2024

Wastewater

Asset Management Plan

Draft Asset Management Plan
for adoption as part of the
2024-34 Long-term Plan.

Christchurch City Council

Asset Management Plan Summary

Wastewater

Asset management plans

Together, our 14 asset management plans (AMP) present a detailed description of all the things – roads, cycleways, footpaths, pipes, buildings, vehicles, parks and so on – that the Christchurch City Council owns, across all areas of work, and how these 'assets' are planned, managed, operated and funded.

All our assets belong to and are managed and operated on behalf of ratepayers.

Ensuring our assets are appropriate for the city's needs enables us to deliver the services that make Christchurch and Banks Peninsula a great place to live, work and visit.

What we do

We collect wastewater from around 160,000 homes, businesses and industries. To do this we own, plan, manage and operate seven wastewater schemes collecting, treating and disposing of wastewater from Christchurch City, Lyttelton and Governors Bay, Diamond Harbour, Akaroa, Duvauchelle, Wainui and Tikao Bay.

Why we do it

Wastewater collection, treatment and disposal is an essential service that protects public health and the environment.

Our assets

Our seven wastewater schemes consist of reticulation networks, pump stations, odour control stations and treatment plants with a total replacement cost of $5.11 billion.

Where we've come from

The Christchurch wastewater system developed independently from the five local authorities under the Christchurch Drainage Board dating back to 1875. The Bromley site was established as a sewage farm in 1882 and developed upstream treatment works in 1962. With the amalgamation of five local authorities into Christchurch City Council in 1989 the Drainage Board was also disestablished and its functions taken over by the Council. The 2006 amalgamation of Christchurch City Council and Banks Peninsula District Council added the Banks Peninsula wastewater schemes.

Our network and services were disrupted by the Canterbury earthquakes of 2010 and 2011. Significant assessment and rebuild work followed, under the Stronger Christchurch Infrastructure Recovery Team (SCIRT) alliance. This programme did not address all earthquake damage and many pipes with varying levels of defects remain.

New pipework has been installed enabling pumping wastewater from Lyttleton, Governors Bay and Diamond Harbour to the Christchurch Wastewater treatment Plant in Bromley.

Wastewater systems in Akaroa and Duvauchelle will be replaced in years 1 to 6 of the Long Term Plan.

Our issues and risks

Our network is vulnerable to a wide range of risks, from issues such as climate change through to inherent operational risks, such as not complying with a resource consent. These are all outlined in the asset management plan, along with the mitigations we've planned.

What it costs

Our proposed budget in Year 1 of the 2024 LTP is $245.50 million, with the operating expenditure projected at $171.01 million and the capital expenditure at $74.49 million.

How we're funded

Council's Revenue and Financing Policy sets out how we are funded, based on who benefits.

- Operational expenditure is funded by rates (general, separate and differential) and through fees and charges.
- Capital expenditure is funded by borrowing and repaying over several years.
- Private developer vesting – wastewater assets created during subdivision development are vested with the Council.

How it's delivered

We work within the Council's Three Waters and Waste Unit across several teams, with other Council units and with external contractors.

- **Staff deliver**
    - Wastewater network operations, asset planning and management, project management
    - Reactive renewals and major maintenance
    - SCADA equipment maintenance
    - The Christchurch Wastewater Treatment Plant operations at Bromley and laboratory services
- **Contractors deliver**
    - General operations, maintenance and construction
- **Key delivery partners**
    - Technical Services Unit (Council)
    - Transport Unit (Council)
    - City Care Ltd
    - Consultants Panel
    - Land developers
    - Selwyn District Council
    - Environment Canterbury
    - Ministry of Health/Government Regulator

Our functions and services

We provide infrastructure and systems that enable wastewater to be collected, treated and disposed of. Our services are reliable and responsive and our treated wastewater discharges are of high quality. This protects public health and the environment.

We apply engineering, financial and management practices to achieve the agreed levels of service for the most cost-effective expenditure. This means optimising investment and outcomes within the constraints of finance, service levels and resources.

Managing our assets involves spending considerable amounts of money, so it's vital that staff ensure they are doing the right thing, at the right time and for the right price.

Asset Maturity assessment

The 2023 maturity assessment for all of our 3-Waters assets, not just the wastewater activity, shows we are performing at a core/intermediate level. This is a reduction in level from the 2020 assessment that had this activity at an intermediate or advanced level.

Planned Improvement items over the next three years would focus on enhancing key data management, forecasting, master planning and a focus on levels of service and customer engagement.

Little progress was made on business improvement items identified in the 2018 or 2021 Asset Management Plans so these items are again proposed in this LTP.

Looking ahead

Along with water supply and stormwater, long-term wastewater service goals are guided by the Council's Te Wai o Tane Integrated Water Strategy.

Shorter term as we move into the 10 years of the Long Term Plan 2025-34 there are a number of specific challenges. These include aging infrastructure, new regulations, service delivery reform, climate change, risk, resilience, demand management, data-rich smart solutions and increased inflation rates affecting capital projects. The capital programme has been constrained for the first 10 years of the LTP, meaning a reduction in asset renewals.

Ageing infrastructure

Different pipe materials used at different times in history have different lives. These different lives mean pipes from different growth periods in Christchurch's history are all arriving at their "use-by" dates at the same time so we now have a sizeable proportion of the network in poor condition.

Proposed budgets are less than the budget needed to maintain current levels of service and condition. This budget shortfall means I&I, blockages and overflows will increase. These increases will result in lower customer satisfaction and higher operational costs to keep the network operating.

New regulations and reform

The drinking water regulatory environment in New Zealand is changing.

The previous Government's Three Waters Reform proposed changes in regulation, funding and organisational arrangements. However with the change in government, the form of any sort of reform are unknown.

We will need to comply with new environmental standards, and this may require a focus on reducing overflows and increasing discharge quality.

Climate change

In addition to overcoming the problem of aging infrastructure, we need to focus on mitigating the expected effects of climate change.

Christchurch is a coastal city and climate change will have a significant impact, especially in the coastal areas. We are likely to see changing rain patterns, sea level rise, higher levels of groundwater and groundwater salinity, drought, increased demand and water shortages. These changes will affect our operations, maintenance and planning.

Continuous improvement

While we have a strong commitment to continuous improvement within the business unit, our efforts are constrained by resourcing and funding.

This means planning to ensure the highest priority improvement items are delivered first, and that future needs and delivery costs are well understood given the constrained funding in the Long Term Plan 2024-34.

Document Control

Version Control

Version numbering changes when a document is approved. Draft document numbering starts at 0.01. Released or approved numbering starts at 1.01.

Version	Date	Description
1.01	30/01/2024	Draft for approval for consultation

Document Acceptance and Release Notice

This is a managed document. For identification of amendments each page contains a release number and a page number. Changes will only be issued as a complete replacement document. Recipients should remove superseded versions from circulation. This document is authorised for release once all signatures have been obtained.

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Long Term Plan documentation

Christchurch City Council's Long Term Plan (LTP) consists of a group of integrated documents intended to be read in conjunction with each other.

Activity Plans include community outcomes, levels of service KPIs, future impacts and demands (such as growth) and finances. Asset Management Plans specifically cover asset lifecycles and asset risks.

This enables Council to meet the detailed requirements of the Local Government Act 2002, which applies to all councils in New Zealand.

Other approaches to asset management (for example the International Infrastructure Management Manual or ISO 55000) should consider both plans together, rather than Asset Management Plans in isolation.

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1 Introduction to our Asset Portfolio

1.1 Background

Christchurch's wastewater system has evolved from the various community reticulation schemes dating back to 1875. The Bromley site began as a sewage farm in 1882 and later developed an upstream treatment works in 1962. Standardisation of wasetwater reticulation and pumping increased from 1989 when five local bodies merged into the new Christchurch City Council. Stand-alone Banks Penninusla wastewater systems came into Council stewardship in 2006 following further amalgamation.

The 2010/2011 Canterbury earthquakes disrupted the wastewater collection, treatment and disposal service. A signficant programme of assessment and rebuilding followed, carried out by the Stronger Christchurch Infrastructure Recovery Team (SCIRT) alliance. 560 km of wastewater pipe was renewed, lined or repaired, 56 lift stations were installed, some existing networks were replaced by local pressure sewer systems and vacuum sewer systems. The SCIRT programme did not remediate all earthquake damage and many pipes with different levels of defects remain for Council to manage. The SCIRT Legacy Report[1] acknowledged that "*it will take many years and significant ongoing funding to address the remaining issues across the network*".

New pipework has been installed to enable the existing wastewater schemes of Governors Bay and Diamond Harbour to be pumped to the Christchurch WWTP, and allow the existing Lyttleton Harbour Basin treatment plant to be decommissioned. New treatment and discharge options are being pursued in Akaroa and Duvauchelle to allow the current harbour discharges to end.

In December 2021, there was a fire at the Christchurch Wastewater Treatment Plant that destroyed the trickeling filters, which are a major part of the treatment process. Following this there was a period while temporary works were being procured to increase aeration and treatment in the existing ponds. This is managing the treatment of the wastewater while permenant replacement works are being worked on. While not a desirable thing to happen, it has given some oppurtunities to modernise part of the treatment process with emphasis on climate resilience.

New Zealand's wastewater services are going through a period of regulation change by the Central Government, although it is still uncertain what changes the new Government may bring, particularly with regard to water reform. This AMP has been prepared on the basis of prudent management of the assets and activity, irrespective of when and how any future changes to water regulation and managmenet takes place.

Christchurch's wastewater system includes five treatment plants, one in Christchurch city and others on Banks Peninsula. Pipes and pump stations convey wastewater (sewage) from homes and businesses to the treatment plant. The total replacement cost of Council's wastewater assets is $5.6 billion.

The Council collects and treats wastewater from approximately 160,000 customers in Christchurch, Lyttelton, Diamond Harbour, Governors Bay, Akaroa, Duvauchelle, Tikao Bay and Wainui, through 1000 km of laterals, 1,900 km of wastewater mains, 150 pump stations, 84 lift stations, and 34 odour control sites.

Each scheme has reticulation, pumping and treatment assets consisting of wastewater treatment plants, pump stations, odour control sites, lift stations, vacuum stations, pipes, and non-pipe assets such as valves and manholes.

Collection, treatment and disposal of wastwater is an essential service to the people of Christchurch. The wastewater activity also supports the community outcomes below.

- Safe and healthy communities
- Healthy waterways

[1] Internal Council Document - SCIRT Legacy Report, CCC, October 2017 – 17/851599

- Sustainable use of resources
- Modern and robust city infrastructure and facilities network

The key services that customers want delivered are:

- Council operates wastewater services in a reliable manner;
- Council operates wastewater services in a responsive manner;
- Public health is protected from Council wastewater services;
- Council has high wastewater discharge quality;
- Council wastewater networks and operations are sustainable

These key services form the basis of wastewater collection, treatment and disposal for the community through the sub-functions of:

- Wastewater flow monitoring and control
- Inflow and infiltration control
- Wastewater overflow management
- Wastewater Treatment
- Treatment by-product management
- Laboratory Services

1.2 Asset Lifecycle Approach

Council has established a lifecycle management framework, aligned to the *International Infrastructure Management Manual* as illustrated in Figure 1-1.

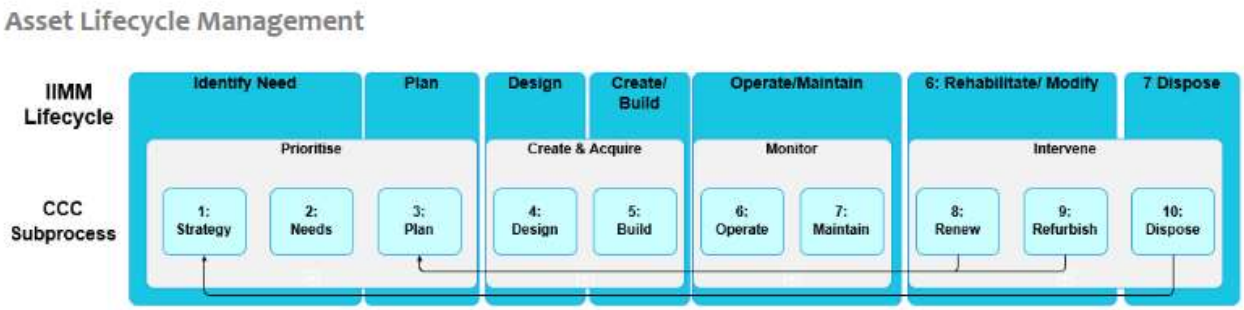


Figure 1-1: Asset Lifecycle Categories

1.3 Goals and objectives of Asset Management

Asset management is a business process which guides the lifecycle management of assets. Lifecycle management includes the planning, acquisition, operation, maintenance, renewal and disposal of assets.

Effective asset management enables the delivery of levels of service in the most cost-effective manner to present and future communities.

The Council's Asset Management Policy (approved by Council's Executive Leadership Team on 26 March 2018) provides the organisation's long-term vision, values and direction for asset management. The policy aligns with the organisation's strategic framework. The policy relates to Council's overarching intentions for asset management and the asset management system and not specifically assets or asset decisions.

The five principles underpinning the policy are:

- Asset management outcomes align with the strategic direction of Council
- Asset management is an organisational wide practice
- Decisions about assets are based on well-managed, quality information
- Asset management maturity is appropriate to the assets, services and risks we manage
- Asset management plans are living documents

The Asset Management policy sets out the assets Council manages in accordance with its asset management principles, and therefore within the asset management system scope.

The Asset Management Policy demonstrates commitment to maintaining an Asset Management System that promotes responsible management of assets to deliver value to customers and support business objectives, in accordance with best practice and alignment across the organisation. This provides a framework for establishing detailed plans and targets that support these objectives; and are measured and monitored to ensure continual performance improvement for Asset Management.

The Asset Management objectives (see Appendix 5.1) enable the management of assets in a manner consistent with the principles of the policy, and the organisation's objectives.

2 Lifecycle Management Plans

2.1 Asset Overview (what assets we have)

The following assets are covered in this AMP:

Table 2-1: Scope of Assets and Services Covered in this Plan

In Scope	Out of Scope
Reticulation: Pipe Assets	Private laterals
Reticulation: Non-Pipe Assets	Private on-site low pressure pumping systems
Pump Station Assets	
Lift Station Assets	
Vacuum Station Assets	
Odour Control Assets	
Monitoring Stations	
Wastewater Treatment Plant Assets	

2.2 Location and Value

In the Te Pūrongo-ā-tau Annual Report 2022, Fixed Assets under direct Council Control carried a book value of $14.2 billion. A detailed summary of the assets covered by this AMP is included in **Error! Reference source not found.** and for t he purposes of this AMP, the assets are considered to fall in to 3 groups as follows;

1. Reticulation Assets; including pipe and non-pipe assets
2. Pump Station Assets; including pump stations, odour control, lift stations and monitoring sites
3. Wastewater Treatment Plant Assets

Table 2-2 below lists the value of wastewater assets based on the 2023 Valuations. Total replacement cost of wastewater assets is **$5.6 billion** with a book value of $3.0 billion and an annual depreciation of $80 million.

Table 2-2: Detail of Wastewater Assets Based on 2023 Valuations

Asset Class	Asset Type	Replacement Value	Book Value	Annual Depreciation
Pipe Assets	Gravity	2,807,974,213	1,336,466,736	37,605,276
	Pressure	511,195,885	378,966,976	5,930,348
	Local Pressure	73,302,218	67,008,659	743,310
	Syphon	3,614,864	2,014,045	44,012
	Overflow	9,244,650	5,030,239	118,783
	Vacuum	64,129,063	59,357,046	641,890
	Laterals	894,770,608	480,976,223	9,798,716
	Biogas	16,551,520	14,237,139	165,913
	Sub-total	**$ 4,380,783,021**	**$ 2,344,057,064**	**$ 55,048,248**
Non-Pipe Assets	Vacuum System	18,090,005	15,784,785	315,443
	Air Gap Separator	25,633	9,342	480
	Flush Tank	299,084	202,148	2,988
	Manhole	314,933,504	171,353,083	3,102,181
	Outfall	669,229	392,886	6,678
	Pipe protection	3,129,337	2,222,407	31,203
	Pipe Restraint	142,484	110,324	1,425
	Structures	16,424,009	12,883,769	231,128
	Valves	19,720,621	11,671,194	446,144
	Vents	499,261	310,765	9,862
	Pressure Sewer	49,700,627	41,701,560	1,343,406
	Sub-total	**$ 423,633,792**	**$ 256,642,262**	**$ 5,490,939**
Pump Station Assets	Buildings & Structures-Civil	48,361,870	16,966,014	599,994
	Crane	5,369,812	4,219,185	106,005
	Electrical	34,756,809	15,991,718	1,021,395
	Control	14,242,042	5,191,432	752,034
	Pipework	53,146,507	42,750,017	567,742
	Pumps/mechanical	20,952,668	8,377,480	406,599
	Standby Equipment	6,051,046	3,719,900	119,367
	Soil Filter	1,993,669	1,408,859	39,873
	Sub-total	**$ 184,874,424**	**$ 98,624,605**	**$ 3,613,008**

Asset Class	Asset Type	Replacement Value	Book Value	Annual Depreciation
Lift Stations / Monitoring Stations	Lift Stations	12,187,207	10,992,472	130,203
	Monitoring Stations	632,531	484,287	12,354
	Sub-total	**$ 12,819,738**	**$ 11,476,758**	**$ 142,557**
Odour Control Assets	Fan	1,183,272	356,020	38,474
	Filterbed	1,498,675	849,249	29,974
	Pipework	899,214	674,411	8,992
	Electrics	946,635	286,667	30,694
	Building and Structures (Civil)	803,462	465,259	16,069
	Sub-total	**$ 5,331,258**	**$ 2,631,606**	**$ 124,202**
Treatment Plant Assets	Buildings and Structures (Civil)	212,075,838	115,335,759	2,689,781
	Civil Earthworks	18,210,347	18,210,347	N/A
	Electrical	31,982,131	11,998,735	721,295
	Instrumentation & control	115,306,975	38,703,351	6,393,214
	Mechanical Equipment & Plant	149,604,243	52,754,117	5,009,780
	Pipework	22,156,570	11,936,412	295,421
	Standby and Generation	17,096,287	8,699,199	428,833
	Sub-total	**$ 566,432,390**	**$ 257,637,919**	**$ 15,538,323**
Total Wastewater		**$ 5,573,874,624**	**$ 2,971,070,215**	**$ 79,957,277**

Figure 2-1 and Figure 2-2 on the next pages show an overview of where the wastewater reticulation, station and treatment assets are located in Christchurch city and in Banks Peninsula.

