WATER SUPPLY
Asset Management Plan

June 2021

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Chapter 1: Introduction

Marlborough District Council provides a water supply and distribution service to approximately 82% of residences and businesses in Marlborough through seven reticulated supply schemes.

The abstraction, treatment and distribution of water provides a source of drinking water for the community. The water supply is also used for cleaning and sanitation, sustenance of livestock, irrigation and as a resource for both commerce and industry.

The water supply activity contributes to the Community Outcomes of

- **Living** by providing an adequate supply of clean drinking water for communities
- **Economy** by supplying cost effective treated water that permits commercial activities to thrive
- **Environment** by ensuring responsible stewardship of the source water from aquifers and waterways.

This asset management plan covers the management of infrastructure for water abstraction, treatment, pumping, storage and reticulation owned and operated by the Council.

The plan details the process and costs of operating, maintaining and upgrading the water assets. It describes the services provided by the assets, and how they achieve the desired community outcomes. The plan looks forward to future service requirements: growth in demand from various sources, enhanced customer service in line with increased customer expectations, changing legislation and environmental constraints, and how to achieve greater efficiency of water use.

The plan forecasts the cost implications of providing water supply services and the funding methods proposed and adopted by the Council.

Content of the Introduction

1.1. Purpose — what the asset management plan seeks to achieve, the asset management process and requirements.

1.2. Strategic Context — how water asset management fits into the wider Council vision, the infrastructure strategy and functional environments.

1.3. Asset Management in Relation to the Planning Process — a summary of the Council's planning processes, including other relevant plans.

1.4. Water Assets included in the Plan — a short summary of the water supply assets managed by the Council.

1.5. AM Plan Stakeholders — the main stakeholders and interested parties in water supply activities.

1.6. Organisational Structure — how the water supply function is managed within the Council structure.

1.7. Negative Effects — the consequences of not providing or not delivering a satisfactory water service.

1.8. Plan Framework — a short description of the main elements of the asset management plan.

1.9. AM Planning Maturity — a discussion on the development status of water asset management planning.

1.2 Purpose

The purpose of the asset management plan (AMP) is to document the asset management processes undertaken by the Council regarding its water supply infrastructure and services in order to:

- demonstrate to stakeholders that responsible, sustainable operation and management of water assets is occurring
- describe how service delivery is achieving the defined community outcomes
- define the strategy for asset maintenance and development into the future
- outline the medium-term (10+ years) financial planning profile related to the life cycle of the infrastructural assets
- demonstrate the risk management strategies employed to deliver a reliable service
- support the development of the Council's Long Term Plan and meet the requirements of the Local Government Act 2002.

An asset management plan describes the current standard of service, the future expectations of stakeholders and any assumptions about future changes that could affect the management of the assets. Decisions on operational asset management and investment in infrastructure are explained within the context of cost and the Council's funding constraints.

The Council recognises asset management planning is a valuable tool for delivering effective, efficient and sustainable services to the community. The management of water assets is subject to continual improvement. Issues identified in previous asset management plans are actioned or are being addressed as a part of a continuous process of business improvement. New and outstanding issues, and proposed improvements, are included in Chapter 6 for future action.

The 2021 Water Supply Asset Management Plan updates the asset management plan prepared in 2018 which was preceded by plans in 2015, 2012, 2008, 2006, 2000 and 1997.

The draft plan is presented to the Assets & Services Committee for scrutiny before being forwarded to Council for approval. It then provides the basis for the water supply budgets and proposed actions in the Long Term Plan 2021-31.

The Council seeks to meet the requirements of a basic asset management plan as defined by the Auditor General.

1. Define the service level.
2. Define the timeframe (life cycle).
3. Describe the asset (physical and financial details).
4. Include financial information (10 years +).
5. Recognise decline in potential ability to deliver services.
6. State assumptions and data confidence levels.
7. Outline an improvement programme.
8. Be prepared by qualified persons.
9. Be a firm commitment of the governing body.
10. Be reviewed regularly.

This Asset Management Plan has been prepared in accordance with the Local Government Act 2002 (including Schedule 10) and subsequent amendments to the Act. Other relevant legislation is summarised in section 2.5 of this plan.

1.2 Strategic Context

1.2.1 Council Vision & Mission

Marlborough District Council has an overarching Council vision and mission.

Our Vision

Marlborough is a globally-connected district of smart, progressive, high-value enterprises, known for our economic efficiency, quality lifestyle and wellbeing, caring community, desirable location and healthy natural environment.

