growth. Specific aspects of each scheme that are considered are the reticulation network and treatment plants.

The existing capacity and performance of the wastewater schemes throughout the district are assessed using hydraulic models constructed and maintained by the Council for each scheme. Demand in the models is based on flow records collected from the Council's SCADA system and analysed by the PDU unit to obtain daily diurnal flow profiles. Calibration is also undertaken on the models to ensure the models are accurately predicting inflow and infiltration to simulate wet weather events.

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.

For the first time a wastewater specific growth report has been produced for this AMP review, summarising reticulation and treatment capacity, and works required to meet future demand. The report 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

Where a scheme has been identified as performing below the required Levels of Service set out in the Engineering Code of Practice upgrades have been subsequently modelled and recommended. These upgrades have been costed and added to the list of AMP capital projects for inclusion in the Council's Long Term Plan.

Upgrades required for growth areas have been incorporated into the Council's assessment of system performance and, where required, upgrades have been identified and tagged to development areas to fund the works.

Uncertainties affecting the timing and demand for upgrades are assessed through the options and investigations reports for affected schemes, prior to the confirmation of capital projects. These reports are referenced in the Data Reference table of the AMP, or noted in the following sections.

Networks

A review of the of the **Ocean Outfall** wastewater network capacity was completed in January 2020 (Trim 200214019934). The review concluded that the network has capacity until at least 2069 with opportunities to extend this with better management of storage and pumping control. A subsequent report TRIM 200214019933 recommended that the Kaiapoi WWTP PS rising main be cleaned, and a flushing cycle re-instated, to maintain LOS.

Neither **Kaiapoi** nor **Rangiora** meet current levels of service for reticulation capacity. A ten year programme of works commenced in 2015/16 to upgrade trunk sewer capacity in Rangiora (TRIM 150323044514) will resolve this situation, and also provide growth capacity out to about 2055.

Kaiapoi has very little suitable land for growth, the capacity issues being more related to stormwater and I and I. The Kaiapoi budget includes a $17 million ten year budget with construction programmed to start in 2025/26. Concept for the full programme is to be developed during FY 23/24 when catchment I&I investigations have been completed.

The existing reticulation systems in older areas in both **Woodend** and **Oxford** meet the required level of service of accommodating peak wet weather flow resulting from a 2 year rainfall event, as well as newer areas (post May 1999) meeting the 5 year event level of service. Oxford is a stand alone system and the modelling shows that the existing reticulation can meet future demand. Recent field monitoring has confirmed that while I and I is high, the major constraint in the network is the terminal pump station delivering wastewater to the treatment plant. Upgrading of this is included in the planned overall WWTP upgrade.

The **Pegasus** network is new and has been designed to Council's current LoS, and no growth is planned.

The **Waikuku Beach** reticulation also meets current LoS for both existing and new development areas (2 and 5 year level of service).

Rising main replacements at Kings Ave, North Oval and Reserve Road pump stations have been deferred to post 2031. This is following the condition assessment of a section of AC pipe from the Kings Ave pressure main which resulted in recommended programming the renewal in 2037 (TRIM 210111001675). The rising main capacity will be increased when it is replaced to accommodate the expected growth.

The **Tuahiwi** scheme has been recently upgraded utilising Covid-19 stimulus funds, and now has adequate capacity to meet expected growth demand.

Woodend Beach reticulation also meets current LoS for both existing and new investigate areas (2 and 5 year level of service). The only potential growth area on the Woodend Beach scheme is a parcel to the southwest of the existing residential area. Servicing this area has been investigated and the modelling shows the scheme has capacity for the potential extra 20 lots.

A desktop study of the small **Pines Kairaki** system concluded that the system has sufficient capacity to accommodate the existing peak wet weather flow during the 2 and 5 year rainfall. There is limited scope for growth for the Pines-Kairaki sewer scheme and it is likely to be impacted by coastal retreat in the future.

Fernside and **Loburn Lea** have recently been connected to the Eastern Districts scheme and expected growth has been allowed for in the designs.

The **Mandeville** system, despite being fairly new, has had capacity issues in the past associated with significant I and I caused by high groundwater levels, overland stormwater flow, and under capacity stormwater systems. The network, which is a STEP system, is vulnerable to overland flow entering the septic tanks, and overwhelming it locally. A programme of site by site work to try and prevent stormwater entering the tanks was completed some time ago, but there are two outstanding drainage capital projects due for completion in 2025/26 and 2031/32, which are expected to further improve the situation.

Treatment

The most recent assessment of the capacity of the Eastern Districts treatment plants to meet BOD removal, was carried out in 2020. See TRIM 200214019932 for the findings of the assessment, and references to other relevant documents. This report updated the findings of a number of previous Beca reports that considered the capacity of each of the four treatment plants connected to the eastern District Sewer Scheme, to meet anticipated future demand over a 50 year time horizon. The initial report was carried out in 2011 TRIM 111205058266.

The 2011 report recommended a suite of works to upgrade the **Rangiora** plant. Low dissolved oxygen in the Rangiora ponds in 2014 led to an investigation and recommendations for a further programme of pond and aeration upgrades. TRIM 141219141680. Earlier recommendations were reviewed and updated in a further 2016 Beca report TRIM 161129123158. Upgrades recommended in this report are nearing completion with only an upgrade to the aeration basin in 2024/25-/2027/28 remaining to be completed.

The 2011 report found that the **Kaiapoi** WWTP had sufficient capacity until 2040, subject to a change in the resource consent from enterococci to E-coli as the indicator bacteria for testing post treatment. This consent change has been made.

To meet 50 year future demand, the **Woodend** WWTP plant which also takes wastewater from Pegasus and Woodend Beach, required additional aeration, two new aeration ponds, increased UV capacity, and duplicate wetlands. Still to be completed are: 2025/26, increased UV capacity and in 2030/31 a third oxidation pond.

No upgrades were required for the **Waikuku Beach** WWTP

The **Oxford** plant is a modified activated sludge plant (MLE), which has been subject to a number of upgrades in order to comply with consent conditions, growth, and high I and I in the network. A further significant upgrade is planned in 2024-2028, to meet expected increases in flow and load, and potential changes from a future consent renewal in 2031. See GHD report TRIM 210810131225, and the Apex peer review/update 230808120833

Since the last AMP was written the **Loburn Lea** and **Fernside** plants have been decommissioned, and the networks connected into the EDSS.

Consents

The most significant wastewater consent that WDC has is the Ocean Outfall consent, which permits the disposal of all of the treated effluent from the Eastern Districts wastewater scheme. It expires in 2039. It only permits a maximum discharge of 57,000 m3 per day. The Ocean Outfall Wastewater Network Model Capacity Assessment, 2020 (Trim 200214019934) confirmed the discharge limit would not be exceeded in the next 50 years.

The Oxford WWTP discharge consent expires In 2031. However in high rainfall events current consent conditions can be breached, and furthermore the current sludge management/removal process is not sustainable. In addition, a forthcoming Regional Plan review commencing in 2024, and due for being operative in 2028 may complicate the consent renewal. It is therefore proposed

to apply for an early renewal, and upgrade the plant in conjunction with the new conditions. Budget has been allowed in years 1-4 of the LTP

It is likely that more stringent discharge consent conditions will be the outcome of the renewal process.