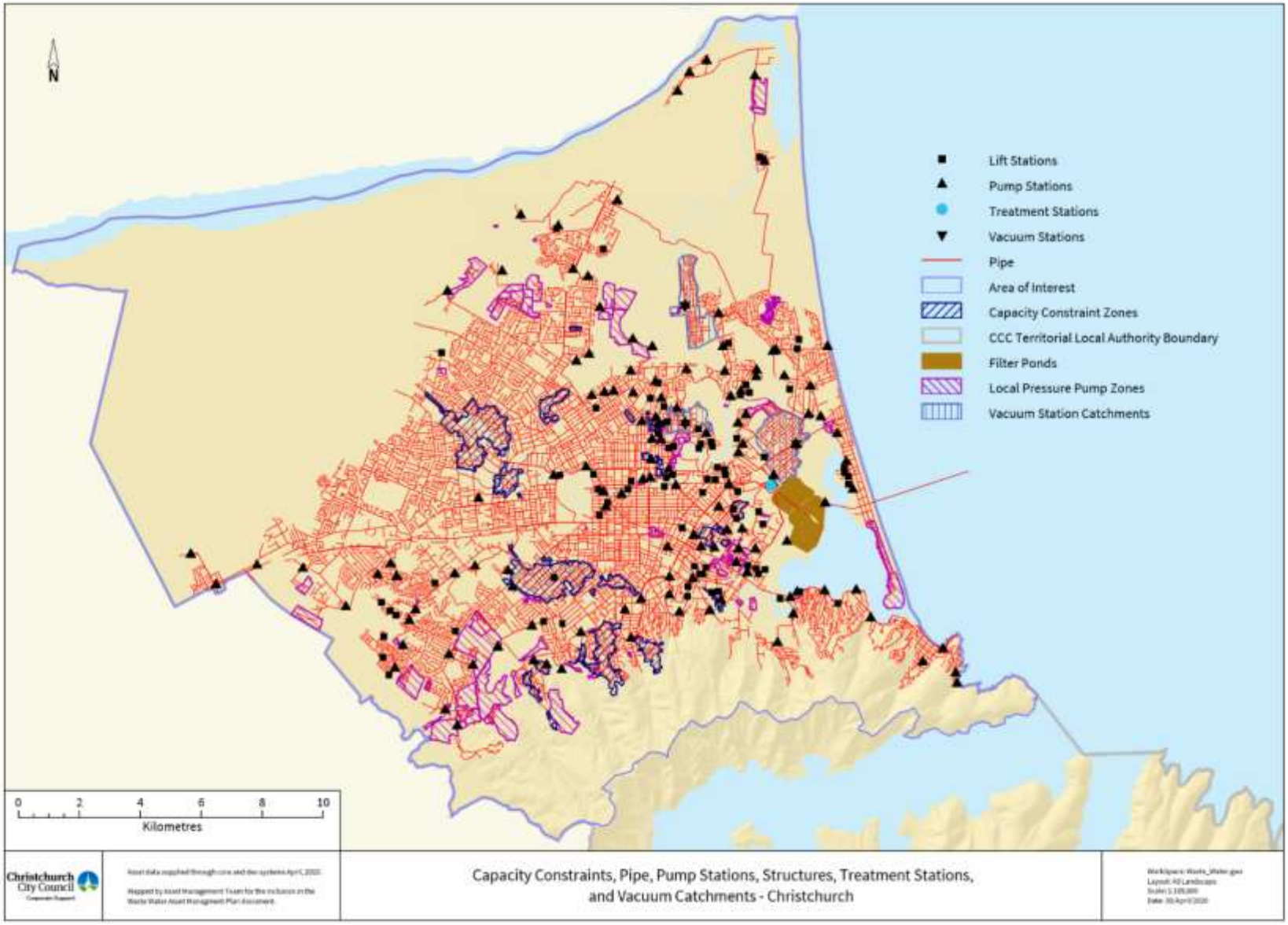


Figure 2-1: Christchurch City Wastewater Asset Locations

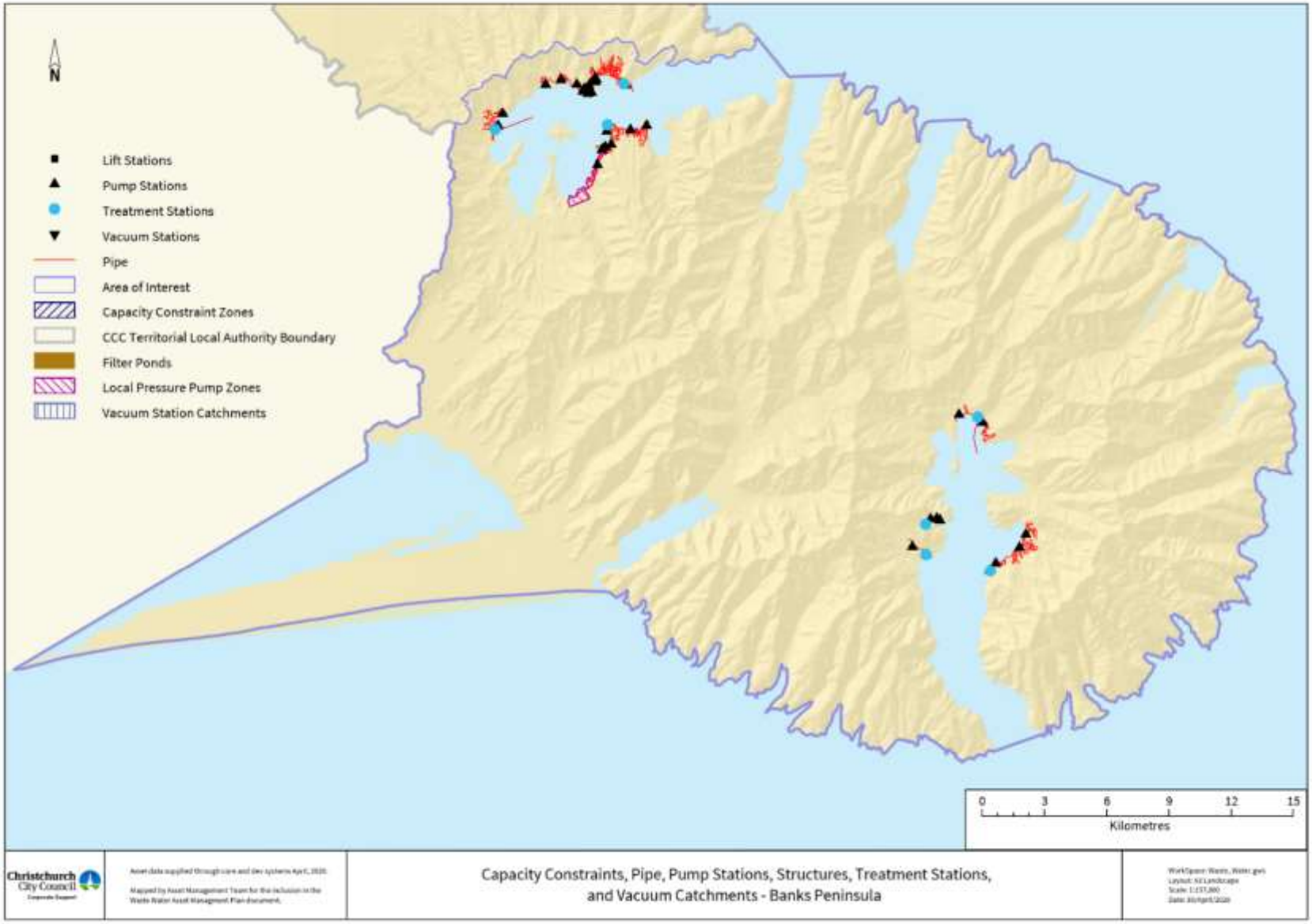


Figure 2-2: Banks Peninsula Water Supply Asset Locations

2.3 Asset Data Confidence

Table 2-3 summarises the asset information available for the wastewater assets both in terms of completeness (% of assets for which that data type is stored) and reliability (using the A-E grading below). Asset data is held in SAP, GIS and InfoAsset systems. Table 2-4 describes the confidence assessment system.

Although the numbers of most assets and asset types are available, detailed data is commonly lacking.

Table 2-3: Data Confidence for Each Asset Group

Asset Group	Data Confidence				
	Quantity	Age	Condition	Performance	RMO*
Buildings	Reliable	Highly Reliable	Uncertain	Uncertain	Unknown
Electrical and electronic equipment	Highly Reliable	Reliable	Uncertain	Uncertain	Unknown
Mechanical equipment & plant	Highly Reliable	Highly Reliable	Uncertain	Uncertain	Unknown
Land	Very uncertain	N/A	Very uncertain	N/A	Unknown
Station Pipework	Reliable	Reliable	Uncertain	Uncertain	Unknown
Structures	Reliable	Reliable	Uncertain	Uncertain	Unknown
Reticulation	Highly Reliable	Reliable	Uncertain	Uncertain	Reliable
Spares	Uncertain	Very uncertain	Very uncertain	Very uncertain	Unknown

*RMO – Repair, Maintenance Operation records – this selection of information is used as part of the Asset Assessment Intervention Framework (AAIF) process for renewal forecasting. With the AAIF process only used for gravity pipe assets, this is the only asset group with a Data Confidence record.

Table 2-4: Confidence Grade Description

Confidence Grade	Description
Highly reliable	Data based on sound records, procedures, investigations and analysis, documented properly and recognised as the best method of assessment. Dataset is complete and estimated to be accurate ± 2%
Reliable	Data based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example some of the data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation. Dataset is complete and estimated to be accurate ± 10%
Uncertain	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which grade A or B data are available. Dataset is substantially complete but up to 50% is extrapolated data and accuracy estimated ± 25%
Very Uncertain	Data is based on unconfirmed verbal reports and/or cursory inspections and analysis. Dataset may not be fully complete and most data is estimated or extrapolated. Accuracy ± 40%
Unknown	None or very little data held.

The Data Confidence rating and descriptions are based on Table 3.5.3 of the "International Infrastructure Management Manual – 2011" which is the grading system used by the consultant who carried out the valuation process.

2.4 Network Age and Lifecycle Stage

2.4.1 Reticulation Age and Condition

Wastewater reticulation condition grades use the 1 to 5 scale. Closed Circuit Television (CCTV) inspection results are the primary source of wastewater reticulation condition data with valid inspections recorded for 52% of mains. The remaining 48% have an estimated condition grade based on installation year. These theoretical useful lives are based on industry guidelines and staff knowledge.

The oldest reticulation assets still in use date back to 1882 in Christchurch City, 1885 in Akaroa, 1900 in Lyttelton. Typically a network dating back to 1880 with building booms in 1910-1920, 1950-1960 and the 1980s, there would be a very large cohort of pipes approaching end of life at the same time. For Christchurch a significant portion of the reticulation network was renewed after the earthquakes and this peak is not as pronounced. Installation dates and materials of the Council wastewater reticulation network is shown in Figure 2-3 below.

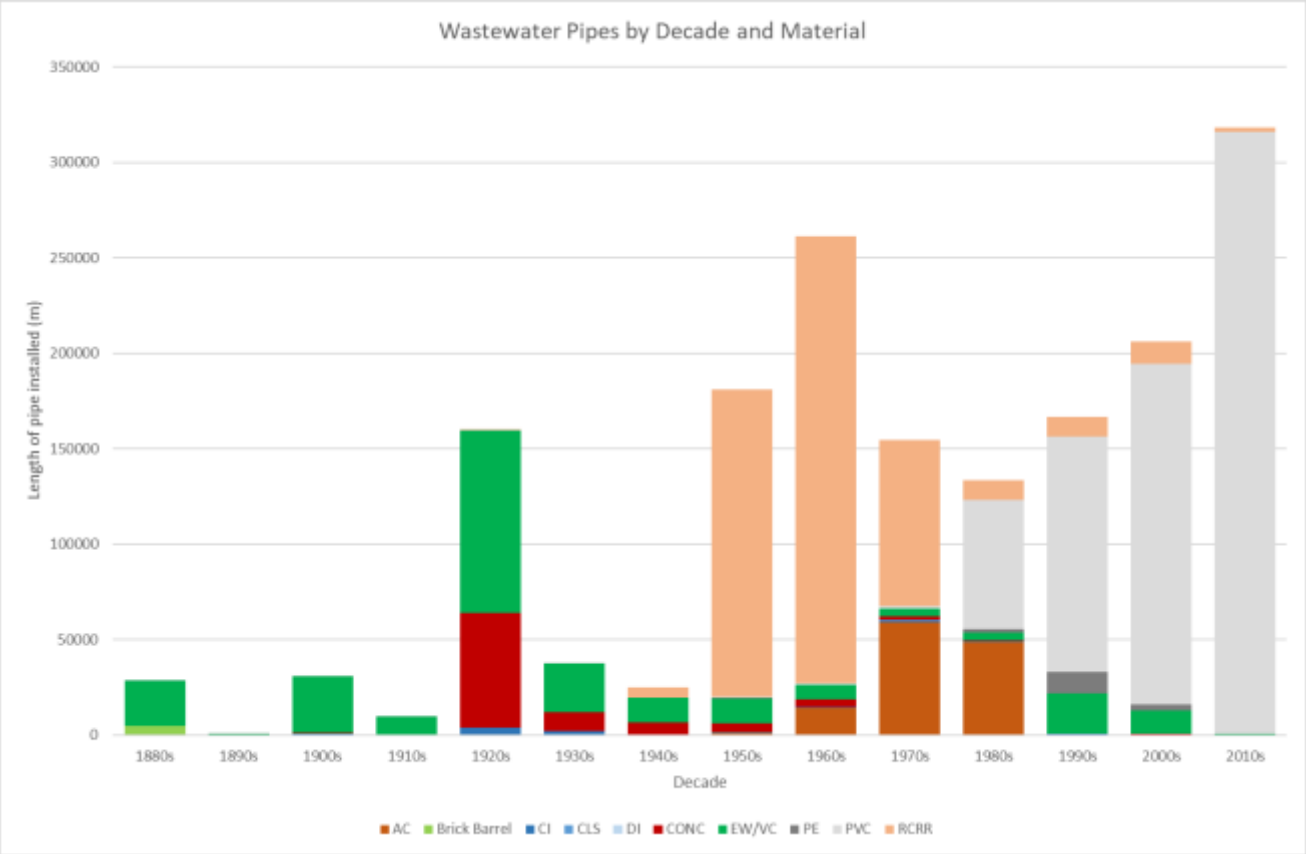


Figure 2-3: Pipe Installation Decades

The overall condition profile of the Council wastewater reticulation network is shown in Figure 2-4. This figure indicates a significantly improved condition profile compared to previous AMPs, due to the new condition grading process developed by using the AAIF assessment framework.