Our Mission

"We invest in Marlborough's future, our people, quality lifestyle and outstanding natural environment."

The Council's vision and mission are implemented through a number of community outcome statements which describe the sort of community Marlborough could become as a result of actions taken now and into the future.

The vision, mission and community outcomes are reviewed and updated from time to time to ensure they are clear and fit for purpose. Amendments are consulted on and published in the Long Term Plan, with the latest amendments made in 2021.

1.2.2 Thirty Year Infrastructure Strategy

A 2014 amendment to the Local Government Act required local authorities to produce an infrastructure strategy to look at challenges over a 30 year planning horizon, and to ensure the infrastructure strategy aligned with the Council's financial strategy. This asset management plan complements and contributes to the Marlborough Infrastructure Strategy 2021.

The strategy looks at Council-owned infrastructure related to water supply, wastewater, stormwater, roading and river flood management. These key services are critical to the functioning of the region. The strategy considers the major factors influencing the delivery of these service areas over the next 30 years. Community facilities have also been included in the strategy as they have an important role in the functioning of the community. As many of the infrastructural assets have a design life in excess of 80 years it is essential to plan for the medium to long term.

There are five main themes running through the infrastructure strategy which reflect the Council's challenges related to providing infrastructure for the community.

Resilience — building and maintaining assets that are resistant to natural events such as earthquakes and storms, and being adaptable to climate change.

Levels of Service — providing assets that can respond to changes in demand from customers in terms of the quality and quantity of the services, and external influences on local government services such as changes in national and international policy and legislation.

Affordability — considering whether the costs of owning and operating the infrastructure assets will be affordable in future, bearing in mind changes in population demographics, economic prosperity and changing work patterns.

Renewals — recognising that within the 30 years of the strategy many of the built assets will have reached the end of their useful life. It is important to plan for their replacement to avoid a deterioration of service and ensure works are undertaken in a timely and efficient manner.

Growth & Demographics — Marlborough has had an increase in population of approximately 9% between 2013-2018 and this is expected to continue at a rate of approximately 1%. An increasingly elderly population may have different demands on services and their ability to pay may also be different from the current population. The general trend to rural depopulation is likely to continue and will be apparent in many small settlements and provincial towns.

These key themes provide a context for this asset management plan and are incorporated throughout the plan.

1.2.3 Functional Environments

The Council operates in a number of distinct environments that shape the services provided and the management of the assets required to deliver the services.

Legislative and Regulatory Environment — water supply services are highly regulated in order to ensure people receive a reliable and safe public water supply. Legislation has been implemented through agencies such as the District Health Boards, the NZ Fire Service, and by councils' planning and regulatory departments. With the implementation of the Crown Entity Taumata Arowai in March 2021 and the Water Services Bill in July 2021, DHB's will no longer hold responsibility for the Drinking Water Standards. The Police can also be involved, for Crown offences. Legislation also has an influence through matters such as the health and safety of staff, building standards and financial control regulations.

The National Policy Statement on Urban Development requires councils to identify and zone sufficient land to meet the needs of urban development, and the associated water treatment and reticulation capacity must also be planned and available in a timely way. Policies and strategies must be adopted for the equitable allocation of these servicing costs.

Commercial Environment — funding and spending are important considerations for the delivery of Council services. Local authorities are scrutinised and regulated by central government and have a responsibility to their ratepayers to be financially prudent. Council has a number of funding sources — including general rates, targeted rates, development levies, volumetric charges loans, enterprise income, grants and fees. The allocation of costs must give due consideration to factors such as customer affordability, equity between business and domestic users; inter-generational equity, socio-economic groupings and geographic areas.

Economic Environment — Council must consider its strategic approach to economic development in terms of the number and types of industry sectors it wants to encourage to establish in the region and the subsequent development of commercial services to support those industries. The prosperity of the area will encourage population growth and urban development.

Social Environment — social responsibility requires the Council to fairly balance the benefits of its services across all socio-demographic groups by providing access to a water supply and taking an equitable approach to charges.

Natural Environment — environmental sustainability is becoming increasingly important. Councils are expected to meet high standards of environmental stewardship. The national context is set by central government through the Coastal National Policy Statement and the National Policy Statement for Freshwater Management. Regional policies and strategies must be adopted to protect the environment and provide community leadership.

Cultural Environment — there are significant differences in how European, Maori, Pacific and other cultures perceive the relationship between people and the environment. Disregarding these beliefs and values can cause considerable offence.