The Rangiora, Woodend, and Waikuku Beach plants are currently meeting their primary consent conditions with respect to capacity and performance. The Ocean Outfall is also meeting its consent condition, but not all the Oxford plant conditions were met for the 2022/23 year.

A spreadsheet of all the Council's consents relating to wastewater is available at TRIM 230621091962.

14. OPERATION AND MAINTENANCE

Operation and maintenance expenditure incorporates the day to day running of the wastewater network and allows the system to carry on functioning to deliver the agreed levels of service.

Historically the maintenance programme has been partially proactive and partially reactive, although the Council has the intention to move further towards a proactive maintenance programme, acknowledging that some reactive maintenance will always be required. Currently there is little distinction in the budgets between planned and unplanned maintenance, and they are largely based on past expenditure carried forward, with an increase based on growth projections.

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

Table 19: 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.
Sampling	Planned samples are taken for process monitoring, consent compliance and trade waste	As required.
Generator Checks	Planned monthly, quarterly and annual checks	As required in response to plant failure.
Pipe maintenance	Pipe flushing, root removal	Repairs undertaken in response to service requests / blockages.
Valve maintenance	Air valve maintenance	Repairs undertaken in response to service requests / leaks.

Council has recently implemented additional asset management functionality to its asset register. Wastewater maintenance 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 mobility 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 would enable Council to better understand it's maintenance costs, and move towards a more planned maintenance regime. 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.

Since the 2021 AMP review Council has purchased and implemented the widely used InfoAsset Manager software which allows more efficient importing of CCTV data, and proper analysis of that data. This will provide benefits in both maintenance planning, and renewals, though the ability to target CCTV work in a more systematic way.

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 AMP's to provide a clearer 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 pump station being constructed. This would require power costs to be reviewed (as the new headworks would consume power), as well as items related to pump station 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 6 presents the forecast Operations and Maintenance Expenditure across all the Council's wastewater schemes for the following 30 year period.

Figure 6: District Overview – Projected Operation & Maintenance Expenditure

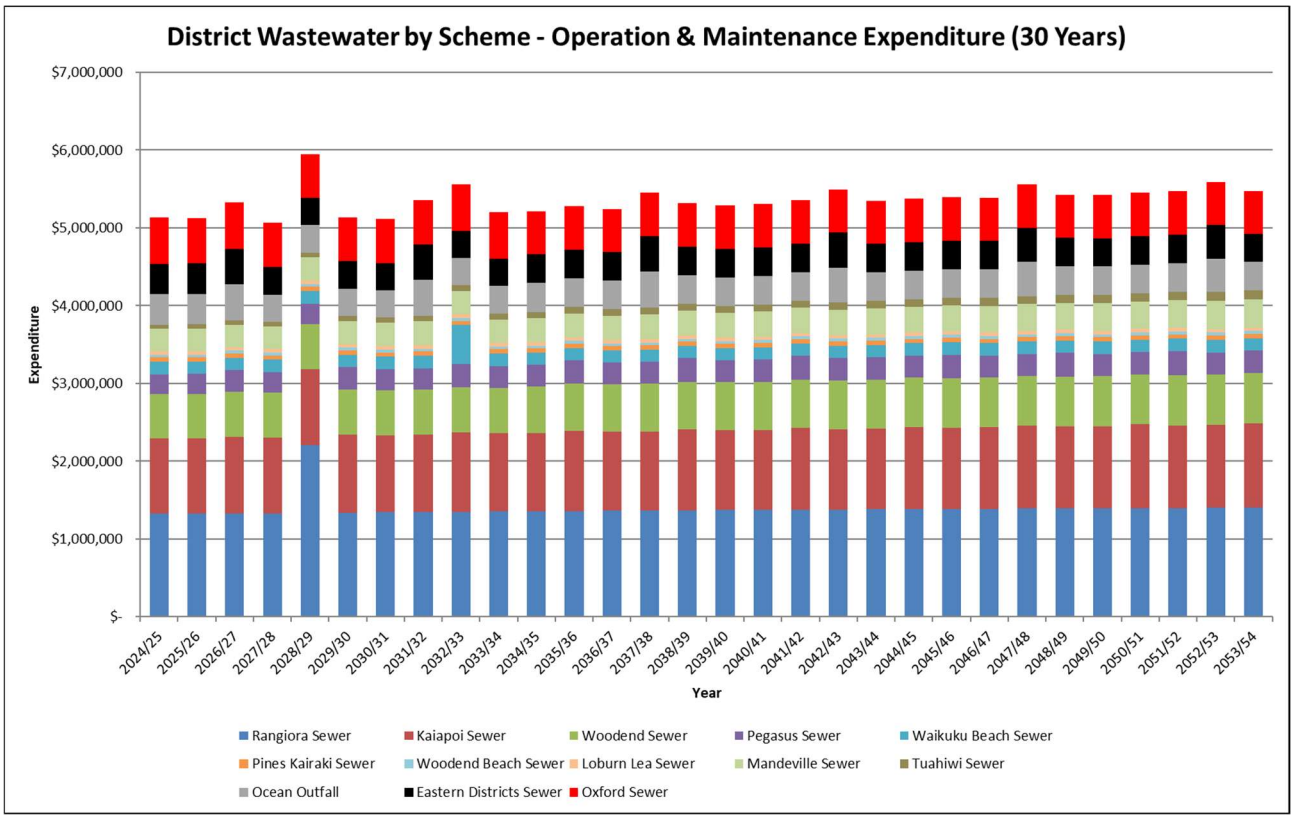
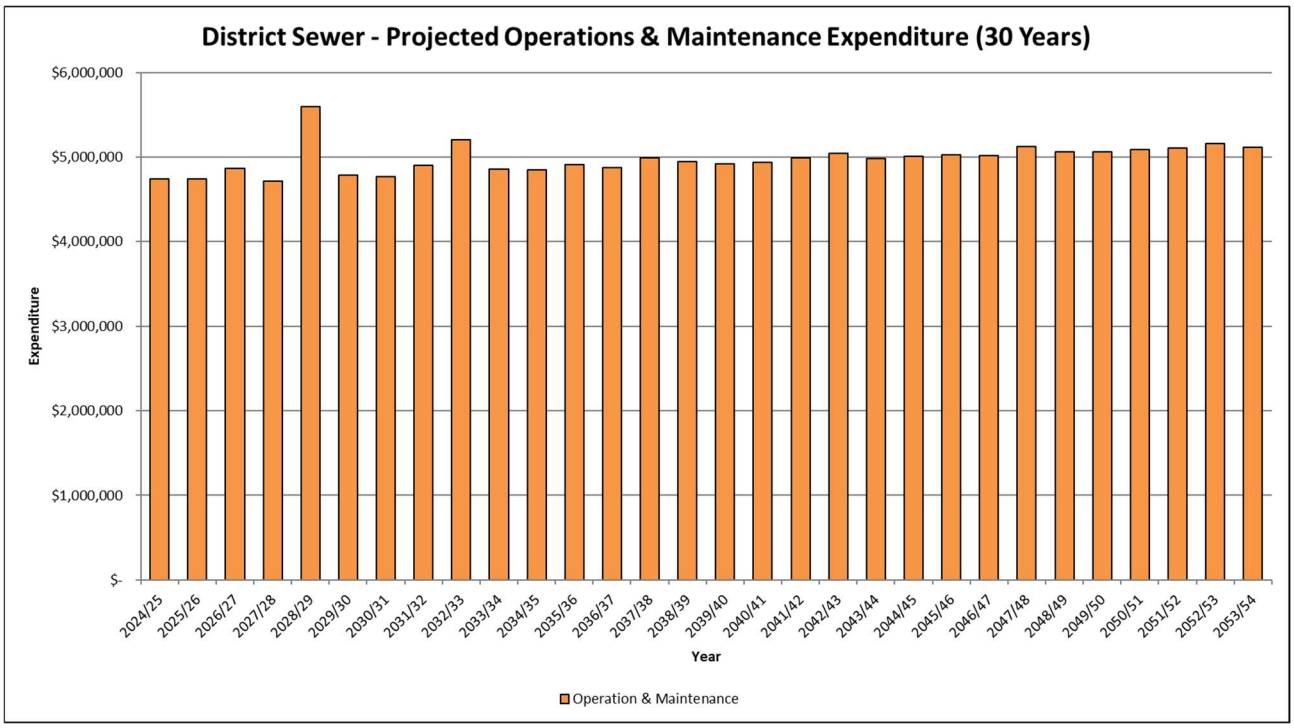