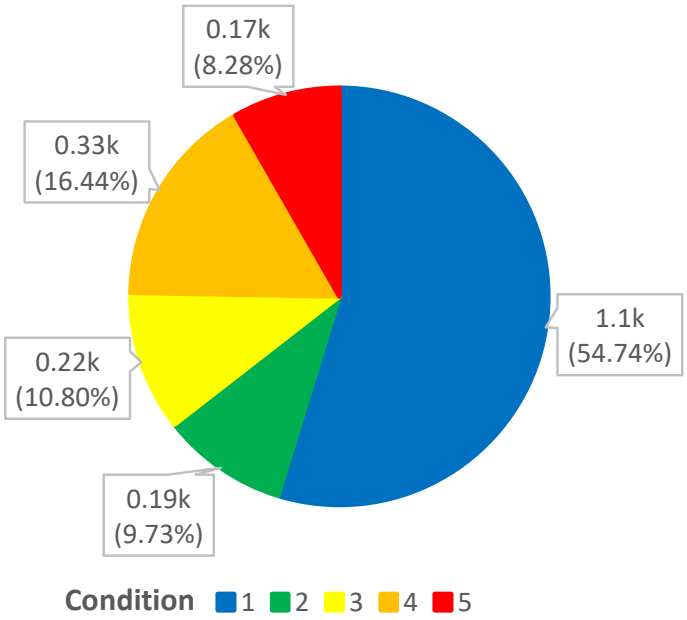


Figure 2-4: Wastewater Main Condition

CCTV inspections are targeted at pipes approaching the end of their lives. The proportion of condition grades based on CCTV evidence is 64% for condition 4 pipes, and 95% for condition 5 pipes. Continued proactive CCTV inspection is essential to maintain these levels of condition grade confidence.

Damage to wastewater pipes includes:

- Cracks and breaks from ground movement, including movement from construction, traffic or earthquakes.
- Corrosion of cementaceous pipes from hydrogen sulphide gas given off by wastewater.
- Changes in pipe levels when ground has liquefied or moved.
- General deterioration and loss of strength from age.
- Corrosion or abrasion of pipe interiors from discharge of harmful substances.

A higher proportion of earthquake damage was to the older, more brittle pipes. However, newer pipes also suffered damage. Earthquake recovery budget limits mean that some of this legacy earthquake damage remains. RCRR pipes make up a large proportion of the remaining poor condition pipes, both due to their brittle nature and the corrosive effects of sewer gases. This is shown in the breakdown of the condition 5 pipes shown in Figure 2-5.

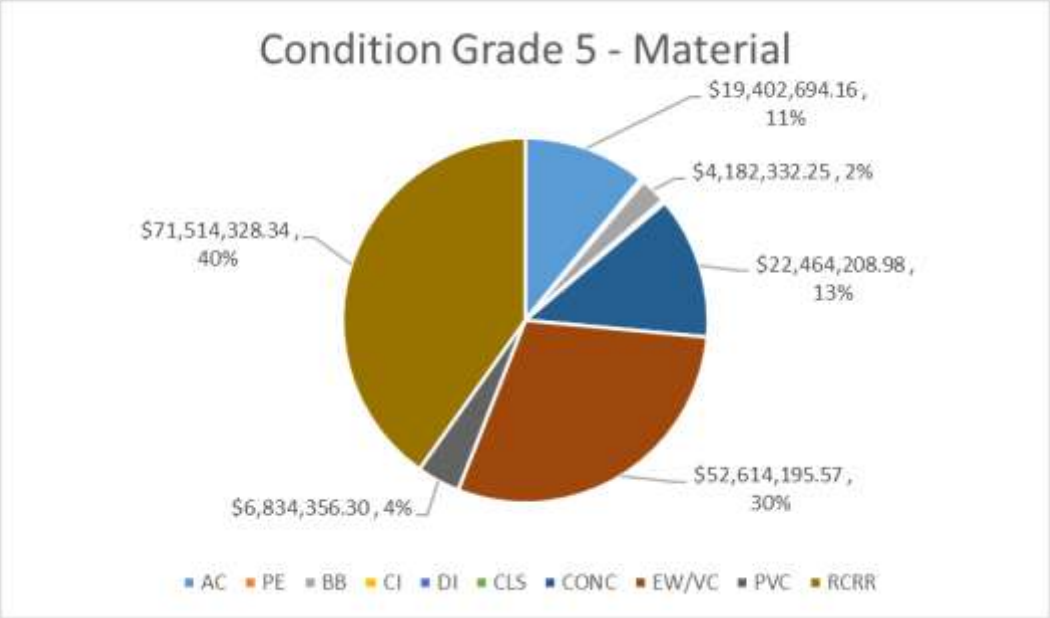


Figure 2-5: Breakdown of the condition 5 pipes by material (2020 dollar values)

Figure 2-6 on the next page shows condition grades over the Christchurch wastewater supply network by location.

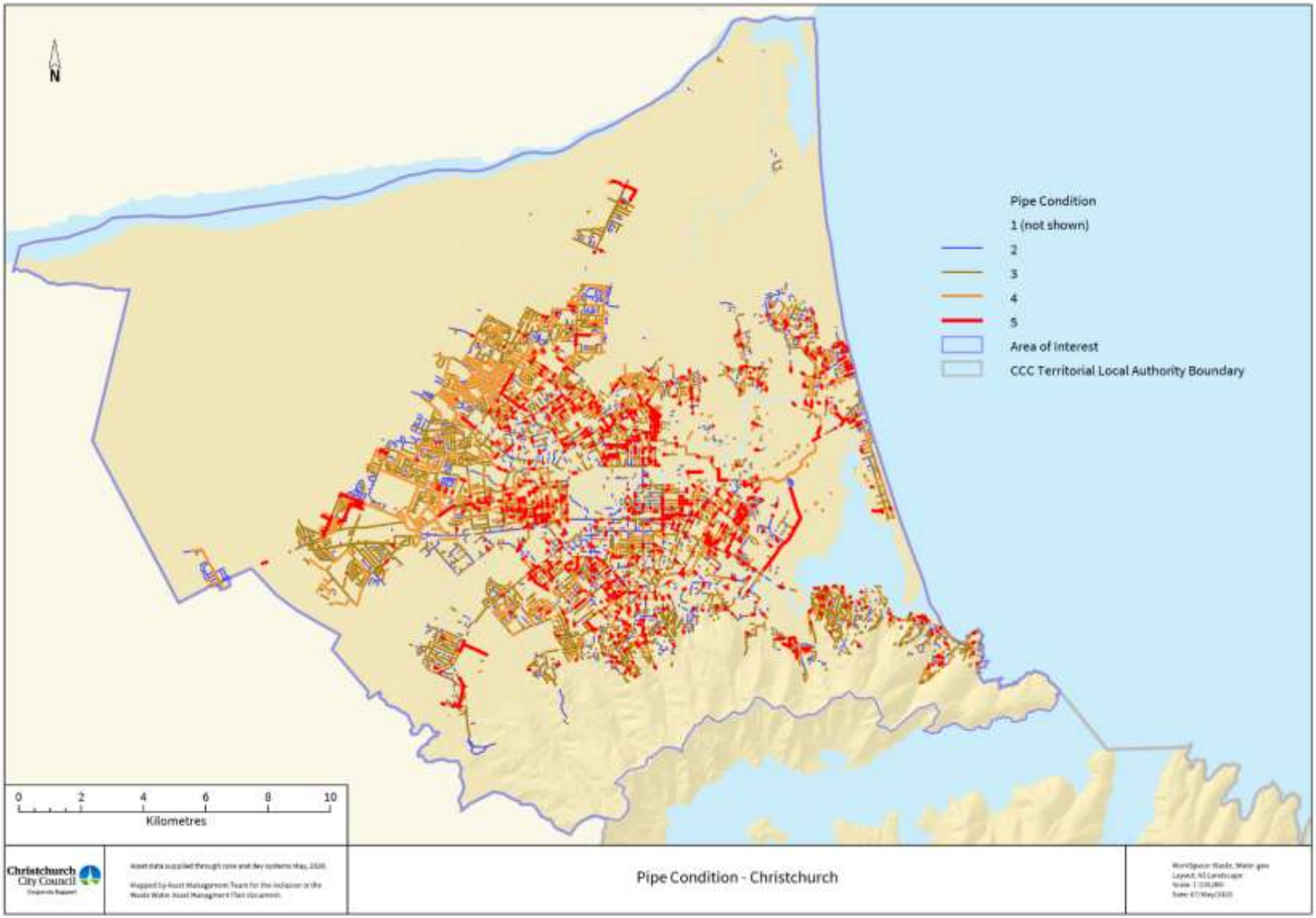


Figure 2-6: Wastewater Pipe Condition Map

2.4.2 Stations Age and Condition

At a portfolio level, the condition data held in the database for station assets is poor compared to reticulation assets. The high-level condition assessments rely on asset age as a proxy for condition.

Asset condition is measured on a 1-5 scale.

Figure 2-7 below shows the condition grading profile of the station assets by replacement value (from the 2021 LTP).

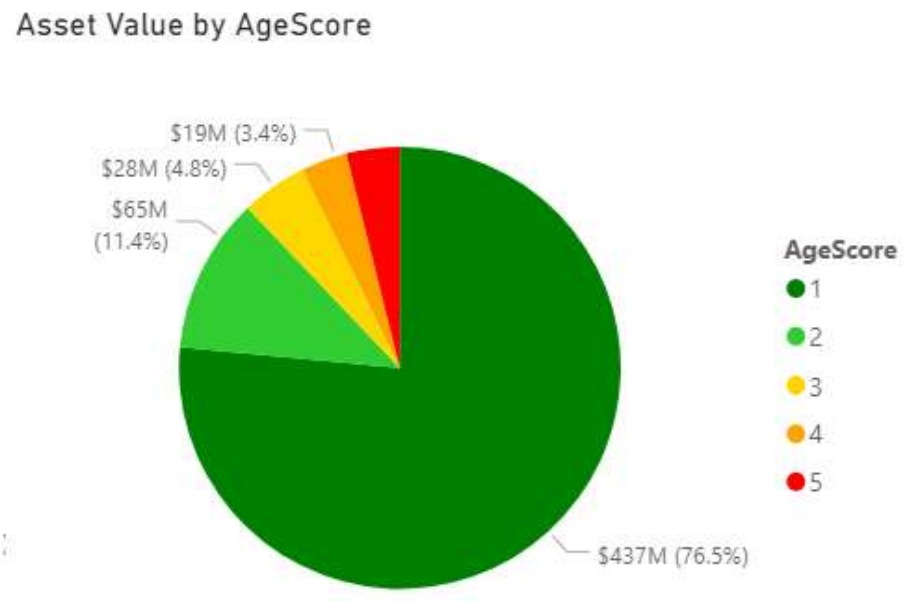


Figure 2-7: Station asset condition by value

8% of the total station asset value have a condition grade of 4 or 5.

Figure 2-8 below show which categories make up the worst assets i.e. where the condition score is 4 or 5. The first graph shows the split by number of assets and the second graph in Figure 2-9 shows the split by replacement value.

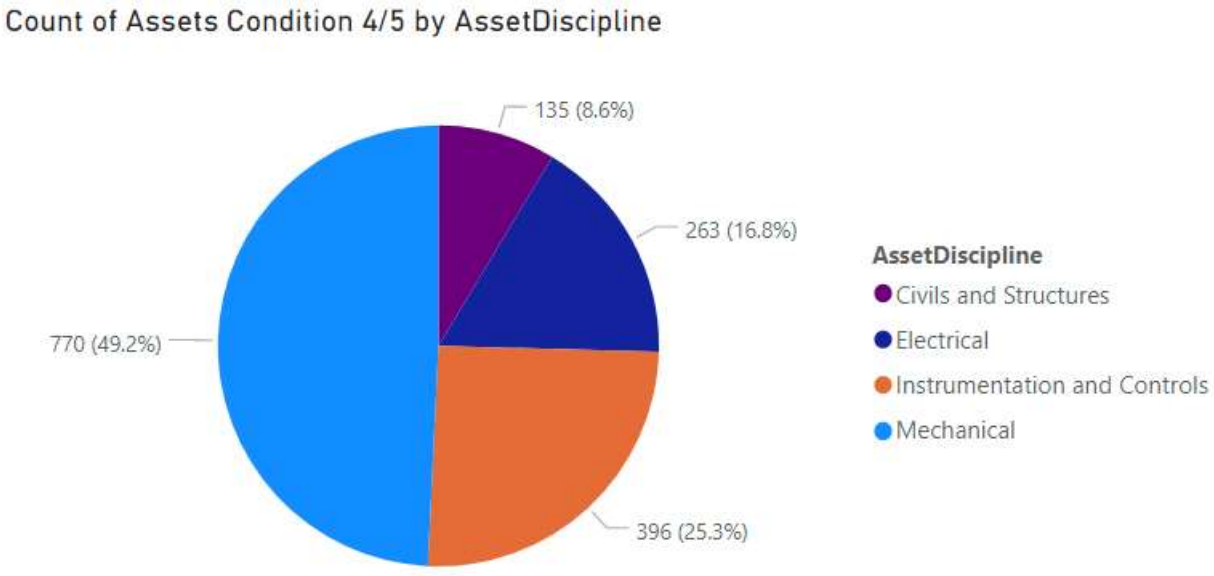


Figure 2-8: Types of assets in poor or very poor condition (by number)

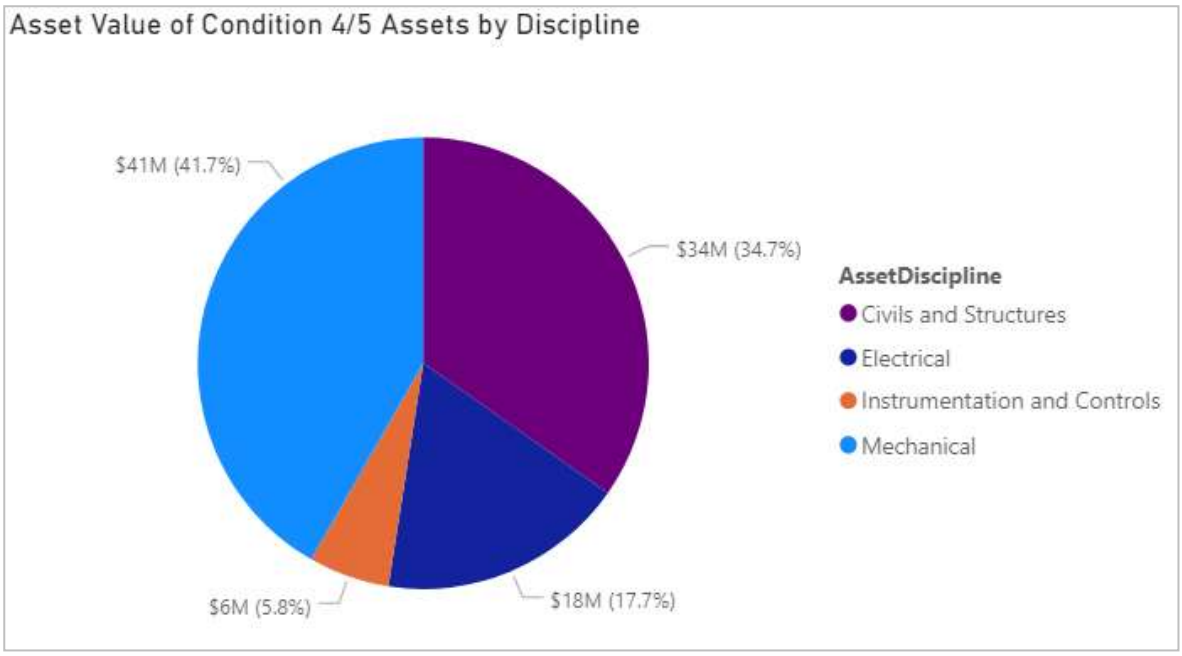


Figure 2-9: Types of assets in poor or very poor condition (by value)

The worst category is mechanical assets that represent approximately half of the poor condition assets. There are a small number of civil and structures assets that are relatively expensive to replace. 7% of the poor condition assets represent 28% of the value.

The poor condition IAC assets are relatively inexpensive to replace. IAC makes up 21% of these poor condition assets but just 6% of the value.

To increase confidence in this age-based condition profiling, future condition assessment effort should be focussed on civil and structures assets, then mechanical, electrical and IAC in that order.

Despite current data limitations, the condition profiles shown above agree with operation and maintenance observations:

- The SCADA system has a backlog of assets that are obsolete and beginning to fail. Some of these assets are running on spares gifted from other councils. This SCADA system underpins the wastewater collection activity.
- Mechanical assets at terminal stations are old, have been overhauled several times and require reactive repair and renewal. These are high value assets where renewal includes a long lead-in time for design and construction. Funding provision and condition assessment is needed in the short term as several sites are likely to require significant renewal in the next 10 years. Priority intervention is needed at pumping stations PS0001 and PS0015.
- Initial assessments of “bunker style” stations found that internal pipework and concrete well structures are in very poor condition and need intervention. Priority intervention is needed at pumping stations PS0057 and PS0034.
- Some pumping stations are degrading rapidly due to hydrogen sulphide gas (H2S). A new H2S monitoring programme is proposed in this AMP so that the right interventions are made.

2.5 Critical Assets

Consequences of failure, often also referred to as criticality, grades the importance of individual assets to the delivery of the service.

Critical assets are those whose failure would likely result in a significant disruption in service and financial, environment and/or social cost, and therefore warrant a higher level of asset management.

Within three waters we do not call this criticality as national data standards limit criticality only to the consequences of failure on service delivery to customers while with consequences of failure we are looking at include financial, environmental, cultural, heritage, damage to other infrastructure, health and safety and reputational outcomes as well.

In general assets with high consequences of failure receive a higher level of asset management and more proactive interventions compared to other assets.