1.2.4 Levels of Service

From these environments the levels of service and subsequent performance measures were established to provide:

- an overall level of service that meets or exceeds residents' expectations
- a level of water quality that meets community needs and is appropriate to the degree of public health risk
- a reliable water supply service
- a service that is timely and responsive to customer needs
- a sustainable water service.

The method of developing and establishing the levels of service is described in Section 2.4.

1.3 Asset Management in Relation to the Planning Process

The role of the water asset management plan in Council planning is shown in Figure 1-1. The asset management plan provides a link between the Council's strategic objectives and long term plans, and the Council's day to day operational activities related to providing the services.

Asset management is a continuous process because operational circumstances change minute by minute. Data is collected to inform short, medium and long term operational and maintenance decisions. The data is also analysed to identify where system improvements are required. The upgrade options are evaluated and presented to Council for consideration and approval. The asset management plan collates the available data and current decisions into a single document.

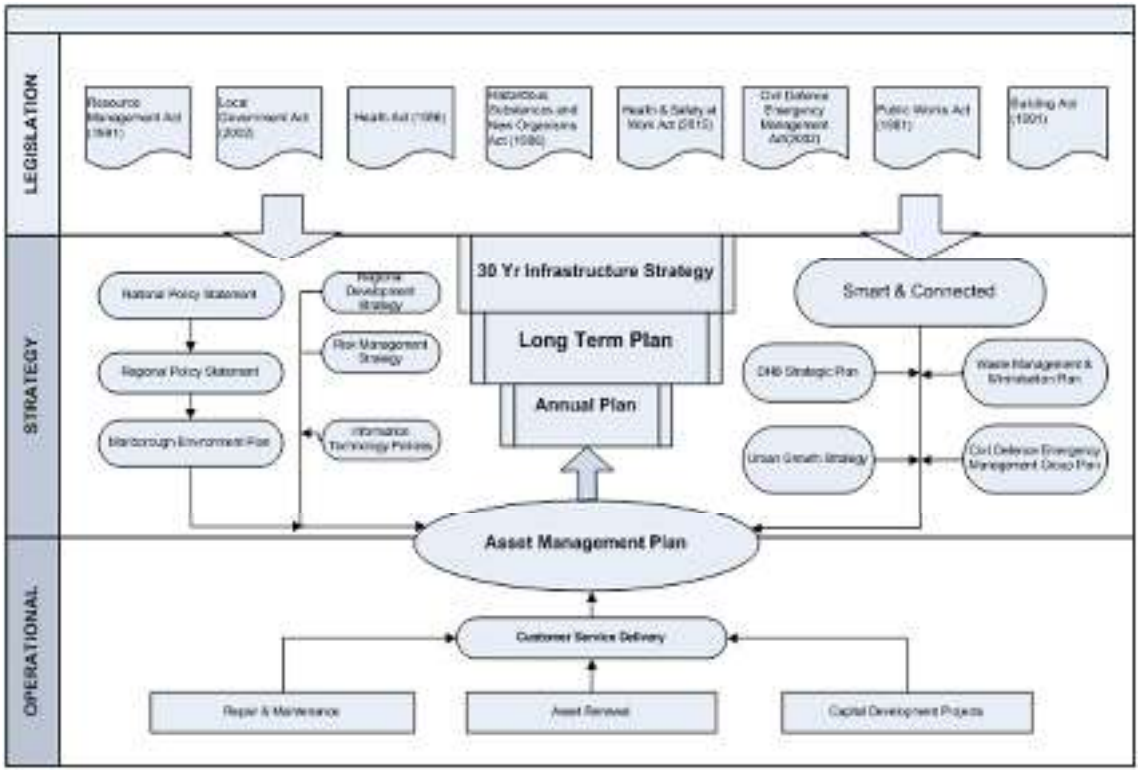


Figure 1-1 Asset management planning process

1.3.1 Other Planning Documents

Smart and Connected Strategy — The Council has adopted a regional 'Smart and Connected' Strategy to promote the economic development of the region and this is now integrated across Council activities. The strategy emphasises an integrated approach that maximises the skills and resources of the region and how they interrelate with the national and international context.

The strategy has been built on a framework of six Community Outcomes — Governance, Environment, People, Economy, Mobility and Learning, as shown in **Error! Reference source n ot found.**. The outcomes of most significance to the water supply are: environment (sustainable resource management), economy (productivity), and living (health). The contribution of the water supply activity is discussed in more detail in section 2.2 of this plan (community outcomes).