Figure 7: Projected Operations and Maintenance Expenditure (30 years)Project



The graph is based on the assumption that past operational and maintenance costs reflect future costs except for known future changes, such as periodic oxidation pond sludge removal, as seen in the peaks in 2028/29 and 2031/32.

15. CAPITAL WORKS

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 restores the system to its original capacity. 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:

- Condition Rating – standard scoring from pipe inspection manual based on CCTV data.
- Remaining Useful Life – based on the design life, as used previously.
- Vulnerability – a function of location, material and joint type calculated as part of the DRA review, which assesses the risk of earthquake damage in areas subject to liquefaction.
- Criticality – the criticality score calculated for each main, which is determined from various factors e.g. pipe material type. Details are shown in Table 12.

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 .

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. Since knowledge of the headworks condition is not high, 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

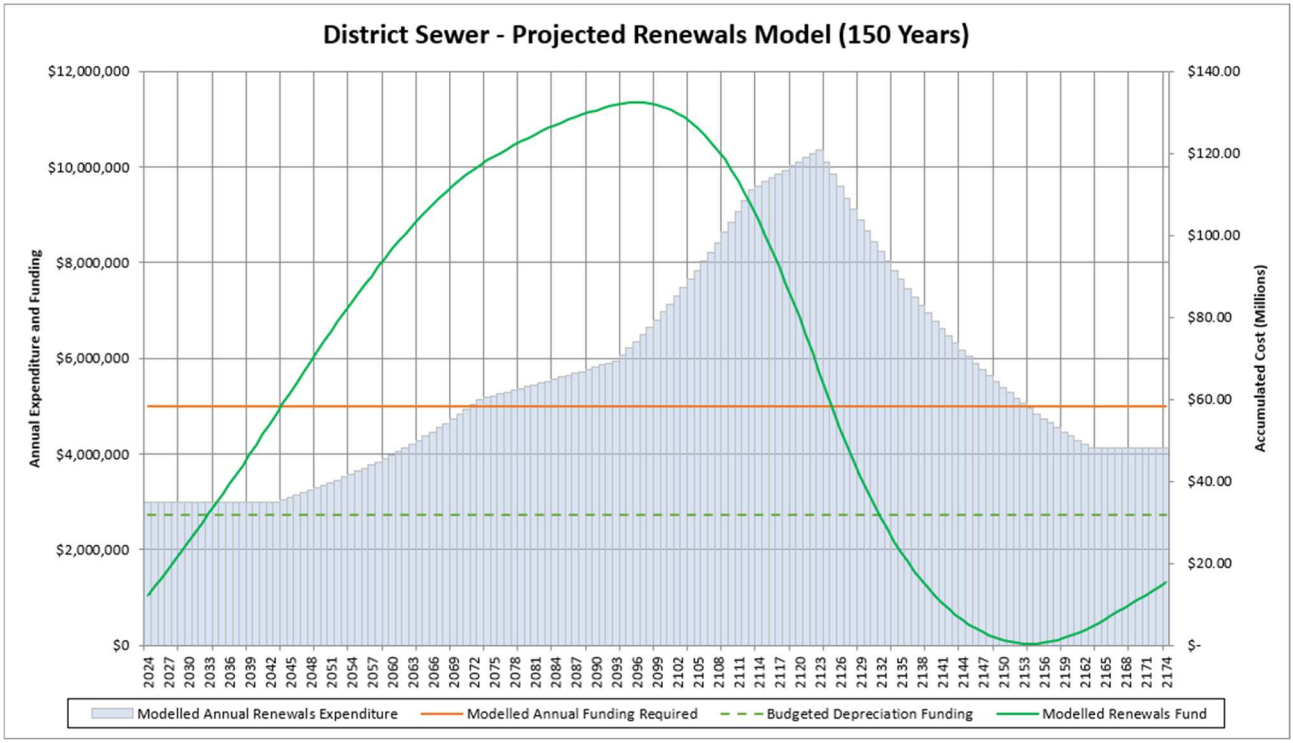
Error! Reference source not found. presents the forecast Renewals Expenditure across all the Council's wastewater schemes for the following 150-year period. The horizontal line is the required level of funding to ensure that renewals are not deferred, and current levels of service are maintained.

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.

The model is operated at a district wide level. Renewals expenditure by scheme is then determined by breaking down the district wide expenditure in relation to the value and type of the assets within each scheme.

All properties that are connected to the Eastern District Wastewater Scheme (EDSS), which makes up most of the district's sewer network, are charged using the same set of (differential) rates.

Figure 8: 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 in Figure 8, this account goes into surplus, peaking at approximately $93 million in the year 2100, before reducing to zero in 2160

The key point to note is that for both graphs the Budgeted Depreciation Funding is less than the Modelled Annual Funding Required. The reason for this discrepancy is as follows:

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 wastewater the difference between model outputs and the planned budget is shown in the table below