The criteria used for assessing consequences of failure for wastewater assets are defined in the 3 Waters Lifecycle Management Manual. Consequence of failure assessments have been completed for reticulation assets but criteria are still being developed for station and treatment assets. In the interim a basic criticality concept has been applied for station assets where all assets at the station location are given the same criticality score based on the total flow provided by that station.

2.5.1 Reticulation Assets Consequence of Failure

The overall consequence of failure is a weighted average of the score from several consequence of failure categories. The consequence of failure framework was developed as part of Council's Asset Assessment and Intervention Framework and is aligned with the organisational risk policy. The framework is covered in more detail in the 3 Waters Lifecycle Management Manual.

Some pipes have a unique consequence of failure due to being so old that they are archaeologically significant sites requiring special attention if exposed and renewed. Pipes falling into this category are typically the larger brick and rock constructed pipes.

Figure 2-10 shows the consequence of failure profile for wastewater reticulation.

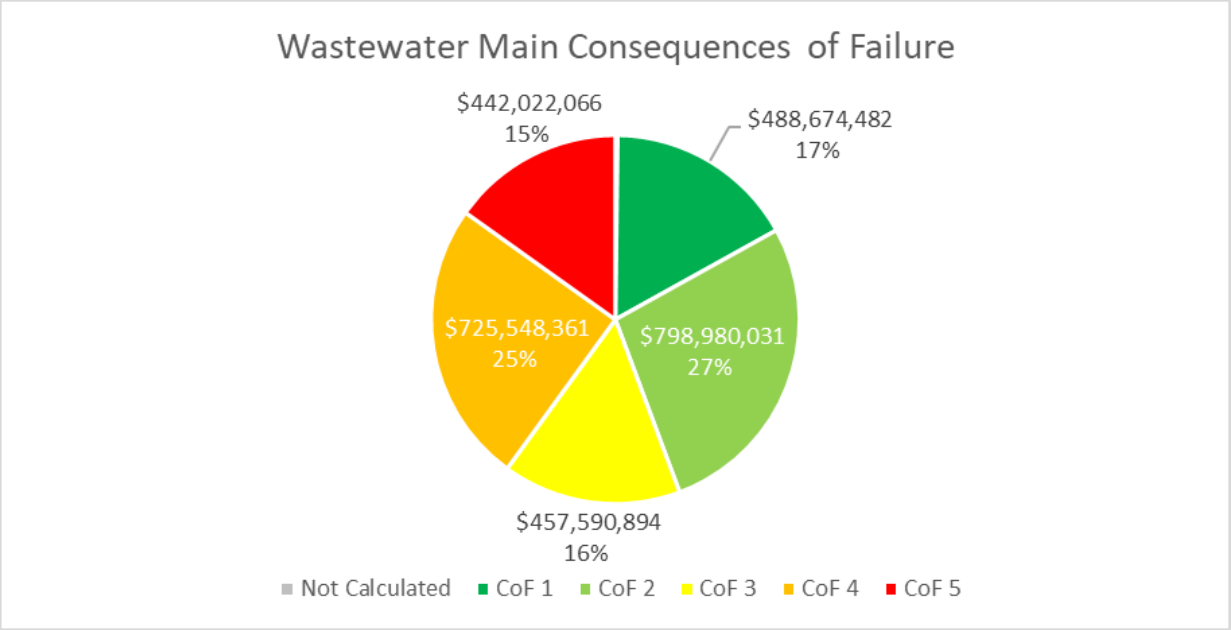


Figure 2-10: Consequence of failure profile for wastewater reticulation

Pipe consequence of failure grades are shown by location for Christchurch City in Figure 2-11.

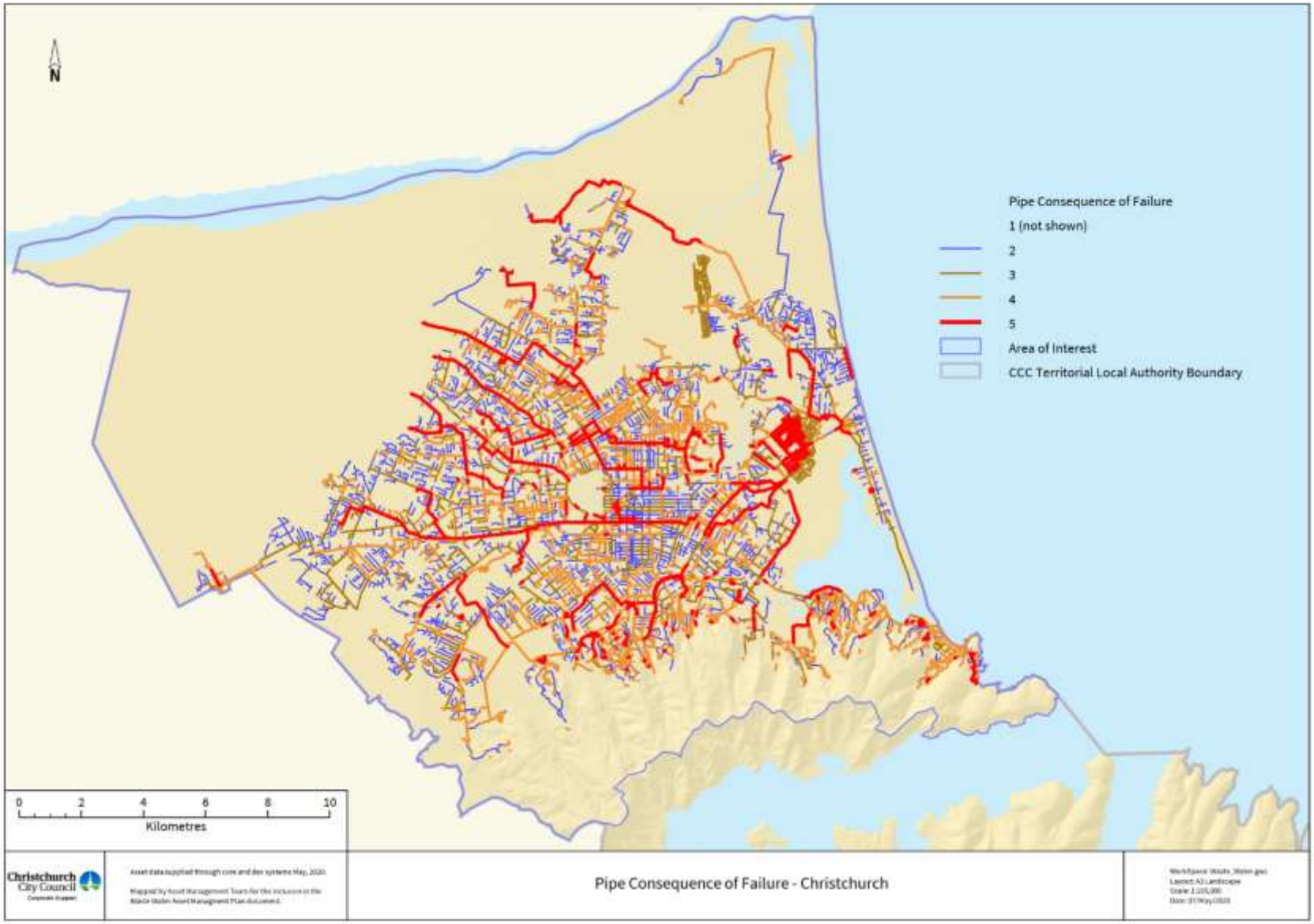


Figure 2-11: Pipe Consequence of Failure Map

2.5.2 Stations Criticality

Criticality criteria is still being developed for station assets. Current criticality criteria is based on the sum of electric motor power as shown in Table 2-5**Error! Reference source not found.** below.

Table 2-5: Stations Criticality criteria

Score	Size (kW)
1	Up to 5kW
2	Up to 22kW
3	Up to 60kW
4	Up to 150kW
5	Over 150kW

Additionally, stations with generators are criticality 5.

Smaller monitoring sites and lift stations are criticality 1. Lift stations have bypasses that mean flows are still contained within the network if the lift station is not working.

The criticality profile is shown in Figure 2-12**Error! Reference source not found.** which shows the distribution of criticality across the stations sites in the wastewater portfolio. Each site represents one pump station, or lift station or monitoring site etc.

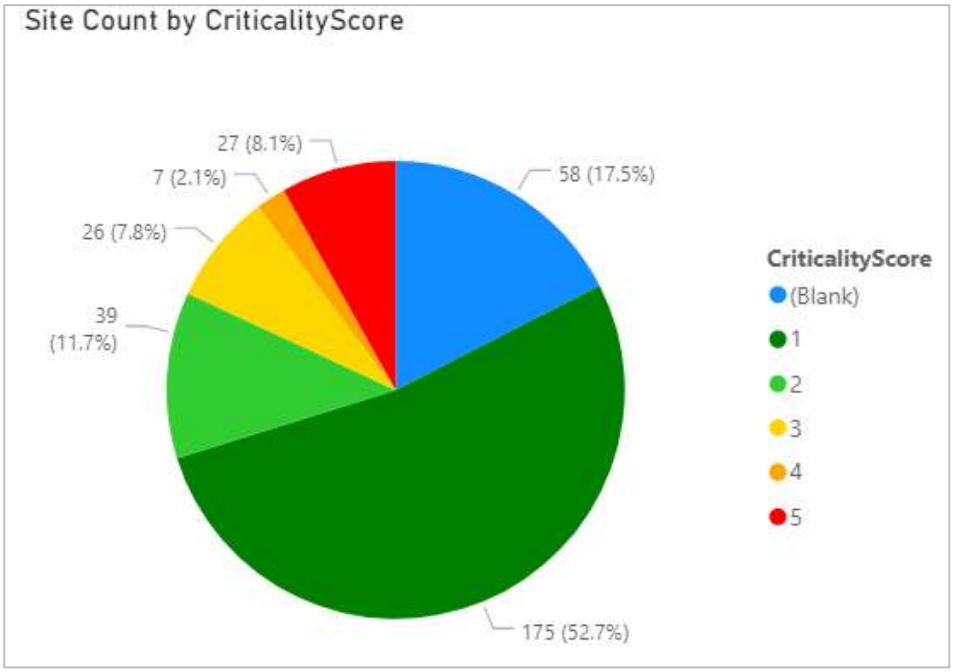


Figure 2-12: Station site criticality (by number)

10% of all wastewater station sites are criticality 4 or 5.

Looking at both condition and criticality at the same time shows that a large number of the poor condition assets have high criticality. Figure 2-13 below shows the criticality profile of those assets with a condition score of 4 or 5.

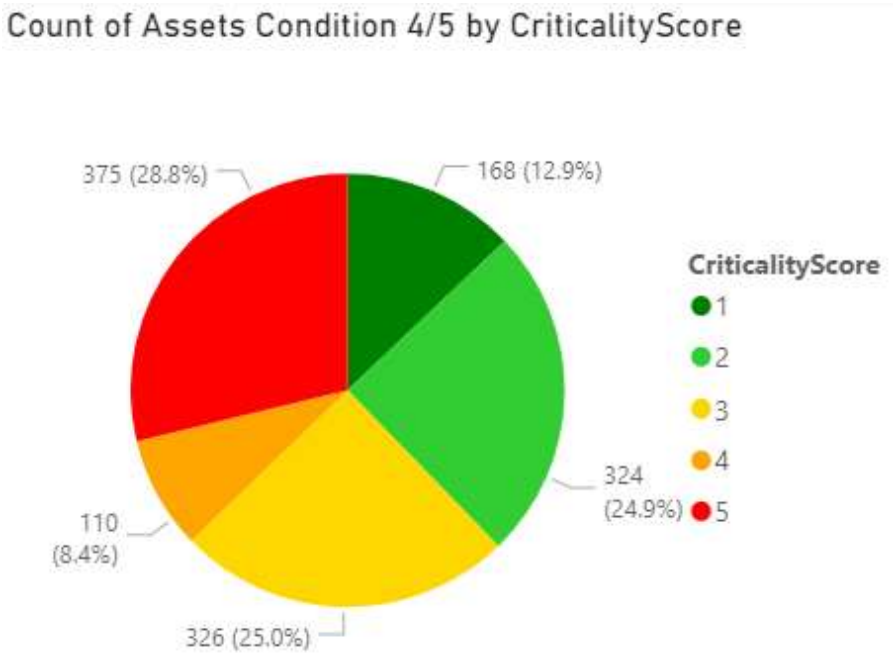


Figure 2-13: The criticality of poor and very poor condition station assets

The high risk, resulting from the high criticality of the poor condition assets, demonstrates the need to focus on increasing condition assessment and renewal of wastewater station assets across the portfolio.

2.6 Asset Data Improvements

The following improvements to data quality are included in the AM Improvement Plan in Section 4.

Improvement programme	**Asset inventory, condition assessment and failure data improvement programme**
Scope	Targeted data capture strategy for vertical assets to improve completeness and confidence of asset inventory, with a specific focus on treatment assets. Condition assessment of critical or high value assets for stations and treatment plants to inform renewal programmes. Condition assessment of pipes where evidence will help refine AAIF criteria for applying condition scores (CCTV records), including old brick barrel pipelines. Condition assessment of pressure mains. Asset failure and disposed asset post-mortem to understand failure mechanisms and verify condition grading. Improve maintenance activity and failure data capture to strengthen the connection between network performance and proactive renewal/maintenance strategy.
Issues addressed	Incomplete asset register, particularly for vertical assets with many treatment assets missing from the register or without installation dates. Poor information on the condition of vertical assets, which presents a risk particularly for critical or high value assets. Better valuation information for large vertical assets such as the Christchurch Wastewater Treatment Plant (CWTP). Condition assessment relies on ongoing CCTV inspection. Failure data and maintenance events are not always captured in a way that can be analysed across the portfolio to aid decision-making.
Benefits	Increased confidence in decision making around risk management, maintenance strategy, condition management, renewal intervention and financial management.

3 Managing Risk

3.1 Managing Risks

Council's approach to managing risk is detailed in its Risk Management Policy

3.1.1 Risk Management plan (risk framework)

Risk management is inherent in all of Council's asset management processes. Significant risk management strategies for this activity include:

Asset Design

Significant effort has been applied to updating design and construction standards for infrastructure to become more resilient to earthquakes, specifically targeting: flexible materials, jointing systems, foundation designs, structural interfaces and alternative sewerage systems.

Design requirements are set out in Council's Infrastructure Design Standards (IDS). This includes:

- Approved materials, jointing systems and design solutions to provide resilient earthquake performance
- Duty/standby pumping for redundancy
- Storage requirements

Where necessary, new infrastructure installed since the 2010/2011 Canterbury earthquakes is made of modern materials to the latest design standards and therefore has greater resilience to future earthquake damage and potentially other disruptions.

Insurance

Insurance is a risk transfer strategy to mitigate financial risks associated with disruptors. Council's approach is to attract and consolidate a balanced insurer panel and secure the maximum amount of insurance possible for the best possible price.

Business Continuity and Emergency Response Planning

The business continuity plans for wastewater are located within the Three Waters and Waste Business Continuity Plan. An index of the individual plans is shown below:

- CWW-WW-051: Process Failure at a WW Treatment Plant
- CWW-WW-052: Rupture of Large Gravity Main
- CWW-WW-053: Rupture of Sewer Pressure Main
- CWW-WW-054: Failure of WW Terminal Pump Station
- CWW-WW-055: Failure of other WW Pump Station
- CWW-WW-056: Biological, Toxic or Explosive Substance released into the Sewage Network
- CWW-WW-057: Death or major harm incident in the operations area (all activities). Workplace accident or incident
- CWW-WW-058: Failure to repeatedly meet Resource Consent discharge parameters
- CWW-WW-059: Other natural event incidents excluding earthquake and tsunami (3 waters)
- CWW-WW-060: Contractor is terminated for insolvency or poor performance

3.2 Critical Risk Identification and Management

3.2.1 Climate Change Impacts

Key climate risks for the Wastewater Collection, Treatment and Disposal activity includes:

- Sea Level Rise Related
    - Some coastal wastewater assets may be at risk
    - Limitations in asset life due to corrosion from saltwater

- Rainfall and Flooding Related
    - Increased inflow and infiltration due to more frequent storm events that could increase overflow frequency
    - Higher groundwater levels leads to increased infiltration that could increase overflow frequency

- Heat, Drought, Fire Related
    - Increased odours in wastewater network because of higher temperatures and microbial activity

- Other
    - Increase in overflow events resulting in untreated wastewater flows to the environment have potential public health and environmental health impacts
    - Potential untreated overflow discharges into the ocean could cause beach closures or deterioration of water quality of receiving waters, impacting the mauri of the water for Māori and opportunities to practice mahinga kai

Options being considering to reduce the risks to the Wastewater Collection, Treatment and Disposal activity and the community posed by those climate risks include:

- Request (in terms of the Water Supply and Wastewater Bylaw 2022) the inspection and repair of sewer drains on private properties to avoid rainwater or groundwater from entering the wastewater system
- Provide educational resources and messaging relating to wastewater use best practices such as not flushing wet wipes and separation of fats and oils
- Undertake a programme to identify and eliminate tree planting over pipes to avoid damage that leads to groundwater infiltration
- Reduce stormwater and potentially seawater inflow and infiltration through continuance of renewals programme
- Fund the implementation of projects identified to reduce the frequency of wastewater overflows
- Explore options for increased resilience of the wastewater system against climate change impacts and fluctuating operational statuses.