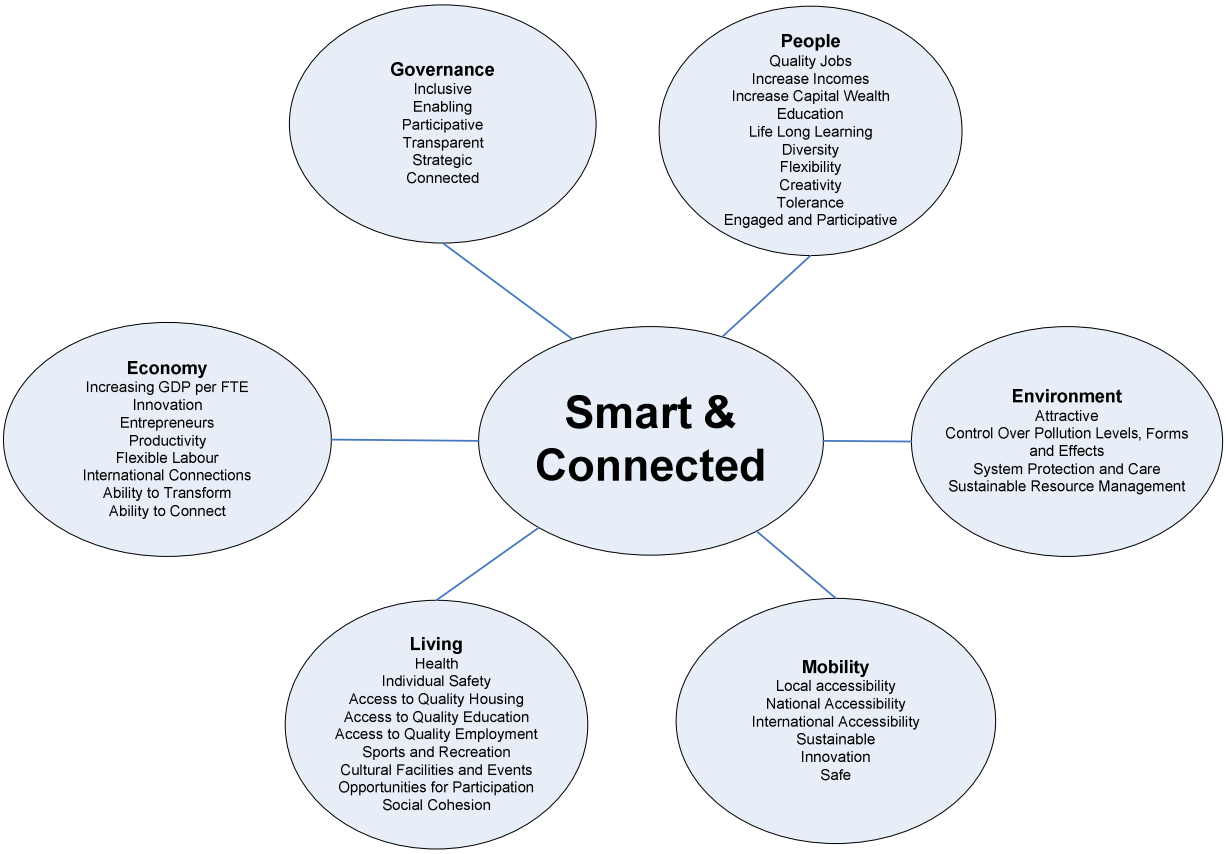


Figure 1-2 The Smart and Connected Strategy framework

The 30 Year Infrastructure Strategy — This strategy is an important document for medium to long term planning.

The Long Term Plan — The Long Term Plan (LTP) is a requirement of the Local Government Act 2002. The LTP is the primary medium term planning document for local government and contains key information on the activities, assets, levels of service and financial details of all Council services. The plan covers a 10 year period and is updated every three years. It contains detailed information for the first three years and outline information on proposed services and budgets for a further seven years. Asset management plans provide more detailed information on the main Council activities included in the LTP.

Annual Plan —The Long Term Plan (LTP) is reviewed and updated every three years. In the intervening years, any significant changes to the LTP are consulted on through the Annual Plan. Progress on infrastructure projects, performance against levels of service and financial matters are communicated to the public through the **Annual Report**.