Table 20: Planned Budget Versus Renewals Model Recommendation 2024-34

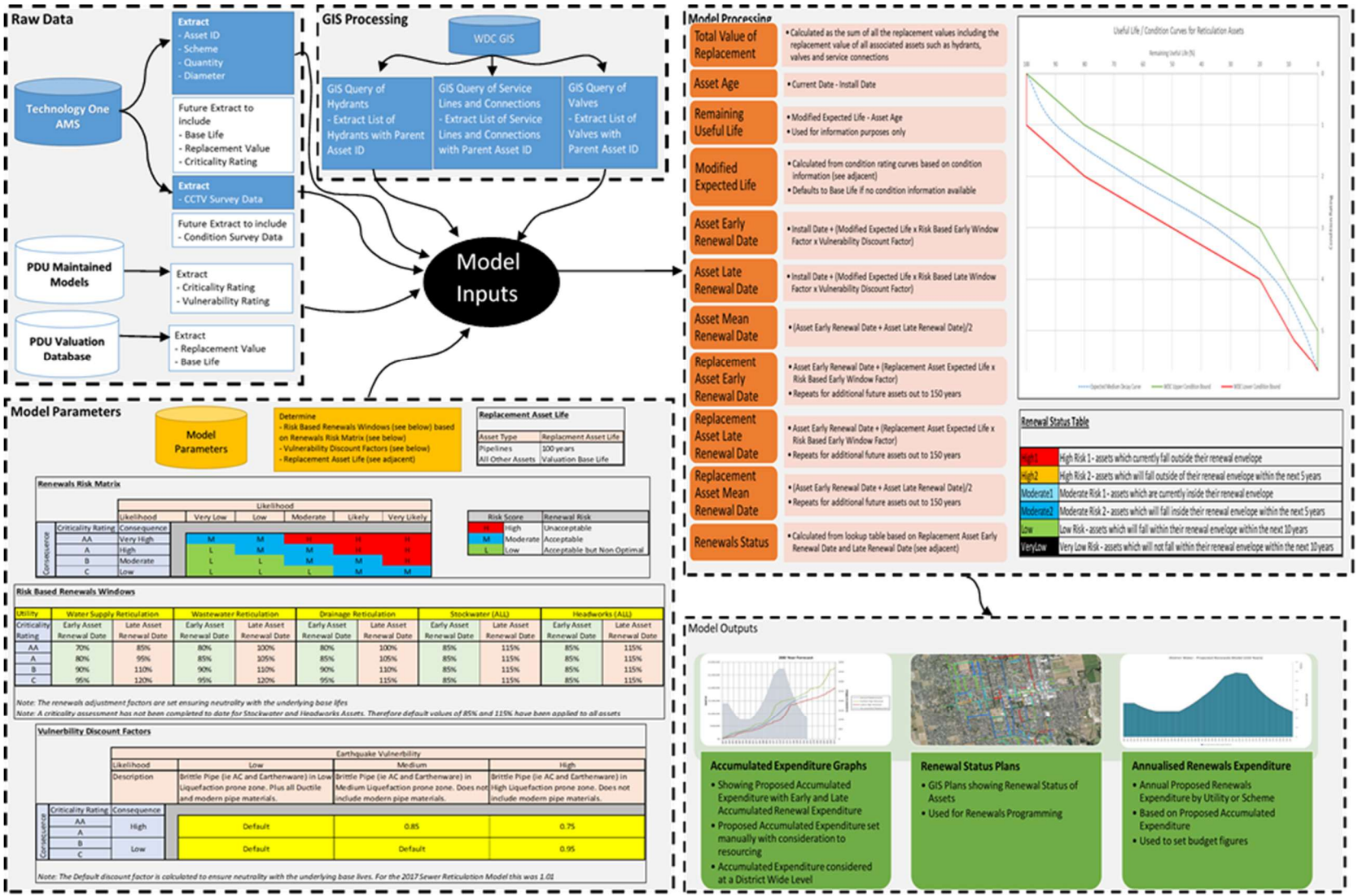
	Renewals model recommendation	Planned Budget	Budget as a percentage of model recommendation
Reticulation	$15,000,000	$21,513,000	143%
Headworks	$15,000,000	$8,489,000	57%
Total	$30,000,000	$30,002,000	100%

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 9: Renewals Expenditure Models



17. 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

18. NEW WORKS

There are five main sources of new works in the District that come together to produce the new works programme. These are:

- The capacity assessments provide details on any shortfall on the schemes and new works are prioritised to address these, the primary influence being growth.
- 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.
- The Risk Assessments provide information on the highest risk areas on each wastewater supply scheme, with any extreme or high risks requiring works to mitigate against those risks.
- 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 populate the budget for the next 50 years. The table below shows the projected budgets for new works for the next 50 years for all the district's wastewater schemes, including renewals.

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 -Sewer , which in turn provide references to supporting documentation.

Table 21: New Works across Wastewater Schemes Over 50 Years

Scheme	2024 – 2033	2034 – 2043	2044 – 2053	2054 – 2073	Total
Rangiora Sewer	$21,632,306	$15,948,727	$6,050,282	$48,304,093	$91,935,408
Kaiapoi Sewer	$31,498,886	$8,225,759	$16,535,710	$28,630,796	$84,891,151
Woodend Sewer	$8,336,363	$7,638,756	$9,504,538	$11,537,030	$37,016,687
Pegasus Sewer	$639,077	$1,692,906	$898,751	$2,085,685	$5,316,419
Waikuku Beach Sewer	$1,648,282	$4,699,701	$1,368,582	$15,374,355	$23,090,920
Tuahiwi Sewer	$0	$1,372,758	$567,191	$68,326	$2,008,275
Woodend Beach Sewer	$458,676	$599,242	$62,592	$1,114,982	$2,235,492
Pines Kairaki Sewer	$93,131	$729,018	$128,668	$1,300,757	$2,251,574
Mandeville Sewer	$322,055	$133,804	$190,457	$566,136	$1,212,452
Loburn Lea Sewer	$8,095	$1,078	$9,482	$0	$18,656
Ocean Outfall	$3,968,632	$63,231,067	$2,688,663	$6,000,664	$75,889,026
Eastern Districts Sewer (other)	$0	$12,687,260	$0	$0	$12,687,260
Oxford Sewer	$15,408,705	$7,390,663	$664,287	$3,287,872	$26,751,527
Total	**$84,014,209**	**$124,350,739**	**$38,669,204**	**$118,270,694**	**$365,304,847**

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 do not change significantly into the future, and that growth forecasts are accurate. Growth projects may be 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 has recently been updated to ensure 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 6 : Data References in Section 3, Scheme Description.

Works Coordination

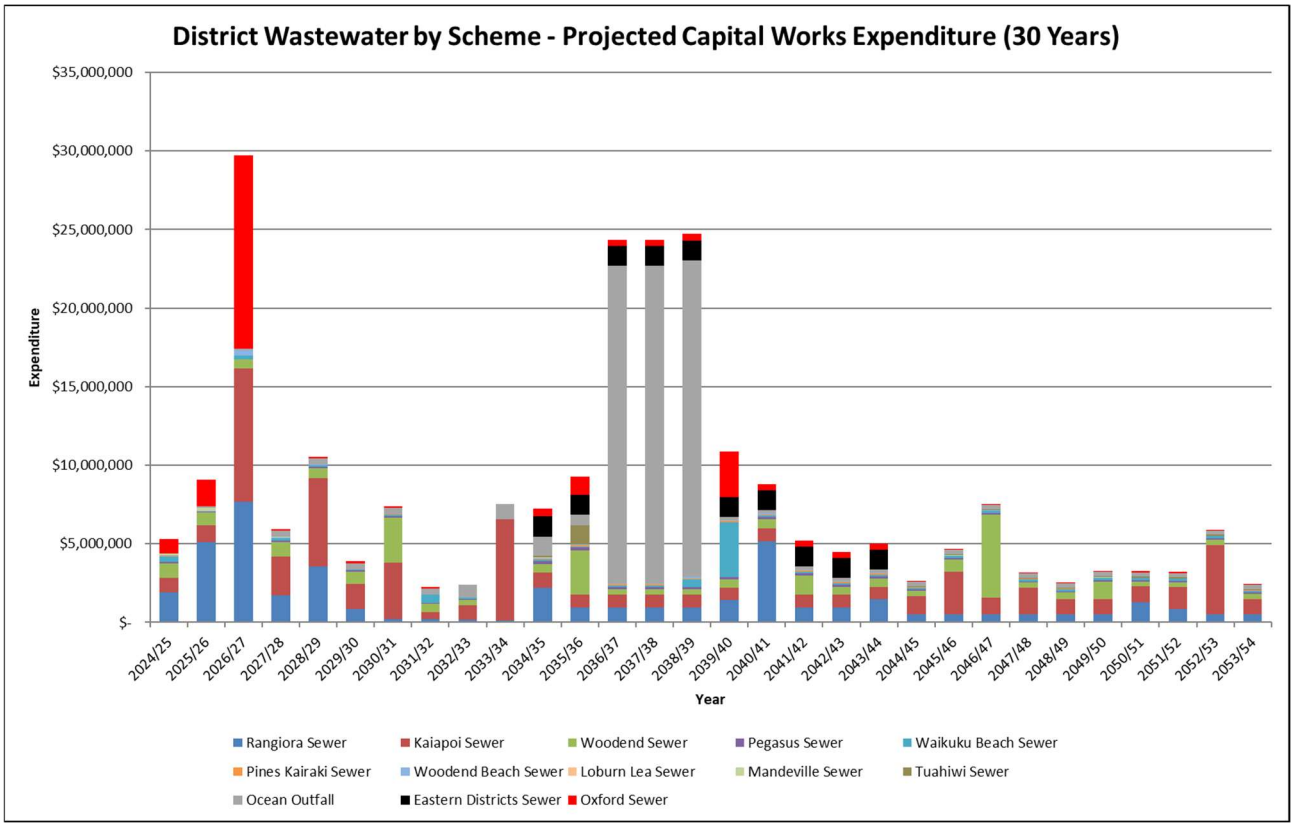
As well as the processes above identifying works on a scheme by scheme basis, or by service type, further consideration is required to coordinate work programmes between a combination