Key sources of greenhouse gas emissions from this activity includes:

- Processes and activities associated with wastewater treatment, including:
    - Primary, secondary, and tertiary treatment within the treatment process – biological processes (~47% of total CWTP plant emissions)
    - Treated effluent discharged to ponds and to the marine environment (~49% of total CWTP plant emissions)
    - Biogas and biosolids production and disposal (~4% of total CWTP plant emissions)
- Energy consumption in the form of electricity used for wastewater pumping, aeration, heating, etc
- Travel associated with operations and maintenance activities

Untreated wastewater overflows into the environment during high rainfall events (potential to increase with climate change)

Wastewater Collection, Treatment and Disposal have indicated that the following actions to reduce greenhouse gas emissions could be undertaken:

Operational/embedded greenhouse gas emissions

- Develop a monitoring plan and monitor emissions from the wastewater treatment plant at Bromley.

- Consider and implement alternative treatment configurations which have lesser greenhouse gas emissions.
- Develop a greenhouse gas emissions baseline for the wastewater service operations and maintenance function.
- Explore renewable energy options such as solar power generation.
- Consider ways to reduce our carbon footprint through changes in design, material choice and construction of new assets without compromising service quality, reliability and resilience.

Greenhouse gas emissions by users of Wastewater Collection, Treatment and Disposal activity

- Don't flush wet wipes, sanitary products, rags, fats and oils, or other items which may cause blockages and increase operational interventions.
- Regularly inspect and repair sewer drains to avoid inflow and infiltration which leads to wastewater overflows.
- Follow-up on required inspections of septic tanks to ensure systems are fit for purpose and not discharging untreated flows to the environment.
- Adopt water efficient appliances.

3.2.2 Asset Risks

The three waters unit has identified and recorded risks at a more detailed level. These high-risk issues from Promapp fall into the following strategic themes for wastewater:

- Risk of consent breach (pollution/odour) due to capacity constraints at the Christchurch Wastewater Treatment Plant (following trickling filter fires)
- Major/critical infrastructure fails
- The wastewater operation harms staff, public or the environment
- The assets are planned and managed poorly, resulting in high costs or poor service outcomes due to outdated asset management practices and poor data quality
- Our staff are not able to deliver our project, operational, and improvement commitments.
- Not able to reach wastewater overflow targets (exacerbated by climate change)

A detailed risk register with treatments is included in Appendix 5.2.

4 Continuous Improvement

4.1 Overview of the Improvement Programme

Council has made a strong commitment to improvement of asset management practices and seeks to further improve the approach. Council acknowledges the need to focus efforts to further asset management practices over the next 2-3 years to an appropriate level of capability.

4.2 Current Asset Management Maturity

Historical Assessments

Historically, Council has carried out full independent Asset Management Maturity Assessments (AMMA) usually once every 3 years, most recently being October 2020, with an abridged assessment undertaken in September 2023. Additionally, 3 Waters carried out benchmarking against the Water Services Association Australia (WSAA) using the Asset Management Customer Value (AMCV) project in both 2008 and 2016.

Historically, baseline maturity assessment was predominantly achieved through onsite interviews, with a good cross-section of participants. Future maturity level was also set based on best appropriate practice and considering the agreed business drivers. Strength and opportunities for improvement area summarised alongside the results to acknowledge the baseline achievements.

The findings of the 2016 WSAA review closely paralleled the AMMA review with both acknowledging that:

- Council improved in the general "asset management" practices involved with Policy, Strategy, Risk, Asset Management Plan preparation, Service Delivery and Quality Management.
- There were on-going deficiencies with the storage and updating of asset data, and the use of the data for forecast planning for both operational and capital works spends and a lack of models to allow appropriate demand forecasting.

An independent assessment of current asset management practice was undertaken in October 2020. Asset Management Maturity Assessments (AMMA) are carried out once every 3 years.

The baseline maturity assessment was predominantly achieved through onsite interviews, with a good cross-section of participants. Future maturity level was also set based on best appropriate practice and considering the agreed business drivers. Strength and opportunities for improvement area summarised alongside the results to acknowledge the baseline achievements.

The October 2020 maturity assessment determined that the activity was defined as '**Intermediate or advanced level for most functions**'.

A summary of the 2020 assessment results for this activity is attached as Appendix 5-3. The maturity assessment shows that Council scored highest and lowest in the following areas:

Scores 85 - 90	Scores 65 - 80
AM Policy and Strategy Levels of Service Forecasting Demand Managing Risk Operational Planning Capital Works Planning AM Leadership and Teams AM Plans AM Information Systems	Asset Performance/Condition Management Systems Service Delivery Mechanisms Asset Register Data Decision Making Financial Planning Audit and Improvement

Figure 4-1 below shows Council's asset management maturity mapped against historical and target scores for water supply.

Figure 4-1**: Asset Management Maturity Assessment for Wastewater**

The 3-waters Head of Department determined that the WSAA benchmarking exercise that was scheduled to be carried out in 2020 was not required to be done.

Current Assessment

As stated above, a review of current asset management practices are usually carried out once every 3 years, however an abridged assessment was undertaken in September 2023. This assessment focussed on a core selection of the topics normally covered by a AMMA review. These topics included:

1. Asset Condition and Performance
2. Asset Financial Planning & Management
3. Asset Data & Information
4. Asset Management Information & Systems
5. Asset Management Process Management
6. Outsourcing and Procurement
7. Continuous Improvement

The latest review found the 3 Waters Asset Management Maturity was rated at a Core/Intermediate level for the essential asset management functions. This is lower than the previous assessment and confirms that the deficiencies found in the previous assessments are still present. Following the findings of the 2023 review and some negative media coverage, the Elected Leadership Team has stated that there shall be an emphasis on increasing asset management maturity within Council.

4.3 Review of Progress against Previous Plan

- The last improvement plan was developed as part of the 2021 AMP update. The indicative term of the improvement programme was three years. No OPEX funding requested by the 3 Waters Asset Management team for carrying out the land drainage improvement items within the 2021 AMP were approved. Therefore, all of the items have been carried through into Table 4-2 within Section 4.5 – Improvement Plan 2024 below.

4.4 Improvement Plan 2024

The independent asset management maturity assessment process provides a sound basis for prioritising and monitoring improvements to current asset management practices. This will put in place the programme for 2024 through to 2026.

Table 4-2 details those tasks that have been proposed that could be undertaken over the next three years to improve the level of Asset Management maturity as a response to the latest AMMA report that reconfirms the findings of the previous AMMA reviews. These tasks have focus specifically on those areas where the risk is most critical and are explained in greater detail in Appendix 5.4. To facilitate the practical implementation of the improvement programme tasks have been designed to address several issues concurrently and be programmed to ensure a logical progression towards an improved asset management maturity 3–year target.

The Improvement programme assumes that suitable funding and resourcing will be provided by the organisation to enable the improvements items to be carried out. Once the level of funding for three waters is confirmed, a programme road map document can be produced which outlines tasks, timelines, hold points, interdependencies between tasks, resource constraints (either inter or intra unit) and completion dates.

Table 4-1: Asset Management Improvement Tasks

Task ID	Project / Task	AM Maturity Gaps	Priority (H, M, L)	Responsibility	Resources (teams, $)	Timeframe
WW-01	Asset inventory, condition assessment and failure data improvement programme	Data, lifecycle asset management	H	Asset management	Up to $1M / yr	Intensive 2 years, then ongoing
WW-02	Financial tracking, forecast and relationships improvement programme	Data, lifecycle asset management, financial	H	Asset management	$200k / yr	12 months
WW-03	Demand management improvement programme	Demand, data	M	Planning	$100k / yr	4 years
WW-04	Integrated master planning improvement programme	Demand, lifecycle asset management	M	Planning	$100k / yr	12 - 24 months
WW-05	Climate change response improvement programme	Risk and resilience	M	Planning	$100k / yr	12 months
WW-06	Level of service and customer engagement improvement programme	Levels of service, financial	L	Service delivery	Combine with water supply activity	Ongoing

4.5 Monitoring and review

The Asset Management Improvement Programme (AMIP) will be reported to the Strategic Asset Management Team (SAM). All improvement items and the improvement programme will be monitored by the SAM team and reported to the Executive Leadership Team as required. At this time, it is difficult to understand how the AMIP will be able to be carried out by the business given the lack of additional investment over the current amounts that have been insufficient to previously carry out any improvement items.

5 Appendices (Supporting information)

5.1 Asset Management Objectives

Principle	Objective
1. Asset management outcomes align with the strategic direction of Council	1. Linkages between Council's strategic direction and asset management outcomes are clear and understood
	2. All asset based services are linked to the attainment of Community outcomes
	3. A whole of life approach is taken for all asset management initiatives
	4. Asset management planning outputs provide the options and financial forecasts for the first draft of the Long-Term Plan (LTP)
	5. Investment in Infrastructure is optimised across all asset types
	6. Opportunities to increase resilience are considered in all asset management planning
2. Asset management is an organisational wide practice	1. The Strategic Asset Management Team (SAM) provides leadership of asset management practice at Council
	2. Asset management is co-ordinated across the organisation
	3. Core asset management processes are consistent across Council
	4. Asset management practice is compliant and appropriate
	5. Asset Management Teams across all lines of the business are motivated and driven by customer needs
	6. There is an organisational culture of continuous improvement in asset management
3. Decisions about assets are based on well managed, quality information	1. Asset data is available in corporate system for use in all decision making related to Council assets
	2. The performance and condition of assets is monitored and reported
	3. Decision making by asset owners and managers is outcome based and based on reliable asset information
	4. Supporting asset information is readily accessible
	5. Asset data is up to date
	6. Asset management decisions by asset owners and managers are based on evaluation of all viable options to deliver levels of service outcomes
4. Asset management maturity levels are appropriate to the assets, services and risks we manage	1. Identified asset management maturity gaps close over time
	2. The asset management capability of staff resources matches the needs of the organisation
	3. The organisation recognises the importance of AM and adequately resources the AM system
	4. Appropriate levels of asset management maturity are defined and reviewed as business needs change

	5. The level of AM practice is matched to the criticality of the assets
	6. Christchurch City Council gains recognition for its evolving AM practice
5. Asset management plans (AMPs) are living documents	1. AMPs are easy to follow
	2. AMPs are complete and at the agreed level of maturity
	3. AMPs reflect the current level of asset management practice for the asset type
	4. The asset management improvement programme in the plan, contains all actions necessary to close the existing maturity gaps
	5. AMPs contain the 30-year financial forecasts; suitable to develop the first draft of the Long Term Plan and the Infrastructure Strategy
	6. Life cycle strategies are articulated within the asset management plan

5.2 Risk Register

Risk Register (only the High and Very High rated risks are included here, refer to ProMapp for full register of risks)			
ID	**Risk Description**	**Residual Rating**	**Control Description**
R00727	The Oxidation Ponds were subject to significantly loading of both potentially toxic and organic loading following the fire and loss of the trickling filters on the 1st November 2021. The medium to long term impacts are still unknown.	Very High	Weekly monitoring of oxidation pond performance and response planning / instructions by Process Engineer, issued by Team Leader Shift Engineers. Complete a sludge survey of all 6 Oxidation Ponds to determine the level of sludge loading, to understand potential work required.
R00741	Network Operations are experiencing significantly increased outages for repair / replacement of faulty assets. Previous experience for turnaround was days to weeks, is now months to quarterly. As documented in Network Operations database for asset status.	Very High	Review critical spares inventory, including electrical critical spares. Support and encourage, by continuing to report of assess availability on a monthly basis, a transition from reactive maintenance to a proactive approach from both capital delivery and planning, (mix of proactive and predictive maintenance).
R00726	The new temporary secondary treatment process is operating at maximum capacity with no redundancy. Capacity will reduce (i.e. risk increases) in winter due to environmental factors on the biological treatment process. By-passing of settled sewage to the oxidation ponds is also occurring at times, as the maximum throughput of the temporary system is below the incoming flows to prevent overloading / failure of the secondary treatment process.	Very High	Daily monitoring of temporary secondary treatment performance and response planning. Instructions by Process Engineer, issued by Team Leader Shift Engineers. Provision of Process Documentation and Operational Information (i.e. set-points) for temporary secondary treatment process by Process Engineer and Training / Instruction / Competency Assessment of Shift Engineers by Team Leader Shift Engineers.
R00102	Context: The Council has an objective that it will provide Freshwater, Wastewater, Stormwater and Resource Recovery functions without environmental damage and ensuring Council service provision is in compliance with regulations (including the RMA). There is a risk that: Whilst managing Council utilities, pollution of the environment occurs from such events as: 1. Raw sewage escapes network. (People exposed to bacteria risk) 2. Wastewater treatment process failure. (People exposed to bacteria risk) 3. Water abstraction over consent limits. (Reduction in water availability) 4. Excessively contaminated stormwater. (Low water quality resulting in poor ecological and cultural health of waterways). 5. Excess noise. (Health and amenity impact on people). 6. Offensive or objectionable odour. (Health and amenity impact on people). Caused by: 1. Network capacity exceeded, or maintenance fails to maintain network capacity. 2. Operations and/or Maintenance failures in the wastewater treatment processes. 3. Water allocation not in line with operational requirements and/or water supply not	Very High	Monitor and record resource consent parameters. All CCC resource consents from ECAN database maintained in HPRM 12/163439. Key 3 waters activities have consent year planners in Excel see WW-008: Monitoring Resource Consent Compliance for details. Establish and maintain open and honest communications with stakeholders especially the regulator (ECAN). Currently undertaken through a quarterly compliance meeting with ECAN local zone manager and consent processing team leader. For the transport of sludge and or screenings we have response, communication and clean-up plan. MSDS's and appropriate HAZCHEM signage to be displayed. Trucks and bins to be properly maintained and checked for water tightness. Implement clean up and communication plan. Fill out spill report and provide to Contract Manager. Trade waste Bylaws in place to reduce likelihood of overloading wastewater treatment plant.

	operated in line with abstraction limits. 4. Insufficient/inadequate stormwater treatment facilities. 5. Excess contaminate loading on stormwater treatment facilities. 6. Constrained maintenance budgets, requiring prioritisation of response. 7. Inadequate or poorly operated odour control. Resulting in: 1. Loss of reputation. 2. Breach of consent and prosecution by regulator. 3. Reduction in ecosystem health. 4. Loss of amenity value. 5. Costly clean-up and/or legal issues. 6. High cost of maintenance.		Bromley WWTP Operated and Maintained in line with documented procedures. Monitor and record key plant process indicators on a regular basis. Training for staff is appropriate to operate and maintain plant Plant capacity reviewed every 4 years.
			Odour treatment facilities designed into WWTP and pump stations as required. CCL to ensure plant maintained and operated according to Contractor plans.
			Reactive; but part of SOP. Investigate all odour complaints. Modify process where able to overcome problem. Open communication with affected stakeholders. Deploy masking sprays to neutralise odours.
			Develop load models for each plant and compare regularly against actual loads to determine needs for upgrades or process changes.
			Ocean Outfall diffusers are operated according to the management or contractors plan. Pump test to monitor outfall performance. Undertake reactive maintenance and repair.
			Manage facilities within the network (Tim) and treatment plants (Adam) so noise standards are not breached. Network 1. In the network CCL to investigate, recommend appropriate remedial actions and ensure plant maintained and operated according to Contractor plans. 2. Facilities designed to meet district plan requirements. 3. Management of network station noise complaints and reports. Network operations will endeavour to investigate any reported noise complaints and rectify issue as they are presented. Treatment 1. In the treatment plants either CCC or CCL to investigate, recommend appropriate remedial actions and ensure plant is maintained and operated according to plans. 2. Facilities designed to meet district plan requirements. 3. Management of treatment plant noise complaints and reports. CCC or CCL will endeavour to investigate any reported noise complaints and rectify issue as they are presented.
			CCC to conduct sewer trunk modelling to identify catchment wide overflows and formulate capacity upgrades to overcome to meet agreed terms and conditions of water resource consent for wet weather overflows.
			Reduce I&I through infrastructure rebuild/renewals.
			Contractor to perform performance tests on wastewater pumps as required in agreed contractors plan.