Resource Management Plans — The operative Wairau/Awatere and the Marlborough Sounds Resource Management Plans have been updated and superseded by the Marlborough Environment Plan (MEP). The MEP is a combined regional and district plan which implements the Resource Management Act. The Proposed MEP provides the framework for assessing resource consent applications. Resource consent conditions apply for a number of water supply activities, including water abstraction and how the discharge of water treatment wastes can occur.

Bylaws — Council has powers to write local enforceable bylaws. The district-wide Water Supply Bylaw is currently being reviewed. It defines local laws and standards in the design and operation of the reticulation system and the customers connecting to the reticulation.

Urban Growth Strategy — The Council has a well-established urban growth strategy which was developed through 2011–2013, following thorough consultation and analysis of future growth patterns. The Assets & Services (A&S) Department was fully involved in the development of the strategy in order to ensure urban growth pockets could be adequately serviced.

The A&S Department works with developers from the beginning of a development proposal to form an agreed service plan. This ensures new infrastructure is designed and installed in a way that matches the long term growth projections. Council coordinates the collection of development levies, and ensures developers are reimbursed for installing additional capacity to meet future demand.

The Backflow Prevention Policy — This policy seeks to avoid contamination of the drinking water supply through back-siphonage or backflow into the reticulation from private plumbing. The policy requires customers who present a risk of contamination to install and maintain a suitable backflow prevention device at the point of delivery.

1.4 Water Assets included in the Plan

Council operates seven water schemes — Blenheim, Picton, Renwick, Havelock Awatere, Riverlands and Wairau Valley. The details of each of the schemes is summarised in Table 1-1

Location/ Asset Type	Mains (km)	Service lines (km)	Meters	Back flow Preventor	Bores	Intake	Treat ment plants	Distribution pump Stations	Booster Pump Stations
Awatere	147.7	6.9	535	7		1	1	1	4
Seddon	10.2	2.0	286	4			1	1	
Blenheim	202.6	72.5	713	302	9		2	2	6
Havelock	9.5	2.6	37	9	2		1	1	
Picton	61.0	17.2	189	59	3		2	1	3
Renwick	17.1	6.6	49	22	6		1	1	
Riverlands	10.8	1.2	134	50	3			1	
Wairau	3.5	0.4	61	3	1		1	1	
Total	**462.3**	**109.4**	**2004.0**	**456.0**	**24.0**		**9.0**	**9.0**	**13.0**

Table 1-2 Summary of Water Assets

Maps and a description of the assets and their recent history are included in Appendix 1.

The Council also owns and operates two irrigation schemes — the Southern Valleys Irrigation Scheme and the smaller Riverland's Irrigation Scheme. The irrigation schemes are reported in the LTP and annual plans within the Regional Development activity group. However, they are not included in this asset management plan because they do not provide potable water, and are primarily a resource for economic development.

1.5 AM Plan Stakeholders

This plan is an important reference for current and future Councillors and community decision makers. It provides information on the Council's stewardship of the water assets on behalf of the community, including the performance and capacity of the assets, and future demands related to the assets.

The plan is also a primary reference document for managers and engineers within the Assets & Services Department, and operators of the water supply services. It provides a systematic approach to maintaining, upgrading and operating the water assets in order to meet the Council's objectives. It will be a source of information for the Council's corporate planners (particularly during the development of long term plans) as well as for Finance, Building Control and Resource Consents staff.

Marlborough is a unitary authority and, as such, is responsible for environmental monitoring and the management of both freshwater and coastal water quality. Treated wastewater effluent discharges can have a major impact on the quality of local waterways and these are monitored by the Regulatory Department.

It is of interest to the District Health Board and the NZ Fire Service, who have a significant interest in the quality and performance of the service. The current status and future resilience of the water supply is also important for civil defence and the engineering lifeline utilities group.

Businesses, particularly the viticulture, agriculture and food processing industries, are stakeholders with an important vested interest in the quantity, quality, reliability and price of water supply services.

Environmental and ecological groups have a significant interest in the abstraction and management of water resources, as do local iwi who have a deep cultural association with the aquatic environment.

1.6 Organisational Structure

The Assets & Services Department is responsible for the Council's water supply services. The capital programme is managed by the Planning and Development Engineer and the day-to-day running of the system by the Operations and Maintenance Engineer. The structure of the department is shown in Figure 3. The department has its own Finance and Information Manager to supervise the budget and liaise with the Corporate Finance Department.