of service types. Utilities Providers Coordination meetings are held quarterly between 3 Waters, Roading, 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, and including carry forwards.

Figure 10: District Overview – Projected Capital Works Expenditure



The significant peak in 2027/28 relates to the major Oxford WWTP and Kaiapoi capacity upgrade projects, and in 2036-39, relates to the major upgrade required for the EDSS plants corresponding to the consent expiry in 2039.

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 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.

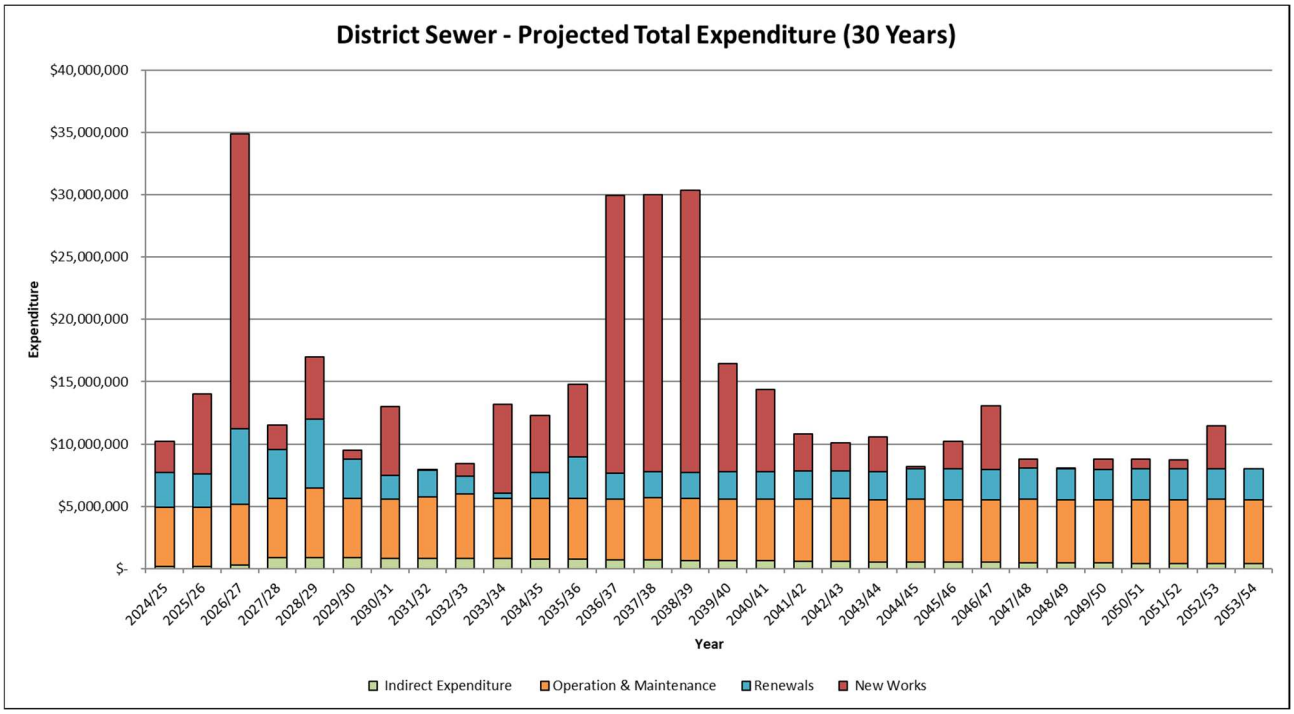
19. OVERALL FINANCIAL FORECASTS

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 includes expenditure for growth, levels of service and renewals, (including carry forwards).

Figure 11: 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 wastewater 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.

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. **Error! Reference source not found.** below provides a summary of the replacement cost, depreciated replacement cost and annual depreciation for the district, broken down by scheme.

Table 22: Asset Valuation

Scheme		District	Rangiora (incl Fernside)	Kaiapoi	Woodend	Pegasus	Waikuku Beach	Tuahiwi	Woodend Beach	The Pines/ Kairaki Beach	Mandeville	Loburn Lea	Oxford	Ocean Outfall
Manholes	Quantity	4,295	1,815	1,129	494	369	96	8	18	31	33	50	251	1
	Replacement Cost	$61.9M	$25.8M	$16.3M	$7.1M	$5.7M	$1.2M	$104.4k	$293.7k	$368.7k	$575.6k	$717.3k	$3.7M	$1.3k
	Depreciated Replacement Cost	$48.6M	$19.1M	$12.7M	$6.1M	$5.1M	$0.8M	$103.0k	$212.7k	$263.6k	$539.7k	$652.1k	$3.0M	$1.1k
	Annual Depreciation	$499.8k	$207.6k	$132.2k	$57.0k	$45.2k	$10.3k	$0.8k	$2.4k	$3.0k	$4.9k	$6.3k	$30.0k	$0.0k
Valves	Quantity	698	65	159	39	55	15	26	2	-	256	-	2	79
	Replacement Cost	$12.2M	$337.9k	$995.0k	$246.1k	$237.5k	$52.7k	$81.1k	$24.7k	-	$998.3k	-	$8.8k	$9.2M
	Depreciated Replacement Cost	$8.8M	$305.9k	$899.9k	$226.8k	$210.1k	$46.7k	$78.2k	$19.3k	-	$895.8k	-	$7.0k	$6.1M
	Annual Depreciation	$160.0k	$3.4k	$10.9k	$2.6k	$2.4k	$0.5k	$0.8k	$0.2k	-	$10.6k	-	$0.1k	$128.5k
Main	Quantity	397.6 km	121.0 km	82.3 km	37.6 km	33.9 km	10.5 km	8.7 km	3.0 km	2.0 km	47.9 km	4.1 km	20.8 km	26.0 km
	Replacement Cost	$282.3M	$82.0M	$78.8M	$23.8M	$25.4M	$7.0M	$1.2M	$1.5M	$1.4M	$7.0M	$2.0M	$15.3M	$36.9M