			Minimise discharge of toxic substance in the network. 1. Mapping of high risk H2S generation areas and logging of H2S in the network. 2. Back pressure monitoring in the odour fan. 3. Investigate alternate odour control technology and apply correct technology for individual situations.
			Strategy to improve the prioritisation of maintenance and repair strategies used by contractors, and agree unit costs for reactive responses where appropriate.
			Execute the Sewer Overflow Response Plan and Wastewater Wet Weather Plan 17/833401.
			Odour mitigation developed to manage chronic odour associated with Council owned Resource Recovery facilities as required. Operational Contractors to ensure plant maintained and operated according to odour management best practice and approved odour management plans. Council to ensure mitigation processes effective in meeting any potential breach of the Act.
R00730	The need to comply with increasing regulation and legislative reporting requirements over the past 5+ years, has necessitated a prioritisation of the Operation Team. This has resulted in a reallocation of staff resources from trades/vocational roles to professional / engineering roles, without increasing head-count or budget. This has significantly reduced the resilience and redundancy of operational delivery of service.	High	Periodic review of the Business Continuity Plan and collaboration with Head of Department, capturing in the quarterly Three Waters reporting.
R00732	Potential for increased number of midges arising from the ponds causing nuisance to the adjacent residents due to climate change extending the 'midge season' and the unknown effects of the trickling filter fire.	High	Implement the Midge Management Plan (18/1024967), including midge number monitoring, midge dredging and native vegetation planting etc.
R00733	The CWTP Oxidation Ponds are susceptible of seasonal outbreaks of avian botulism, which can be influenced by operational configurations and seasonal variation.	High	Implement Regional Parks Avian Botulism Response Operational Plan (12/196629) in collaboration with Parks Team (who lead the response, Three Waters generally covers expenses associated with response costs on Three Waters land).
R00734	The thermal sludge dryer process at the CWTP is degrading with extended use, with no formal assets management in place to manage or identified funding for refurbishment / replacement. Risk is predominantly around contractual obligations and financial.	High	Support the creation and Implementation of a condition survey and asset management plan for refurbishment or alternative plan for the thermal sludge dryers at the CWTP.
R00735	There is no available internal resourcing with the Operation Team to progress with the implementation and update existing documentation across the CWTP, Banks Peninsula Treatment Plants, Water Treatment and Network Control - without compromising routine operation and operational compliance reporting.	High	Consider the re-distribution of resources within Three Waters to support the delivery of operational and compliance documentation through a quarterly review process, driven from operations.
R00742	There is reduced resilience and redundancy due to an inability to train and qualify vocational staff for core delivery roles.	High	Work with HR and senior management to evaluate options to build in succession planning and support vocational training and cross-skilling.
R00743	The Duvauchelle Wastewater Treatment Plant is located at the base of an old quarry face. Frequent minor rock falls are a real risk to personnel and the assets.	High	Create, brief, and install the controls required in a Standard Operating Procedure for when and how to safely access and work on the Duvauchelle Wastewater Treatment Plant.

R00574	There is a risk that: Operational budgets will be overspent with an adverse impact on rates. Caused by: - reactive maintenance activities exceeding budget, due to differed renewals - Business being unable to accurately predict maintenance spend requirements - Working to a budget cap due to adverse rates impact - No additional budget being released due to unplanned (for) events. This may result in: - adverse/negative Levels of Service (LoS) impacts - major health, safety and wellbeing events (risk to life eg., recent road-markings death event); - increased asset recovery costs (from deferred maintenance) - Increased asset failure rates.	High	Monthly review of all operational expenditure (OPEX). Ensure all expenditure is reviewed prior to commitment. Review expenditure and revenue to date and ensure the best information available is submitted to CS business partner regularly to ensure appropriate changes are made for future AP/LTP bids.
R00518	There is a risk of: Council relying too heavily on outside consultants. Caused by: Council's (perceived) lack of ability to attract and retain staff with the level of expertise and experience, in the numbers required, across the City Services portfolios, given (amongst other things) a highly competitive technical recruitment marketplace. Resulting in: A consequential loss in internal knowledge, expertise and specialist skills development, a lack of ownership of issues and an inability to progress key initiatives in core functions.	High	Managers to proactively ensure PD's reflect role and job evaluations along with remuneration scale reflects responsibilities and markets. Staff structure regularly reviewed and reflects the needs of Council along with reflecting the changing environment. Succession plans in place for all critical and specialist roles where scarcity in the market or in house knowledge dictates a need.
R00555	Central Government may legislate to re-arrange the operations and management of either part or all of the 3 Waters into a larger independent organisation/s. There is a risk that the Christchurch City Council may not be suitably informed and prepared for any particular central government led change, including legislative change, and therefore is unable to best respond to the threats and opportunities this presents. This could be caused by: • The Havelock North inquiry recommendations; • Current research being undertaken by Central Government into overseas options; • Governments approach that one solution fits all; • Christchurch City Council being unaware of the preferred position of its community; and • Not understanding the potential change, impact, or opportunities that this may have on the organisation cost, structure, and access to expertise; This could result in: • Removing an element of self-governance; • Financial costs or benefits, due to the change in structure and spread of overheads; • Downsizing of the organisation; • Inability to fully integrate decisions on future infrastructure for Christchurch; • Organisational culture risks; • Reputational risk; • Increase or decrease in cost to CCC ratepayers; and • A misalignment between Council and its residents.	High	Appropriate involvement in the research and engagement being led by Crown, to stay current on process and ensure views are considered. This includes: • Proactively submit at all stages of the process • Keep fully informed by attending appropriate forums • Executive Sponsor role with framework established • Participate in regional water working groups • Studying overseas models to understand their strengths and weaknesses • Look for opportunities to discuss options/decision one on one with the decision makers and policy advisors Understanding the potential impact on CCC and wider Canterbury. This includes: • Undertake gap analysis of state of drinking water network compared with best practice; • Liaise with key partners including neighbouring authorities; • Coordinating an integrated approach across Council ensuring organisational alignment; and • Consult widely with the community in a proactive manner.

R00728	Compost from the Organics Processing Plant (OPP) is being used to enhance the paddocks around the Oxidation Ponds in preparation for native planting. This is part of the Midge Management Plan for the Oxidation Ponds.	High	Periodic monitoring of compost application, including weekly reporting, in collaboration with the contractor.
R00199	There is a risk that: Critical Infrastructure fails leading to network failure of core Council services. Caused by: - The current (poor) state of some areas of core infrastructure resulting from earthquake events - Earthquake damaged pipe not found previously, now surfaces - Earthquake repairs completed to a lower standard than desired/required - Renewal programme being further eroded - Renewal programme inadequate to meet identified/agreed need - Operations Budget constraints preventing repairs - Energy supply disruption, including major power outage or fuel supply - Mechanical failure of infrastructure, including wells, pipes, pumps. Resulting in: - Failure to deliver essential water and waste services - Increased risk to community safety - Wate Increased Opex or litigation costs - Failure r borne disease outbreak or unacceptable public health issues - Environmental and/or property damage - Significant costs of clean-up operations and restoration work - Negative economic impact - Reputational damage for Council - to provide waste water collection in a safe and efficient manner to meet ratepayer expectations and/or Levels of Service (LoS) - Unbudgeted reactive expenditure - Need for premature pipe replacement.	High	Incorporate in the future renewals programme significant known earthquake damage that has not been covered by the existing cost share agreement. Negotiating the transfer of the defects liability from SCIRT repairs to CCC at an agreed risk cost. Contractors and staff in the field actively managing and monitoring operations of the network assets with Robust response plans in place for potential events, including remote and physical onsite control as required. Develop an Improvement Plan derived from our participation in the WSAA International Asset Management Benchmarking project to optimise renewals decisions across 3 waters. (End of June 2017). Reviewing renewals programme on an on-going basis. Delivering of the capital programme. Utilizing bring backs from future LTP years if necessary to replenish reactive budgets that have been depleted. Proactive monitoring of any failure in core services so that CCC can identify at risk assets and notify asset renewal team for potential inclusion into renewal programme. CCL to provide pipe samples and failure/condition codes from failures. BCP for water, wastewater, storm water and solid waste. Ensure that Asset Management Plans are up to date and renewal programmes are based on the best available data and information so that work is prioritised to the most critical assets. Reservoirs and portable generators to address long term power outages.
R00011	There is a risk that: A member of staff or contractor, or a member of the public or other individual/group, causes damage to the water or wastewater network through either accidental or deliberate action. Caused by: - A contractor causes damage by working on council assets without the appropriate authority, does not follow agreed plan, or incorrectly tags and locks out equipment, or does not identify council services when working around them - An individual or group damage or remove infrastructure by vandalism or theft - Security features are breached and specific assets or asset targeted in a planned action. Resulting in: - Disruption to service, small or large - Contaminated water supply causing illness or (potential) death - Repairs, replacement or cleaning of infrastructure being required - Rivers or aquifers being polluted.	High	Permit to work and Permit to Enter systems in place and used for contractor work on council assets. CSS, Water Supply Installer and Authorised Drain layer specs followed by qualified contractors and planned shutoffs controlled by council. Registers of installers and drain layers kept up to date. Council retains the right to prosecute for unauthorised interference and this acts as a deterrent. Assets shown clearly on GIS and valves painted as per specs to show normal position, open or shut with critical valves tagged also. New houses to have water connection checks prior to sign off, and Rural Restricted supplies to be checked periodically. Facilities and hatches to be left locked at all times except when lawfully in use. Respond to reports of suspicious activity at facilities. Follow the Response to Water Supply Contamination and Overflow procedures.

5.3 Asset Management Maturity Assessment 2020: Summary

Table 5-1 Extract from 2020 Asset Management Maturity Assessment

Section	Current/ Target		Reason for scores 2020	Improvement actions planned or underway
AM Policy and Strategy	85	95	Corporate AM Policy and Strategic AM Plan in place, provides key principles, objectives, corporate AM improvement path, framework for AM planning. Strategic context analysis is thorough and documented in Water Strategy, IS, AMP and Activity Plan. Strategic priorities are well embedded with good alignment through to AMP and Activity Plans.	Advancing asset management programme. Continue to build strategic alignment into AMP programmes. Update AM Policy and Objectives.
Levels of Service	85	90	The levels of service and performance framework is aligned to strategic objectives and customer expectations and well measured, reported, and benchmarked. There is a general understanding of customer and stakeholder needs, and there is engagement with Council over level of service and cost trade-offs. There is reliance on the community satisfaction survey and LTP/IS consultation as the means of customer engagement. It has been many years since there was wider community engagement over levels of service and willingness to pay. The ability to link key levels of service and cost is strengthening as modelling (both capacity and condition) progresses. There are some improvements needed to operational performance measures, but that aspect is covered under 'operational planning'.	Re-engage with community around level of service options (beyond 'document submissions' processes). Advancement of network models and AAIF will support ongoing improvements in level of service and cost discussions.

Section	Current/ Target		Reason for scores 2020	Improvement actions planned or underway
Forecasting Demand	85	95	Wastewater model recently updated and calibrated following a 4 months flow monitoring programme. Re-running wastewater optimisation process to identify wastewater constraints and optimisation software to evaluate solutions to achieve outcomes (environmental, cultural, etc), last done in 2016/17. A reduction in Inflow and infiltration, in combination with buffering, are the main demand management techniques to maximise value from the existing treatment facilities and delay growth expenditure.	Ongoing improvements to network modelling and supporting information.
Asset Register Data	80	95	There is a robust core dataset for reticulation assets, with data quality improvements for reticulation recently being driven by AAIF. WW PS data capture has been trialled on a pilot dataset with an intention to roll this out across the network. Data quality dashboards are being established to be able to monitor data quality and easily identify remaining gaps. There is several years of lifecycle cost information captured in SAP (though only at facility level for pump stations). Data management processes are developed, but more work needs to be done to manage and enforce data quality coming into the organisation. Assignment of data owner/steward responsibilities has been a good step. Quality and timeliness of data for vested assets has improved.	Asset information improvements for non-reticulation data. Continue development of data quality monitoring/data improvements through data quality dashboards (e.g. laterals update). Review/audit processes for incoming data streams and implement improvements.
Asset Performance /Condition	75	90	A significant condition information base was inherited for SCIRT (over half pipes CCTV assessed) though this information value is decreasing without progressing an ongoing CCTV programme (beyond reactive inspections). Budget pressure on the CCTV programme and modelling may reduce the reliability of information over time. Performance of the network is monitored (actual data) and modelled (models are well validated). Condition of stations and treatment plants has not been assessed, but performance is known. Council is in the process of implementing alternative communication and control technologies to provide improved accuracy in planning and responding to changes in demand. There is a well-established history of reactive maintenance performance and cost and an improved process for transferring performance, works and cost data from contractor data Council systems. Dashboards have been developed to support performance monitoring, including contract KPIs.	Implement pipe CCTV programme (AAIF). Pump station condition and performance assessment programme. Ongoing management and update of network models. Implementation of updated communication and control technology.
Decision Making	80	90	Formal decision-making processes are applied to major projects and programmes - business cases are used to justify the financial and non-financial benefits of projects. Options are evaluated using a Council framework. CAPEX projects are captured and prioritised against decision criteria (aligned to Council priorities) in the CPMS. See also CAPEX planning re: AAIF/ renewal decisions.	See capital planning.
Managing Risk	80	90	The Council risk policy and framework is well established and regularly updated. Regular risk reporting on 'management-level risks' in Promapp, reported to the Audit and Risk Committee. Resilience section of AMP is new with stronger coverage of 'shocks/disruptors' risks and GIS hazard mapping is being used to improve understanding of hazard-related risks. The AMP Risk section summarises high risks and mitigation measures.	Review alignment/links from strategic Promapp risks to operational risk mitigations (water supply safety plan approach). Complete assessment of 'resilience' against disasters for earthquake, tsunami, coastal, storm (risk analysis, mitigation programmes).

Section	Current/ Target		Reason for scores 2020	Improvement actions planned or underway
			Criticality and risk ratings have been applied to reticulation assets and used to prioritise renewals (AAIF).	Noted that Risk team are also progressing other recommendations from Deloitte risk review 2019.
Operational Planning	85	95	Operations, inspections and maintenance schedules have been developed over many years. AAIF will assist with refining risk-based inspection frequencies. A significant review of pump station maintenance schedules and performance monitoring is underway with a pilot just completed. The wastewater network is remotely monitored, intervention levels are defined and corrective actions implemented. There has been a focus on getting better monitoring and control of contractor operational activities and costs. Emergency management plans, and procedures for specific operations events (e.g. overflows) are in place but the emergency plan needs ongoing review and exercising.	Develop, implement 'Smart Network' strategy to support optimisation of network operations. Continue AAIF programme to inform 'optimised' inspections/ maintenance programmes. Emergency management plan review and exercise programme. Review operational KPIs.
Capital Works Planning	85	95	See decision making, plus. Capital projects and programmes managed in accordance with CPDF and projects tracked in CPMS. A 10-year (AMP/LTP) and 30-year (IS) CAPEX programme is in place. Renewal programmes for reticulation are based on age, condition, life, performance and cost (AAIF). Wastewater optimisation modelling supports development of investment scenarios across a wide range of objectives (environmental, service, etc).	AAIF enhancements and expansion to non-reticulation assets.
Financial Planning	80	90	10- and 30-year financial forecasts are developed with supporting data confidence information to inform reliability of forecasts. A good financial overview is provided in the AMP, supported by detailed programmes in the lifecycle section covering how the finances were developed and the key assumptions/ risks. Revaluations occur regularly - the most recent one seeing a significant increase in value (partly arising from application of actual rather than contracted rates). Funding/level of service scenarios are being presented to Council as part of LTP process. There has been more focus given to unit rates-based development of OPEX forecasts and calculation of 'consequential OPEX', however these still get 'disconnected' from CAPEX discussions for LTP budgeting. A 3-waters financial data framework project aims to better align financial and asset data structures to provide better lifecycle cost analysis and asset financial reporting.	Ongoing improvements to data confidence will improve the quality of revaluations and financial forecasts. Continue three-waters financial data framework to support asset lifecycle cost analysis and financial reporting.
AM Leadership and Teams	85	90	The organisational structure for asset management has embedded. AMU lead the consistent approach to AM across Council. There are council wide AM communications on AM through SharePoint and forums such as the Delegates Liaison Group and AMP workshops and this has been an area of improvement. Generally, AM practice is becoming more standard Council language and culture.	Continue to use opportunities to grow understanding and improve 'AM System' - i.e. how various Council teams work together to deliver good AM outcomes. Continue AM working group/s to support shared learnings and knowledge. Review staff/team capabilities against AM competence framework to identify capability development needs (training, mentoring, etc).
AM Plans	85	95	The AMP is a significant improvement on the one presented for the last review (which was incomplete). It is supported by strong data and analysis noted in other	Review relative content, timing and scope of AMP and Activity Plan prior to the next LTP.