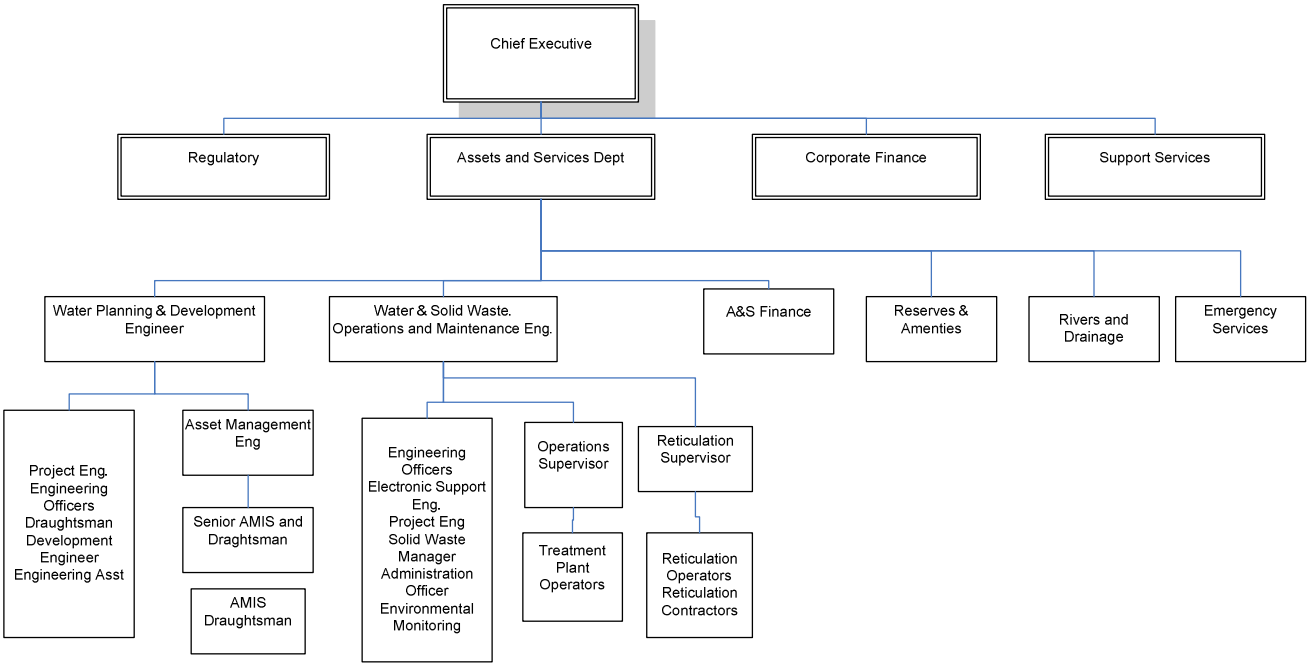


Figure 1-4 Organisational structure of water services at Marlborough District Council

1.7 Negative Effects

The Local Government Act 2002 requires the identification of the possible negative effects associated with the provision or inadequate provision of the service.

Area of Impact	**Potential Negative Effects**
The health of communities	Propagation of human and animal disease through lack of adequate, clean drinking water Propagation of disease, poor hygiene and insanitary living conditions from insufficient water for washing.
The safety of communities	Insufficient water for firefighting purposes.
Minimising adverse environmental effects	Damage to the natural environment through overuse of freshwater resources, pollution from treatment processes or chemicals, or damage during infrastructure installation. Insufficient water to maintain public amenities and parks.
Industrial and residential development	Constraints on the location of domestic residential development due to inadequate water supplies or supply infrastructure. Inhibited economic development due to inadequate water supplies or supply infrastructure.
Cultural Sensitivity	Offence to ethnic or cultural groups from the inappropriate or insensitive use of natural water resources.

Table 1-2 Negative effects of water services

1.8 Plan Framework

In 2012 the asset management plan was substantially rewritten and updated in accordance with the guidance in the NAMS International Infrastructure Management Manual 2011. The 2018 plan incorporates many of the recommendations of the AECOM peer review of the 2015 plan. Advice and guidance from SOLGM and comments from Audit New Zealand are also reflected in this plan. The six chapters in the plan provide the following information.