	Depreciated Replacement Cost	$213.7M	$58.3M	$57.6M	$19.0M	$22.2M	$3.9M	$0.9M	$0.7M	$0.9M	$6.3M	$1.8M	$11.5M	$30.7M
	Annual Depreciation	$3.0M	$866.6k	$873.9k	$260.3k	$254.2k	$95.6k	$14.8k	$21.1k	$17.4k	$70.6k	$19.7k	$152.6k	$369.1k
Service Lines	Quantity	15,419	5,952	4,350	1,732	1,320	431	83	71	162	622	37	659	-
	Replacement Cost	$72.3M	$29.0M	$21.2M	$8.4M	$6.4M	$2.1M	$100.2k	$345.4k	$788.2k	$751.0k	$44.7k	$3.2M	-
	Depreciated Replacement Cost	$56.0M	$21.0M	$16.8M	$7.0M	$5.7M	$1.4M	$95.1k	$189.5k	$530.7k	$654.1k	$35.9k	$2.5M	-
	Annual Depreciation	$759.8k	$304.6k	$221.2k	$88.5k	$64.2k	$26.9k	$1.0k	$4.1k	$9.1k	$7.5k	$447	$32.1k	-
Facilities	Replacement Cost	$64.7M	$18.9M	$14.3M	$9.0M	$4.5M	$1.8M	$1.1M	$121.9k	$374.8k	$768.7k	$704.9k	$4.1M	$9.1M
	Depreciated Replacement Cost	$46.0M	$14.5M	$10.4M	$7.0M	$3.1M	$1.0M	$1.0M	$49.9k	$222.1k	$597.7k	$407.9k	$2.7M	$5.1M
	Annual Depreciation	$1.5M	$389.3k	$320.0k	$162.0k	$102.3k	$46.6k	$16.3k	$3.9k	$16.2k	$20.1k	$17.4k	$140.1k	$255.6k
Totals	**Replacement Cost**	**$493.4M**	**$156.0M**	**$131.6M**	**$48.5M**	**$42.2M**	**$12.2M**	**$2.5M**	**$2.3M**	**$2.9M**	**$10.1M**	**$3.4M**	**$26.3M**	**$55.2M**
	Depreciated Replacement Cost	**$373.0M**	**$113.1M**	**$98.4M**	**$39.3M**	**$36.3M**	**$7.2M**	**$2.1M**	**$1.2M**	**$1.9M**	**$8.9M**	**$2.9M**	**$19.8M**	**$41.9M**
	Annual Depreciation	**$5.9M**	**$1.8M**	**$1.6M**	**$570.4k**	**$468.3k**	**$179.9k**	**$33.8k**	**$31.8k**	**$45.7k**	**$113.7k**	**$43.9k**	**$354.9k**	**$753.2k**

20. DATA CONFIDENCE

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

Confidence Grade	Description
A Highly Reliable	Data based on sound records, procedures, investigations and analysis, documented properly and recognised as the best method of assessment. Dataset accuracy ± 2%
B Reliable	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 ± 10%
C Uncertain	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 ± 25%
D Very Uncertain	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 ± 40%
E Unknown	None or very little data held

Confidence grades have been assessed as:

Table 23: 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 seen to be generally 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.

21. ASSET MANAGEMENT SYSTEMS

A register of Wastewater 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 Roading 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 Waste water supply activity was generally operating asset management at an intermediate level of maturity, and scored overall a 63 against a target of 79.

The key areas for improvement for wastewater were as for water supply: *"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. In addition the report considered there was *potential to improve the use of condition data.* This has been actioned through the implementation of InfoAsset Manager.

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

AM Function	Recommendation	Action
Policy and Strategy	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
Forecasting Demand	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
Asset Register data	Complete the facilities and headworks asset data and condition information improvements.	Will be complete July 2023
Asset Performance and Condition	Improve use of asset condition data	InfoAsset Manager is now in operation to make better use of CCTV data. Facilities asset condition assessment yet to be carried out
Decision Making	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
Managing Risk	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 210506072304 and the peer review documents in TRIM 220506071089

22. NEGATIVE EFFECTS

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

- Potential for noise and foul odours when sewage treatment plants malfunction
- Potential for environmental harm in the event of overflows from the sewer network.
- Potential for environmental harm in the event of treatment plant failure

23. 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, and the rates therein are reviewed annually.

24. IMPROVEMENT PLAN

The table 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 24: 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 Roading & 3 Waters Renewals Programmes	High	Planned for 2024/25	Physical works layer in GIS now used for planning, but further Roading/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

Project Ref	AMP Section	Project Description	Priority	Status	Comment
IPO34	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
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 rising GW levels in affected areas.	High	Phase 1 complete	Initial screening carried out. Further more detailed work on site by site basis to follow

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.

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. TRIM link to policy
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?	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. A facility assets condition assessment has not yet been carried out. 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.
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
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

25. CHANGES TO AMP AS A RESULT OF LONG TERM PLAN CONSULTATION

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 240405053554).

A new budget was created for an urgent wastewater gravity main replacement in Kaiapoi due to recent CCTV inspections identifying the pipe to be in very poor condition and at risk of failure.

The other changes relate to budget changes to existing projects.

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

Budget Name	**Draft 2024-34 LTP (2024/25)**	**Proposed Revised Budget (2024/25)**	**Difference**	**Notes**
Raven Quay Gravity Main Renewal	$0	$540,000	$540,000	New budget for urgent gravity main replacement in 24/25, due to pipe recently identified to be in very poor condition through CCTV inspection.
Oxford Wastewater Treatment Plant Upgrade	$157,050	$57,050	-$100,000	Original scope that was planned for 24/25 is reduced. More investigation is required for strategic long term options for Oxford wastewater scheme.
Woodend WWTP Overflow Improvement	$52,350	$0	-$52,350	Budget no longer required as issue resolved through maintenance works carried out in 23/24.
Total	$209,400	$597,050	$387,650	

Appendix 1: Rangiora (including Fernside) Scheme Performance

Table 25: A1 - Rangiora Elective Levels of Service Performance - Assessed June 2023

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
Customer Complaints	Complaints - Midges & Insects - Treatment	Number of events that lead to complaints about midges and insects at treatment plants	Nil per Year	0	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Complaints - Odour - Reticulation	Number of events that lead to complaints about odour from the reticulation	Less than 5 per year	0	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Complaints - Odour - Treatment	Number of events that lead to complaints about odour at treatment plants	Less than 5 per year	0	This level of service is met	Achieved	N/A	Y	Y	N	Y	Y
Resource Consents	Consent Breach - Action required	Number breaches of consent conditions that result in an ECan report that identifies compliance issues.	Nil per Year	Nil	There were no breaches of consent this year leading to significant adverse effects, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
Outages	Outages - Events >8 hours	Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	2	These are related to the flooding events in July 2022.	Not Achieved	Reticulation upgrade planned for Rangiora to be	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
							completed in 25/26					
Overflows	Overflows - Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 year	Nil	The Central Rangiora Sewer Upgrade is currently under construction. This will provide additional capacity in the reticulation system and is expected to address all the remaining level of service issues in Rangiora. This project is programmed to be complete in 2028 when Stage 9 is undertaken.	Achieved	N/A	Y	N	N	N	N
Overflows	Overflows - New Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 year	Nil	This level of service is met.	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
	Overflows - Private Property	Number of recorded overflows on private property found to be the result of (a) blockage in the main (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2 year event, for areas designed prior to 1999. (c) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5 year event for areas designed after 1999.	Nil per year	(a) 1	(a) SR2200289 - Blockage in the main potentially caused by storm debris (b) Not Achieved (c) Not Achieved	Not Achieved	Ongoing Rangiora sewer capacity upgrade programme will result in (b) and (c) being met when complete	N	N	Data	Y	N
Customer satisfaction	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%	93		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 26: A2 - Kaiapoi Elective LoS Performance - Assessed June 2023