5.4 2023 Asset Management Maturity Assessments

Three Waters | What works well

Category	#	Theme	Observations	Evidence/examples
People: The team has strong capability	13	Asset management practices	• Key personnel are making reasonable qualitative or judgement-based decisions in the absence of data • Team members (Three Waters BI team) are taking ownership to address issues related to the asset management framework (organisation-level)	• Example: for stormwater assets, CCTV footage is reviewed prior to make maintenance or renewal decisions in the absence of reliability, maintainability and availability data *(applicable to Water Supply and Wastewater teams)*
Systems: Initiatives to improve data quality are either in-flight or being planned	14	Improvement initiatives	Initiatives are either in-flight or being planned to improve: • Introducing data standards **(4.2)** • Creating a consistent link between data sources **(4.2, 4.3)** • Using tools (e.g., AAIF) to determine the remaining useful life of an asset **(4.2)**	• The BI team are actively working on a data standard • The BI team are also working on creating a link between GIS and SAP platforms • For reticulation assets, the Asset Assessment Intervention Framework (AAIF) is utilised to calculate the remaining useful life. Key data fields include condition, RMO, consequence of failure and degradation

Three Waters | Oppurtunities for Improvement

Category	#	Theme	Issue	Evidence/examples
Systems: Technology is not fit-for-purpose and data quality is poor	10a	Asset data quality	• Asset data fields are not complete, including condition, age, capacity **(2.4, 3.5)** • Data accuracy is inconsistent across asset types **(4.2)**	• Data confidence is high for quantity of assets (90%), uncertain for condition data (50%) and performance (50%). Validity of the data is unknown. • Condition data is out of date, with condition assessments last completed for waterways in 2015 Asset data confidence is high for reticulation assets, but low for pumping stations and treatment plants (documented in the Water Supply, Stormwater and Wastewater AMP's).
	10b	Consistent storage of data in centralised (Enterprise) systems	• Not all asset data is saved in SAP. Excel spreadsheets, GIS and external compliance data are also used. **(4.3)** • Lack of certainty in the procedure to maintain data in SAP **(4.2)** • Lack of documentation for all asset types which defines the data structure **(4.2, 4.4)**	• External compliance data from NIWA & Metservice is used to inform hydraulic modelling *(applicable to Land Drainage team)* • This process is documented in Promapp, however it was not observed. There is un-certainty to whether the process is adhered to. • Documentation exists for the AAIF for reticulation assets, however was not observed for the remaining Three Waters asset types.

Category	#	Theme	Issue	Evidence/examples
Process: Processes are not fit-for-purpose	11a	Documentation and formalisation of business processes	• No documented process to define and identify critical assets **(4.4)** • No documented process to enable long-term planning of renewals (e.g., renewals are mostly reactive) **(3.5, 4.4)** • Engineering judgement is relied to make asset renewal decisions **(4.4)**	• Asset criticality is defined in the AMPs and is defined for reticulation, waterways and stations assets. However is it missing for all other asset types. • There is no long-term schedule of indicative renewals, based on criteria such as age (remaining useful life/similar). • There are no defined criteria to help on-site teams decide whether to repair, replace or dispose of assets (e.g., a pump on –site)
Process: Processes are not fit-for-purpose	11b	Clarity of accountabilities and responsibilities	• Responsibility is unclear on who is to maintain and update data **(4.2, 4.3, 4.6)** • There is no governance in place to control changes to data requirements or data itself **(4.3)** • Lack of clear requirements for external contractors to update data when undertaking work on-site has resulted in data gaps **(4.5)** • The asset handover process is not efficient, resulting in delays with data being uploaded to SAP **(4.5)**	• It is unclear on whether the responsibility to update and maintain the data sits with the AM or Operations team. There are communication gaps between the activity owners on where this responsibility lies. • Accountability for Asset Management sits with Managers, or Team Leaders, however, this does not appear to be formalised. • When contractors complete work on-site, information is not fed back to Council to update the asset record in SAP • After as-built information has been received, there have been instances where it has taken several months before being uploaded to SAP, which has prevented work orders from being raised against physical assets

Category	#	Theme	Issue	Evidence/examples
People: the team's ability to shift towards a more proactive asset management approach is being disadvantaged by resource constraints	12a	Internal and external resourcing capability	• External contractors don't have the required technical expertise (e.g., to carry out condition assessments and provide a reliable condition rating) **(4.5, 4.6)**	• External consultants engaged to complete condition assessments have been observed to not possess the specialist skills to provide a reliable condition rating (e.g., understanding of how waterways assets function, and what to look for to determine condition) *(applicable to Land Drainage team)*
	12b	Internal resourcing capacity	• The team does not have enough capacity to process its backlog for linear and non-linear assets	• There is minimal spare capacity within the unit to action non-BAU activities e.g., condition assessment programmes and update data

5.5 2021 AMP Improvement Programme

A combination of existing 2018 improvement tasks and new improvement tasks from Asset Management Maturity Assessment make up the 2021 Improvement Plan as shown in tables below. These have been grouped into 6 focus areas. These tasks will be worked on over the next three years and focus specifically on the most critical areas. For practicality, these tasks are designed to address several issues concurrently and allow logical progression towards the 3–year target.

The improvement focus areas are:

1. Asset inventory, condition assessment and failure data improvement programme
2. Financial tracking, forecast and relationships improvement programme
3. Demand management improvement programme
4. Integrated master planning improvement programme
5. Climate change response improvement programme
6. Level of service and customer engagement improvement programme

Improvement programme	Asset inventory, condition assessment and failure data improvement programme
Scope	Targeted data capture strategy for vertical assets to improve completeness and confidence of asset inventory, with a specific focus on treatment assets. Condition assessment of critical or high value assets for stations and treatment plants to inform renewal programmes. Condition assessment of pipes where evidence will help refine AAIF criteria for applying condition scores (CCTV records). Asset failure and disposed asset post-mortem to understand failure mechanisms and verify condition grading. Improve maintenance activity and failure data capture to strengthen the connection between network performance and proactive renewal/maintenance strategy.
Issues addressed	Incomplete asset register, particularly for vertical assets with many treatment assets missing from the register or without installation dates. Poor information on the condition of vertical assets, which presents a risk particularly for critical or high value assets. Condition assessment relies on ongoing CCTV inspection. Failure data and maintenance events are not always captured in a way that can be analysed across the portfolio to aid decision-making.
Benefits	Increased confidence in decision making around risk management, maintenance strategy, condition management and renewal intervention.
Resourcing	1 x FTE with skillset engineer/asset manager/analyst for system improvements Condition assessment experts for both vertical and horizontal assets to carry out the targeted inspection programme.
Budget	$100,000 (1xFTE) for system improvements and programme overview; $60,000 per year for wet well inspection (target 5 sites per year), expand programme for pipe condition testing and failure post mortem, $150,000 data collection.
Timeline	Intensive 2 years, then ongoing

Improvement programme	Financial tracking, forecast and relationships improvement programme
Scope	Require TOTEX (combined CAPEX and OPEX) estimation at all stages of a project. Provide templates for generating these TOTEX estimates Overhaul how OPEX costs are categorised to allow greater analysis of decision making impacts Develop a live and “BAU” method for the financial reporting that carried out as one-off as part of the AMP writing process. Create tools to make financial analysis more accessible and reliable for asset managers
Issues addressed	OPEX impacts are not always taken into account when projects are promoted and then put into service. Poor visibility on where OPEX is being directed and how effective it is over the long term to achieve desired outcomes.

	The financial analysis and reporting that is required as part of the AMP process is pulled together for a one-off process, is inefficient and lacks clarity.
Benefits	Measuring the combination of CAPEX and OPEX together to support effective financial decisions. Give decision-makers the visibility of clear financial data as evidence to support asset management strategy. Reduce the inefficiency and risk of error when pulling together financial data for AMPs.
Resourcing	Change programme champion (internal): staff time. Staff buy in from City Services, Finance, IT and PMO. Potential: (external) advisors, analyst, project manager
Budget	$200,000 (2xFTE)
Timeline	12 months

Improvement programme	Demand management improvement programme
Scope	Proactive demand management, beginning with strategy and quantifying the most useful areas to target. Determine the off-set cost of infrastructure that is not needed if demand is reduced. Determine options and benefits for inflow and infiltration reduction. Identify new bulk metering sites required to support accurate demand calculation and management.
Issues addressed	Infrastructure costs can be reduced by lowering flows through demand management. There is no overarching demand management strategy that sets clear goals, and tactics. Effort is needed to determine where the most cost effective demand management techniques can be applied. Inflow and infiltration is a diffuse source of additional wastewater flow and is difficult to target, however the cumulative impact has a high impact on the capacity of downstream infrastructure and contributes to overflow likelihood.
Benefits	A strategy for demand management provides a starting point and clear direction. Quantifying the need for demand management sets out the costs and benefits. Reducing demand can defer new infrastructure that would otherwise be needed to meet capacity Reducing demand can reduce running costs for pumping and treatment Demonstrate demand management leadership prior to targeting private infrastructure I&I issues Monitor flows more accurately to enable system improvements. Reduce overflow likelihood.
Resourcing	1 x FTE with skillset engineer/asset manager/analyst
Budget	$100,000 per year for 4 years ($400,000 total)
Timeline	4 years

Improvement programme	Integrated master planning improvement programme
Scope	To create a high level infrastructure master plan that sets out strategy for, conveyance, treatment and disposal zones. To make clear which long term infrastructure solutions are preferred. To integrate master plan priorities when projects are promoted for other reasons, such as renewals.
Issues addressed	Projects can be promoted in isolation which misses out on delivering co-benefits or helping address long term issues.
Benefits	Combine growth, level of service and renewal needs into one integrated master plan
Resourcing	Freeing up time and providing support labour to Team Leader Asset Planning WWW
Budget	$100,000 (1xFTE) to support planning team who is the owner of this programme
Timeline	12 - 24 months

Improvement programme	Climate change response improvement programme
Scope	Develop and begin to implement a strategy to mitigate and adapt to climate change specifically for the wastewater activity. Set clear goals, identify options and identify the costs and benefits.

	Develop a long term strategy for supplying wastewater service to areas exposed to rising sea and groundwater level.
Issues addressed	Council has declared a climate change emergency however a clear strategy is needed to ensure that the most significant impacts to the wastewater activity can be planned for. Decisions regarding climate change require financial support and have long term service impact so require a robust decision-making process. The strategy and planning needs to be done now so that the any specific responses that require CAPEX support can be promoted in the next LTP.
Benefits	Clear direction to meet Council's climate change commitments. Ensure quality decisions are made responding to climate change mitigation and adaption impacts to the wastewater activity. Get the groundwork complete so that any specific responses can be promoted.
Resourcing	1 x FTE with skillset engineer/climate change impact
Budget	$100,000 (1xFTE) to support planning team and asset management team
Timeline	12 months

Improvement programme	Level of service and customer engagement improvement programme
Scope	To engage with customers to ensure that levels of service expectations align with community values. To determine and then carry out various methods of engagement; e.g. customer stakeholder group, survey, workshop, level of service training, representation.
Issues addressed	The last detailed customer research that was carried out for wastewater levels of service was over 20 years ago. Informed perspectives of wastewater customers are essential for setting levels of service targets and long term programmes.
Benefits	To ensure alignment between the views of wastewater customers and the decisions made regarding wastewater costs and levels of service
Resourcing	1 x FTE with skillset in community engagement/customer relations. Internal support from asset management/planning
Budget	Combine with water supply activity, part time staff commitment from asset management/planning
Timeline	Ongoing

5.6 Capital Investment Programme 2025-34

DRAFT for CONSULTATION. (15 February 2024)

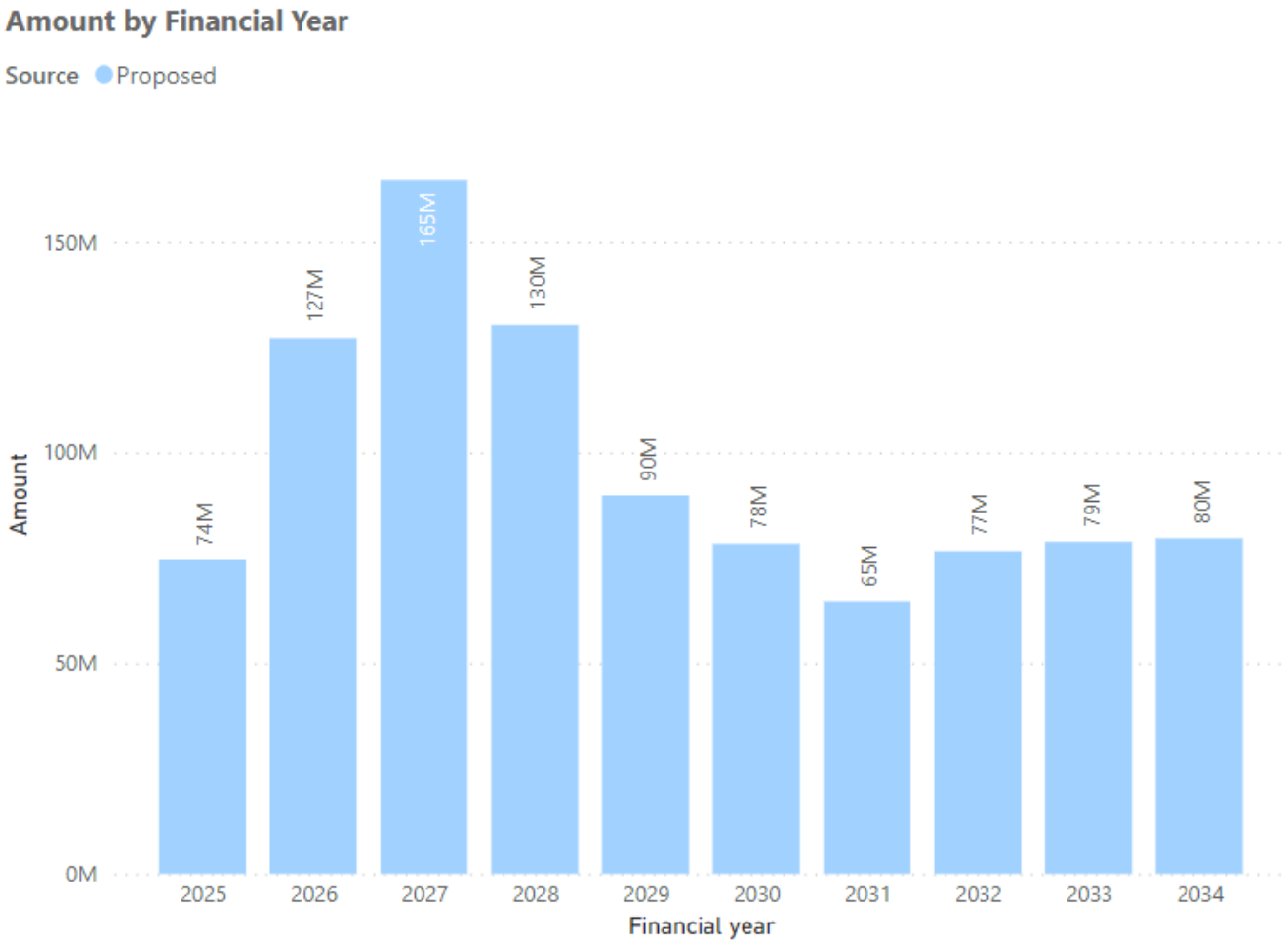


Figure 5.1 : Total Wastewater Supply Capital Programme FY 2025-34.

For Details of all Programmes and Projects refer to Budget Interactive Budget Tool and the accompanying Schedule.

Orbviz Budget Interactive Tool– multiple viewpoints and functionality.

[Home | CCC Consultation for Long Term Plan and Annual Plan - Projects | Christchurch City Council (orbviz.com)]

Schedule 1 – Wastewater by Primary Driver

As at 15 February 2024

DRAFT LONG TERM PLAN 2024 - 2034

CAPITAL SCHEDULE: GROUP OF ACTIVITIES -PROPOSED BUDGETS (INFLATED)

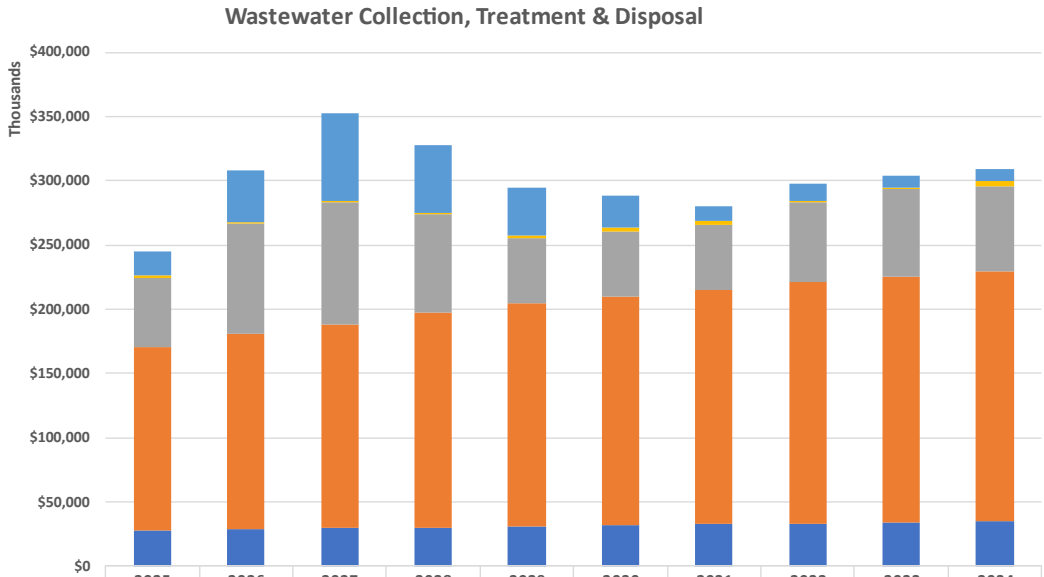
(000s)