- **Chapter 1 — Introduction**: background, strategic context, plan framework, and maturity of asset management planning.
- **Chapter 2 — Levels of Service**: customer research and expectations, strategic and corporate goals, legislative requirements, current levels of service, desired levels of service.
- **Chapter 3 — Future Demand**: demand drivers, demand forecasts, demand impacts on assets, demand management plan, asset programmes to meet demand.
- **Chapter 4 — Lifecycle Management Plan**: background data on water infrastructure, infrastructure risk management plan, routine operations and maintenance plan, renewal/replacement plan, creation/acquisition/augmentation plan, disposal plan.
- **Chapter 5 — Financial Summary**: financial statements and projections, funding strategy, valuation forecasts, key assumptions, data confidence, risks and assumptions.
- **Chapter 6 — Plan Improvement and Monitoring**: status of asset management practices, improvement programme progress, 2018–21 improvement programme, monitoring and review of procedures, performance measures.
- **Appendices.**

1.9 Asset Management Planning Maturity

The Council seeks to achieve a solid core standard of asset management. Intermediate and advanced asset management tools and techniques are deployed in certain areas but only where they add demonstrable value to the decision making process. The maturity of asset management within Marlborough District Council is dependent upon a number factors — skills available, size and criticality of the assets, complexity and value of the infrastructure, experience and culture of staff, and the approach to risk management.

The Council recognises there is an element of diminishing returns between the effort required to collect data and the subsequent improvement in decision making. The water infrastructure is made up of relatively small and comprehensible systems. Whilst there are competing demands for resources between different networks and functions within the networks, they are managed by a single and experienced management team.

Core asset management processes are being developed to provide intelligence to operational managers and to ‘future-proof’ the existing knowledge base. Advanced techniques such as mathematical modelling, option identification and selection, cost-benefit and total benefit analysis, risk management techniques and asset condition grading are all regularly used during the implementation of the current asset management processes.

A team within the Assets & Services Department continues to collect data on asset condition, location and performance to support the asset managers. The quality of the data is systematically and continuously reviewed and improved.

As the treatment processes and the connectivity of the reticulation system become more sophisticated, network modelling and other techniques provide insights into the complex behaviour and performance of the infrastructure. Dynamic mathematical models have been developed for most of the reticulated networks. The models have been verified against existing operational data and can therefore be used to predict the outcomes under a range of different future scenarios.

There is a current reliance on the knowledge and experience of a stable and highly skilled workforce. The depth and breadth of experience across the workforce reduces many of the risks associated with reliance on individual personnel. However, high quality data and empirical analysis can be useful for effective decision making and forward planning. There is an increasing demand for logical and robust processes to support and demonstrate effective management.

The Council's approach to asset management is to select and use advance techniques where they will assist in resolving conflicting demands whilst maximising the skills and practical experience of staff.

Chapter 2: Levels of Service

Components of this section

2.1. Strategic Overview — The role of the water supply services within the context of Council's services.

2.2. Community Outcomes — How water supply services contribute to the Living, Economy and Environment Community Outcomes.

2.3. Who Are Our Customers and Stakeholders — A description of the customers and stakeholders of water services.

2.4. What Our Customers Want — The expectations of our customers and how these were discovered.

2.5. What We Have to Do — Legal Requirements — Our statutory obligations related to providing a water service.

2.6. What We Currently Provide — The current levels of service and the performance indicators of our achievements.

2.7. What Our Customers Would Like — Future challenges from growth and changing expectations.

2.1 Strategic Overview

The supply of drinking water is probably one of the most recognised, and heavily relied upon, services provided by the Council. In 2019-20 the operating costs of the water supply service accounted for around 8.1% of the Council's total activity expenditure. This proportion is likely to increase as water treatment processes become more sophisticated to meet the existing Drinking Water Standards New Zealand (DWSNZ) and proposed Water Services Bill. The relationship between the water asset management plan and the wider strategic context is outlined in Chapter One of this plan.

There is strong national direction to improve the safety and delivery of water supply services. Compliance with the DWSNZ has been mandatory and is almost certain to become more stringent following the implementation of the proposed Water Services Bill. The fire-fighting code of practice has been established by national expertise to determine flow and pressure of water delivery, and the Department of Internal Affairs has introduced national performance measures. Given the national interests in water supplies throughout New Zealand, there is some uncertainty about whether water supply activities will remain as a local authority function in future. The Three Waters Reform which is currently being undertaken asks Local Authorities to decide whether they will "opt-in" to the reform and support the establishment of multi-regional water supply entity by December 2021. At this stage, Marlborough District Council has been in support of this process.

Separation of water supply from local authority jurisdiction would allow consistent implementation of national objectives and priorities; professional and expert governance, consistent standards and the practices across the activity; the pooling of technical expertise for increasingly demanding engineering and operational standard, cost sharing across an increased user base and opportunities for alternative funding models.