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Customer Complaints	Complaints - Midges & Insects - Treatment	Number of events that lead to complaints about midges and insects at treatment plants	Nil per Year	0	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Complaints - Odour - Reticulation	Number of events that lead to complaints about odour from the reticulation	Less than 5 per year	1	This level of service is met	Achieved	N/A	Y	N	Y	Y	Y
	Complaints - Odour - Treatment	Number of events that lead to complaints about odour at treatment plants	Less than 5 per year	1	This level of service is met	Achieved	N/A	Y	Y	N	Y	N
Resource Consents	Consent Breach - Action required	Number breaches of consent conditions that result in an ECan report that identifies compliance issues.	Nil per Year	Nil	There were no breaches of consent this year leading to significant adverse effects, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
Outages	Outages - Events >8 hours	Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	1	This is related to the flooding events in July 2022.	Not Achieved	Increased planned pipeline maintenance in	Y	Y	Y	N	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Overflows	Overflows - Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 year	N	Recent modelling has confirmed a significant proportion of the existing Kaiapoi network is not meeting the desired level of service. Additional flow monitoring and further studies are underway to identify mitigation measures.	Not Achieved	Major system upgrade planned and budgeted	N	N	N	N	N
Overflows	Overflows - New Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 year	Y	Recent modelling undertaken in Kaiapoi has not identified any overflow issues associated with new reticulation designed to the 5 year level of service.	Achieved	N/A	Y	N	N	N	N

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	Overflows - Private Property	Number of recorded overflows on private property found to be the result of (a) blockage in the main (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2 year event, for areas designed prior to 1999. (c) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5 year event for areas designed after 1999.	Nil per year	1	An historical issue of loss of service in heavy rain.	Not Achieved	A programme of works that is expected to resolve the problem will be completed in the 2023/24 FY	Y	Y	N	N	N
Customer satisfaction	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%	91%	This level of service is met	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 3: Woodend Scheme Performance

Table 27: A3 Woodend Elective LoS Performance - Assessed June 2023

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
Customer Complaints	Complaints - Midges & Insects - Treatment	Number of events that lead to complaints about midges and insects at treatment plants	Nil per Year	0	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Complaints - Odour - Reticulation	Number of events that lead to complaints about odour from the reticulation	Less than 5 per year	0	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Complaints - Odour - Treatment	Number of events that lead to complaints about odour at treatment plants	Less than 5 per year	0	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Resource Consents	Consent Breach - Action required	Number breaches of consent conditions that result in an ECan report that identifies compliance issues.	Nil per Year	Nil	There were no breaches of consent this year leading to significant adverse effects, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
Outages	Outages - Events >8 hours	Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	Nil	This level of service is met	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
Overflows	Overflows - Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Overflows	Overflows - New Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Overflows - Private Property	Number of recorded overflows on private property found to be the result of (a) blockage in the main (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2 year event, for areas designed prior to 1999. (c) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5 year event for areas designed after 1999.	Nil per year	Nil	This level of service is met	Achieved	N/A	N	Y	Insf. Data	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
Customer Satisfaction	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%	90%	This level of service is met	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 4: Pegasus Scheme Performance

Table 28:A4 Pegasus Elective LoS Performance - Assessed June 2023

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Customer Complaints	Complaints - Odour - Reticulation	Number of events that lead to complaints about odour from the reticulation	Less than 5 per year	0	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Outages	Outages - Events >8 hours	Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	0	This level of service is met	Achieved	N/A	Y	N	Y	Y	Y
Overflows	Overflows - Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Overflows	Overflows - New Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	Overflows - Private Property	Number of recorded overflows on private property found to be the result of (a) blockage in the main (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2 year event, for areas designed prior to 1999. (c) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5 year event for areas designed after 1999.	Nil per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Insf. Data	Y	Y
Customer satisfaction	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%	92%	This level of service is met	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 5: Waikuku Beach Scheme Performance

Table 29: A5 Waikuku Beach Elective LoS Performance - Assessed June 2025

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Customer Complaints	Complaints - Midges & Insects - Treatment	Number of events that lead to complaints about midges and insects at treatment plants	Nil per Year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Complaints - Odour - Reticulation	Number of events that lead to complaints about odour from the reticulation	Less than 5 per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Complaints - Odour - Treatment	Number of events that lead to complaints about odour at treatment plants	Less than 5 per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Resource Consents	Consent Breach - Action required	Number breaches of consent conditions that result in an ECan report that identifies compliance issues.	Nil per Year	Nil	There were no breaches of consent this year leading to significant adverse effects, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
Outages	Outages - Events >8 hours	Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	1	This is related to the flooding events in July 2022.	Not Achieved	No action planned	Y	Y	Y	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Overflows	Overflows - Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Overflows	Overflows - New Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 year	Nil	This level of service is met	Achieved	N/A	Y				
	Overflows - Private Property	Number of recorded overflows on private property found to be the result of (a) blockage in the main (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2 year event, for areas designed prior to 1999. (c) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5 year event for areas designed after 1999.	Nil per year	Nil	This level of service is met	Achieved	N/A	Y				

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Customer Service	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%	100%	This level of service is met	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 6: Tuahiwi Scheme Performance

Table 30: A6 Tuahiwi Elective LoS Performance - Assessed June 202

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	Complaints - Odour - Reticulation	Number of events that lead to complaints about odour from the reticulation	Less than 5 per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	N	N
Outages	Outages - Events >8 hours	Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Overflows	Overflows - Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Overflows	Overflows - New Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	Overflows - Private Property	Number of recorded overflows on private property found to be the result of (a) blockage in the main (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2-year event, for areas designed prior to 1999. (c) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5-year event for areas designed after 1999.	Nil per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Insf. Data	Y	Y
Customer satisfaction	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%	33% (?)	Survey linked Tuahiwi and Fernside together, which are separate schemes	Not known	Correct survey questions					

** 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: Woodend Beach Scheme Performance

Table 31: A7 Woodend Beach Elective LoS Performance - Assessed June 2023

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	Complaints - Odour - Reticulation	Number of events that lead to complaints about odour from the reticulation	Less than 5 per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Outages	Outages - Events >8 hours	Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Overflows	Overflows - Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 years	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Overflows	Overflows - New Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 years	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	Overflows - Private Property	Number of recorded overflows on private property found to be the result of (a) blockage in the main (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2 year event, for areas designed prior to 1999. (c) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5 year event for areas designed after 1999.	Nil per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Insf. Data	Y	Y
Customer satisfaction	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%	100%	This level of service is met	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: The Pines/Kairaki Beach Scheme Performance