Primary Driver	ProjectID	Project Title	Proposed 2025	Proposed 2026	Proposed 2027	Proposed 2028	Proposed 2029	Proposed 2030	Proposed 2031	Proposed 2032	Proposed 2033	Proposed 2034	Total Proposed 2025 - 34
Improve the Level of Service	1376	Programme - WW New Reticulation Odour Control			434	1,083	1,109	1,134	1,159	1,183	1,206	1,231	8,538
	2214	WW Duvauchelle Treatment and Disposal Renewal	1,000	1,034	5,712	5,253	5,013						18,013
	30172	WW Riccarton Interceptor (Upper Riccarton)	5,500	5,056	2,670								13,226
	42154	WW Selwyn Pump Station (PS0152), Pressure Main and Sewer Upgrades	494	5,049	5,289	10,832	12,874	5,668	5,793	5,914			51,912
	42155	Programme - WW Overflow Reduction		620	529	1,083	1,109	567					3,908
	42603	WW Vacuum System Monitoring Equipment	5										5
	43946	WW Tilford Street Pump Station & Pressure Main Capacity Renewal (PS13)	538	883									1,421
	45289	WW Bamford St Odour Treatment	600										600
	47124	CWTP Biogas Engine Upgrade (Generator 1)			5,989	358							6,347
	47951	WW Deans Avenue to Old Blenheim Road Corridor Odour Treatment	250										250
	48083	WW St Asaph St Odour Treatment	222	83									305
	48308	WW Head to Wiggins Odour Treatment (Sumner)			212								212
	57642	WW Southern Relief Easement	248	195									443
	58434	WW Smart Overflow Reduction	75	75	75	75	75						375
	596	WW Akaroa Reclaimed Water Treatment & Reuse Scheme	3,106	8,272	26,609	26,586	14,158	14,793					93,524
	60260	CWTP Biosolids Holding Tank	20	47						1,774	4,187		6,029
	60303	WW Pressure Sewer System Monitoring & Control Relocation (SCADA)	107	228	119								454
	60305	WW Pump Station Flow Meters at all Stations Stage 1	224	387									611
	60312	CWTP Wastewater Critical Electrical & Control Spares for Increased Resilience			212	217	222						650
	60319	CWTP Wastewater Trade Waste Reception Facility Improvements	387										387
	60609	WW Greenhouse Gas Emission Reduction Programme	50	103	159								312
	65068	WW Sparks, Awatea, Longhurst and Upgradient Catchment Pump Stations Odour Treatment (104, 123, 115)	1,067										1,067
	67458	WW SCADA Server Infrastructure Upgrades	26										26
	67459	Laboratory New Equipment	100	103	106	108	111	113	116	118	121	123	1,120
	73440	Programme - WW Treatment Model Renewal					55				60		116
	73444	CWTP Biosolids Dewatering Belt Press Upgrade					1,109	2,267	2,317				5,693
	73446	WW Vacuum Sewer Demand Reduction	250	517	529	542	555						2,392
	73993	WW Beckenham PS (PS0153) and Pressure Main	350	517	2,616	867							4,349
	74196	WW Flow Meters at all Stations Stage 2	10	396	416								822
	74197	WW Flow Meters at all Stations Stage 3		10	657	683							1,350
	74271	WW McBratneys Odour Treatment (LS2573)	140										140
	76588	WW Odour Control Media Replacement and Improvements			476								476
Improve the Level of Service Total			**14,768**	**23,576**	**52,807**	**47,687**	**36,392**	**24,542**	**9,384**	**8,990**	**5,575**	**1,354**	**225,072**
Meet Additional Demand	42193	WW Halswell Pump Station (Stage 2) (PS60)	1,069										1,069
	43216	WW Tyrone Street Pump Station Capacity Renewal (Stage 2) (PS62)				271	1,331	2,040	869				4,511
	45280	WW Highfield Wastewater Servicing - Stage 2	428	1,234	352								2,014
	60	Programme - WW New Mains			793	812	832	567	753	1,065	701	1,514	7,037
	61	Programme - WW New Pump Stations for Growth						869	1,095	59	603	1,661	4,287
	71996	WW Grassmere Wet Weather Storage Facility	3,200	11,374	11,636	4,413							30,623
	76073	WW Shirley Local Pressure Sewer System	300	517	434								1,251
	94	WW Subdivisions Additional Infrastructure	100	103	106	108	111	113	116	118	121	123	1,120
Meet Additional Demand Total			**5,097**	**13,229**	**13,320**	**5,604**	**2,274**	**3,590**	**2,832**	**1,242**	**1,425**	**3,298**	**51,911**

Replace Existing Assets	17865	WW Reactive Lateral Renewals	500	517	529	1,083	1,109	1,134	1,159	1,183	1,206	1,231	9,650
	17875	WW Cranford Street Pump Station Renewal (PS0058)	656										656
	17876	WW Locarno Street Pump Station Renewal (PS0020)								59	905	9,919	10,883
	17881	CWTP Treatment Plant Asset Reactive Renewals	600	620	635	650	665	680	695	710	724	738	6,718
	2318	CWTP WW Health and Safety Renewals	25	26	26	27	28	28	29				189
	2343	CWTP Roading Renewals	160										160
	2375	WW Pump Station Equipment Reactive Renewals (MEICA)	300	310	317	325	333	340	348	355	362	369	3,359
	3116	Programme - WW Pump & Storage Civil & Structures Renewals			159	542	555						1,255
	35	Programme - WW Reticulation Renewals	556	848	572	9,728	29,947	32,873	33,597	44,948	50,673	41,841	245,582
	37	Laboratory Renewals		54	159	108	111	111	114	118	121	123	1,018
	37839	Programme - WW Treatment Plant Instrumentation, Control & Automation Renewals (ICA)		52	159	650	721	850	869			246	3,546
	37840	Programme - WW Treatment Plant Health & Safety Renewals			48	49	50	51	52	53	54	55	412
	37841	Programme - WW Treatment Plant Civil Structures & Buildings		52	317	477	555	759	834	964	1,044	1,188	6,189
	41393	Programme - WW Treatment Plant Mechanical Renewals	460	587	1,643	2,094	752	907	927	946	965	984	10,265
	41872	Programme - WW Control Software Renewals (SCADA)		66	87	100	104	100	102	175	186	201	1,120
	41876	Programme - WW Pump & Storage Mechanical Renewals			106	108	111	113	116	710	724	916	2,903
	41878	Programme - WW Local Pressure Sewer Systems Reactive Renewals	150	155	159	217	222	227	232	237	241	246	2,085
	41879	Programme - WW Health & Safety Renewals	50	52	53	54	55	57	58	59	60	123	621
	47123	CWTP Biogas Storage Upgrade	5,158	9,189	130								14,477
	48906	WW Health & Safety Renewals	10	10	30	42	163	155	159				569
	50873	CWTP Wastewater Ponds Midge Control	300	310	317	325							1,252
	56307	WW Update Model Base Data	271	278	330	357	365	348	347	469	500	500	3,765
	56684	WW Reactive Mains Renewals & Capex Repairs	500	517	529	542	555	567	579	591	603	615	5,598
	59076	CWTP Wastewater Treatment Plant Building Three Renewal	785										785
	60085	Programme - WW Banks Peninsula Treatment Plant Civils & Buildings		155	212	217				177	1,508		2,269
	60088	Programme - WW Banks Peninsula Treatment Plant Mechanical Renewals		52	212	271	665	283	116	1,183	1,206	246	4,234
	60172	WW Lock Replacement Project	634										634
	60173	WW Pages Road Pump Station Pump Replacements (PS0001)	1,943	1,467									3,410
	60174	WW Alport Pump Station Pump Renewals (PS0015)	687	741									1,428
	60175	WW Pump Station 11 Randolph MEICA Renewals	386										386
	60176	WW Pump & Storage MEICA Renewals for FY2024	993										993
	60177	WW Harrison Street Pump Station Renewal (PS0006)	608	569									1,177
	60178	WW Stapletons Road Pump Station Renewal (PS0007)		147	702	737							1,586
	60179	WW Chelsea Street Pump Station Renewal (PS0009)			269	1,131	297						1,697
	60180	WW Smith Street Pump Station Renewal (PS0012)										330	330
	60181	WW Tilford Street Pump Station Renewal (PS0013)							328	1,372	358		2,058
	60182	WW Pump Station Upgrade (PS0021)									318	1,328	1,646
	60186	WW McCormacks Bay Road Pump Station Renewal (PS0057)	100	100	1,543								1,743
	60299	Programme - WW Buildings Asbestos Removal									121	123	244
	60304	WW Fyfe Road Pump Station Renewal (PS0101)	868										868
	60308	CWTP Wastewater Inlet Flow Monitoring at Pump Station 0015 Alport			53	262							315
	60309	CWTP Wastewater Clarifier Mechanical Renewals (Clarifier 4 only)	1,278	1,366									2,644
	60310	CWTP Wastewater Digester 1-4 Roof Renewal				2,512	2,645	2,781					7,938
	60313	CWTP Wastewater Secondary Contact Tanks Renewal Pipework					333	2,380	1,317				4,030
	60316	CWTP Wastewater Pump Station A & B Pump Renewal					1,653	1,738					3,391
	60317	CWTP Wastewater Odour Control Renewal & Enhancements			317	3,455							3,773
	60321	CWTP Wastewater Toe Drain Reprofiling				1,163	2,348						3,511
	60322	CWTP Wastewater Sludge Dryer 1 & 2 Renewal	215	2,540									2,755
	60323	CWTP Wastewater Solids Contact Tanks Air Distribution Pipe Renewal		285	2,090								2,375
	60385	WW Mains Renewal - Multi-Use Arena - Barbadoes, Madras, Lichfield, Tuam	1,416	1,907									3,323
	63	Programme - WW Pump & Storage Instrumentation Control & Automation Renewals (ICA)	10	103	846	596	721	567	1,610	1,360	1,408	816	8,038
	65016	WW Wainui Seaview Lane & Warnerville Equipment Renewals	87										87
	65017	WW Banks Peninsula Treatment Plant Reactive Renewals	40	41	42	43	44	45	46	47	48	49	448
	65019	CWTP Waste Water Equipment Renewals 2022 (EICA)	534	400									934
	65020	CWTP Waste Water Equipment Renewals 2023 (EICA)	742	590									1,332
	65021	CWTP Waste Water Equipment Renewals MLC-E HV, System Platform (EICA)	1,353	135									1,487
	65107	WW Banks Peninsula Pumping & Storage Reactive Renewals	100	103	106	108	111	113	116	118	121	123	1,120
	65108	WW Banks Peninsula Pumping & Storage Equipment Renewals 2023 (MEICA)	120										120
	65109	Akaroa Wastewater Treatment Plant Electrical and SCADA Upgrade	150										150
	65110	WW Banks Peninsula Pumping & Storage Equipment Renewals 2025 (MEICA)	290	155									445
	65129	WW Bradford, Norwood, Hunter, Malcolm, Young, Woodbridge, Penrith, Cardiff et al Mains Renewals	2,803										2,803
	65133	WW Picton, Nelson, Elizabeth, Lyndon, Mandeville, Kipax, Kyle, Peverel, Burdale, Seto Mains Renewals	1,800	1,738									3,538

	65134	WW Gloucester, Worcester, Hereford, Trent, Nursery, Dearsley & Raglan Mains Renewals	2,330										2,330
	67457	WW Banks Peninsula Treatment Plant Renewals	200	300									500
	67806	CWTP Renewals & Replacements	4,000	36,190	48,658	27,079							115,927
	69465	WW Sandy Ave reticulation renewal	64										64
	69533	WW Langdons Rd Mains Renewal	3,840	1,352	1,211								6,403
	70580	WW Pacific Road Mains Renewal	736	878									1,614
	70633	WW Fitzgerald Ave Brick Barrel Mains Renewal	250	380	12,505	7,701							20,836
	70853	WW Buchanans Road Mains Renewal	2,750	4,198	1,300								8,248
	71128	WW Brougham Street Mains Renewals (NZTA)	2,400	5,170	6,225								13,795
	71129	WW Lyttleton Package Mains Renewals	500	1,623									2,123
	71281	WW Meadows Street Mains Renewal	347	420									767
	72038	WW - Matsons Aorangi Pipe Renewal	5	98	1,634								1,738
	73441	WW Pressure Main Realignment - Pages Road (PM37)	847	2,414	1,278								4,539
	74158	WW Ten Pump Station MEICA renewals		10	550	764	1,371						2,696
	74207	WW Network System Platform and Pump Station Starter/Software Upgrades	10	518	754	1,326							2,608
	74214	CWTP MLC-H 11kV RMU Renewal, Pond Radio's Upgrade	20	553	623	1,239							2,435
	74215	CWTP Electrical Renewals 2026		21	617	827	1,517						2,982
	74217	WW Banks Peninsula Treatment Plant MEICA 25	10	261	277								548
	74218	WW Banks Peninsula Treatment Plant MEICA 26		10	185	201							397
	74221	WW Banks Peninsula Starters & Instrumentation MEICA 2025	10	138	152								301
	74222	WW Banks Peninsula Pumping & Storage MEICA 2026		10	135	149							295
	74352	WW Lincoln Road Mains Renewal	100	517	1,804	2,600							5,020
	74584	WW Anzac Drive Renewal	3,036										3,036
	74865	WW Reactive Wastewater Reticulation Renewals (Maintenance Contract)	650	672	688	812	832	850	869	887	905	923	8,088
	74866	WW Reactive Wastewater Pumping Renewals (Maintenance Contract)	50	52	53	54	55	57	58	59	60	62	560
	74937	CWTP Wastewater Pond transfer structure renewal	300	310	317	325	333	340	348	1,922	1,961	2,000	8,155
	74938	CWTP Wastewater Pump Station A & B Concrete channels renewals							290	296	302	308	1,195
	74939	CWTP Wastewater Thermophilic digesters overhaul.	250	2,068	2,116	812							5,246
	74940	CWTP Wastewater Clarifiers structures overhaul							1,159	1,183	1,206	6,153	9,701
	74941	CWTP Wastewater Thermophilic and Mesophilic air blowers renewals							579	2,188	2,232	2,277	7,276
	74942	CWTP Wastewater Renewal of Thermophilic heat exchangers						170	2,027	2,070	483		4,750
	74943	CWTP Wastewater Gravity belt thickeners (GBT) renewals				162	665	283	116	355	362	369	2,313
	74944	CWTP Wastewater Grit bin renewal		52	159	2,166	333	283	290	296	302		3,880
	74945	CWTP Wastewater Primary Sedimentation Tank (PST) flight and chains renewals	300	310	317	325	333	340	348				2,273
	74984	CWTP Wastewater Ocean Outfall Pump Station (OOPS) preventive renewals						170	1,981	745			2,896
	74993	WW Banks Peninsula Replacement of Lyttleton Naval Point WW Pump Stations	500	776	106								1,381
	75713	WW Springs Road Pressure Main Renewal PM67	1,520	424									1,944
	75891	WW Reactive Wastewater Pumping Renewals (Ops)	100	103	106	162	166	170	174	177	181	185	1,525
	75892	WW Reactive Low Pressure Sewer System (LPSS) Renewal (Maintenance Contract)	10	10	11	11	11	11	12	12	12	12	112
	75893	WW Vacuum Reactive Renewal (Maintenance Contract)	100	103	106	162	166	170	174	177	181	185	1,525
	75894	WW Low Pressure Sewer System (LPSS) Reactive Renewal (Ops)	50	52	53	54	55	57	58	59	60	62	560
	75895	WW Vacuum Reactive Renewal (Ops)	50	52	53	54	55	57	58	59	60	62	560
	75896	WW Reactive Wastewater Reticulation Renewals (Ops)	50	52	53	54	55	57	58	59	60	62	560
	76042	WW Colombo St Ferry Rd Linwood Ave Waltham Rd Renewals	910	1,872	1,788								4,569
	76206	WW Hawthorne Lansbury Walnut Renewals	250	620	1,058	706							2,635
	76593	CWTP Combined Heat and Power Engine Renewal (CHP2, CHP3)	40	917	7								964
	76770	WW Wainui Peverel Matipo George Renewals	250	620	1,058	1,251							3,179
	899	CWTP Step Screen Renewal	149										149
Replace Existing Assets Total			**54,622**	**90,365**	**98,651**	**76,971**	**51,167**	**50,225**	**52,344**	**66,380**	**71,824**	**74,967**	**687,515**
Grand Total			**74,486**	**127,170**	**164,777**	**130,263**	**89,832**	**78,356**	**64,560**	**76,612**	**78,823**	**79,619**	**964,499**

5.7 Total Capital and Operating Expenses for 2025-2034



	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Improved Service Levels	$19,541	$40,182	$68,885	$52,912	$36,392	$24,542	$11,411	$12,656	$9,315	$10,091
Increased Demand	$1,597	$1,338	$1,251	$1,191	$2,274	$3,590	$2,832	$1,242	$1,425	$3,298
Renewals & Replacements	$53,348	$85,650	$94,642	$76,159	$51,167	$50,225	$50,317	$62,713	$68,084	$66,230
Activity Overheads	$143,354	$152,358	$159,001	$167,112	$173,495	$178,100	$182,698	$187,500	$191,266	$195,210
Activity Costs	$27,658	$28,405	$29,336	$30,223	$31,000	$31,828	$32,679	$33,315	$33,974	$34,626