Table 32: A8 The Pines/Kairaki Beach Elective Performance - Assessed June 2023

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	Complaints - Odour - Reticulation	Number of events that lead to complaints about odour from the reticulation	Less than 5 per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Outages	Outages - Events >8 hours	Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Overflows	Overflows - Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Overflows	Overflows - New Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	Overflows - Private Property	Number of recorded overflows on private property found to be the result of (a) blockage in the main (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2 year event, for areas designed prior to 1999. (c) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5 year event for areas designed after 1999.	Nil per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Insf. Data	Y	Y
Customer satisfaction	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%	50%		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 9: Mandeville Scheme Performance

Table 33: A9 Mandeville Elective LoS Performance - Assessed 2023

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Customer Complaints	Complaints - Midges & Insects - Treatment	Number of events that lead to complaints about midges and insects at treatment plants	Nil per Year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Complaints - Odour - Reticulation	Number of events that lead to complaints about odour from the reticulation	Less than 5 per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Complaints - Odour - Treatment	Number of events that lead to complaints about odour at treatment plants	Less than 5 per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Resource Consents	Consent Breach - Action required	Number breaches of consent conditions that result in an ECan report that identifies compliance issues.	Nil per Year	Nil	There were no breaches of consent this year leading to significant adverse effects, as noted in Environment Canterbury compliance reports.	Achieved	N/A	Y	Y	Y	Y	Y
Outages	Outages - Events >8 hours	Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Overflows	Overflows - Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Overflows	Overflows - New Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Overflows - Private Property	Number of recorded overflows on private property found to be the result of (a) blockage in the main (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2 year event, for areas designed prior to 1999. (c) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5 year event for areas designed after 1999.	Nil per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Insf. Data	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Customer satisfaction	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%	90%	This level of service is met	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 10: Loburn Lea Scheme Performance

Table 34: A10 Loburn Lea Elective LoS Performance - Assessed June 2023

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Customer Complaints	Complaints - Midges & Insects - Treatment	Number of events that lead to complaints about midges and insects at treatment plants	Nil per Year	N/A	Plant has been decommissioned	N/A	N/A	Y	Y	Y	Y	Y
	Complaints - Odour - Reticulation	Number of events that lead to complaints about odour from the reticulation	Less than 5 per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Complaints - Odour - Treatment	Number of events that lead to complaints about odour at treatment plants	Less than 5 per year	N/A	Plant has been decommissioned	N/A	N/A	Y	Y	Y	Y	Y
Resource Consents	Consent Breach - Action required	Number breaches of consent conditions that result in an ECan report that identifies compliance issues.	Nil per Year	N/A	There were no breaches of consent this year leading to significant adverse effects, as noted in Environment Canterbury compliance reports.	N/A	N/A	N	Y	Y	Y	Y
Outages	Outages - Events >8 hours	Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Overflows	Overflows - Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Overflows	Overflows - New Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Overflows - Private Property	Number of recorded overflows on private property found to be the result of (a) blockage in the main (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2 year event, for areas designed prior to 1999. (c) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5 year event for areas designed after 1999.	Nil per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Insf. Data	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Customer satisfaction	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%	100%	This level of service is met	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 11: Oxford Scheme Performance

Table 35: A11 Oxford Elective LoS performance - Assessed June 2023

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Customer Complaints	Complaints - Midges & Insects - Treatment	Number of events that lead to complaints about midges and insects at treatment plants	Nil per Year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Complaints - Odour - Reticulation	Number of events that lead to complaints about odour from the reticulation	Less than 5 per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
	Complaints - Odour - Treatment	Number of events that lead to complaints about odour at treatment plants	Less than 5 per year	1	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Resource Consents	Consent Breach - Action required	Number breaches of consent conditions that result in an ECan report that identifies compliance issues.	Nil per Year	1	Consent breach due to lack of data to demonstrate depth of effluent application and exceedance of faecal coliform concentration for 2 samples due to operational issue with UV unitas noted in Environment Canterbury compliance reports.	Not achieved	Connect irrigator to SCADA and improve sampling data collection.	Y	Y	N	Y	N

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
Outages	Outages - Events >8 hours	Number of events that cause a loss of service to any property for >8 hrs (does not include private laterals)	Nil per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Overflows	Overflows - Existing Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed prior to May 1999 without overflows occurring	1 in 2 year	Nil	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y
Overflows	Overflows - New Reticulation	Minimum return period of rainfall event that can be accommodated in network components designed after May 1999 without overflows occurring	1 in 5 year	Less than 1 in 5 year	This level of service is met	Achieved	N/A	Y	Y	Y	Y	Y

Section	Level of Service	2021 – 2024 Performance Measure	2021 – 2024 Target	2020				Previous Results#				
				Result	Commentary	Status	Action to Address	2020	2017	2014	2011	2008
	Overflows - Private Property	Number of recorded overflows on private property found to be the result of (a) blockage in the main (b) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 2 year event, for areas designed prior to 1999. (c) Insufficient capacity in the reticulation system for any rainfall up to a 1 in 5 year event for areas designed after 1999.	Nil per year	Nil	This level of service is met	Achieved	N/A	Y	Y	Insf. Data	Y	Y
Customer satisfaction	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%	92%	This level of service is met	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 12: Glossary of Terms

The following terms and acronyms (in brackets) are used in this Activity Management Plan, either in the overview document or the scheme specific AMP.

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 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.
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 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.
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 Plan (AMP)	In the Waimakariri District Council's context, this is referred to as an activity management plan.
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.
ADF	Average Daily Flow - The recorded flow over a year divided by the number of days in a year and generally expressed as volume/day or litres/second. Also refer ADWF
ADWF	Average Dry Weather Flow is the total sewage flow for a 24 hour period that occurs on a dry day. The ADWF is usually expressed as m3/day. It is comprised of domestic, commercial, and industrial sewage flows and permanent baseflow from groundwater infiltration.
Ancillary	A structure or an arrangement within the wastewater collection system such as a pumping station, weir, syphon, or emergency pumping station overflow.

ARI	Average Recurrence Interval. The statistical period between events (e.g. rainfall or overflows) occurring.
BOD	Biological Oxygen Demand, also known as Biochemical Oxygen Demand. This is the amount of dissolved oxygen needed by aerobic biological organisms in a body of water to break down organic material present in a given water sample at certain temperature over a specific time period.
Brownfields	Previously developed land with potential for new development.
Capital Expenditure (CAPEX)	Expenditure used to create new assets or to increase the capacity of existing assets beyond their original design capacity or service potential. CAPEX increases the value of an asset.
CCTV	Closed Circuit Television. It is used to visually assess the condition inside pipe networks.
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 sewer scheme.
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.
Current Replacement Cost	The cost of replacing an existing asset with an appropriate modern equivalent asset to deliver the same level of service.
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.
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.
Disposal	Activities necessary to decommission and dispose of assets that are no longer required.

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.
Routine Maintenance	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.
SS	Suspended Solids.
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.
Sewer Catchment	An area containing properties that are connected to the wastewater collection system upstream of a particular point whether it is a particular manhole or a network pumping station.
Step Screen	The screen that removes larger solids and debris from sewage just before it enters the WWTP. The step is its action of incremental movement to clear itself and deposit the solids in waste container.
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.
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.
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.
UV	Ultraviolet (light) used to kill bacteria in sewage treatment processes. This can be supplied by the sun or in more modern plants it is generated with fluorescent lights.
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.
WWF	Wet Weather Flow. Wastewater flow comprised of dry weather flow (DWF) and rainfall dependent infiltration and inflow (RDII).