2.2 Community Outcomes

Community Outcomes are a keystone to public service provision in New Zealand. The Council's Long Term Plan (LTP) is the vehicle by which the relationship between the community's well-being, community outcomes and the services provided by the Council are described and published, with feedback invited from the community. The LTP is updated every three years whilst Annual Reports and Plans are published annually in the interim periods.

The water supply activity contributes to three Community Outcomes:

- Living, by providing an adequate supply of healthy drinking water for communities
- Economy, by providing cost-effective treated water that permits commercial activities to thrive
- Environment, by sustainably sourcing water from aquifers and waterways, and avoiding damage during construction and operation of the supply infrastructure.

The Community Outcomes have been established through consultation with the community and their elected representatives. The Council conducts an annual customer satisfaction survey of 600 residents. Plans and strategies are published for public consultation, with submissions considered and all agreed amendments incorporated prior to their adoption. The Council also benefits from the experience and research of a number of national and local agencies such as the Nelson Marlborough District Health Board, Ministry of Social Development, Statistics New Zealand, New Zealand Transport Agency and the Marlborough Research Centre.

2.3 Who Are Our Customers and Stakeholders

The expression 'customers' is a widely understood concept in terms of the free enterprise economy. It has been less readily adopted as a way of describing the relationship between ratepayers and councils. This reluctance is partly due to the monopoly a council has over many services, and the charging mechanism through the general rates. A council has a more complex role to play than simply selling services. Councils also have a statutory duty to provide certain services and to carry out a variety of regulatory functions. This is particularly relevant for the water supply services, and for this reason it is more accurate for this section to consider all of the stakeholders.

Commercial properties and domestic households connected to the reticulation may be considered traditional customers. Approximately 82% of properties in Marlborough receive the Council's reticulated water supply for drinking, cooking, food preparation, the provision of sanitary living conditions and domestic irrigation.

Industries and businesses are also heavily reliant on the water supply. Many businesses use large volumes of water in their processes and to provide domestic facilities for their staff.

Central government is an important stakeholder in the provision of water supply services through its legislative powers. The obligation to supply water and the required standards and quality of supply are outlined in the Public Health Act 1956, the Local Government Act 2002, and other legislation (see section 2.5 of this plan).

The abstraction of water from the environment is controlled through the Resource Management Act 1991. Marlborough District Council is a unitary authority which means the Council's planning and consents departments are also stakeholders and have the same responsibilities as regional councils to establish a water allocation framework in the Marlborough Environment Plan, to administer this framework when assessing resource consent applications to take water, and to monitor and enforce any breaches in consent conditions related to freshwater abstractions and discharges.

Drinking water standards are a fundamental public health issue and are currently monitored and regulated by the Nelson Marlborough District Health Board. Implementation of the Water Services Bill will see Taumata Arowai becoming the new regulator of water services in the second half of 2021. Taumata Arowai was established as a Crown entity in March 2021.

The New Zealand Fire Service is an occasional but important stakeholder in the water supply. Providing sufficient flow and pressure in the reticulation to meet the requirements of the SNZ PAS 4509:2008 New Zealand Fire Service Firefighting Water Supplies Code of Practice is one of the defining standards in the design and operation of the reticulation.

Iwi and environmental groups, including Forest and Bird, Guardians of the Sounds, Kaipupu Point Inland Island and the Grovetown Lagoon Working Group, have an interest in the management of water resources. Iwi have a special cultural relationship with the environment which is an important consideration in the abstraction and distribution of water, and construction of related infrastructure.

2.4 What Our Customers Want

The levels of service and the subsequent performance measures are derived from the fundamental objectives of a water supply, which are to provide:

- a safe and reliable source of drinking water
- a resource for washing, cleaning and sanitary purposes
- a consistent, constant and unlimited supply
- the service at a reasonable and equitable cost.

In practice there is a tension between the provision of the first three objectives and the willingness to pay for the service. Some of the standards are pre-empted by legislation and not open to negotiation; others recognise the realities of delivering the desired goals within financial and environmental constraints.

The proposed levels of service (as listed in section 1.2.4 of this plan) are published in the Long Term Plan consultation document before the LTP is finalised, to enable public consultation on them. Submissions from the public (which can be either in support or opposition to the proposed levels of service) are formally received and carefully considered by the Council.

The Council also collaborates with a number of national and international organisations to help to determine the appropriate levels of service and performance indicators. The National Asset Management Support Group (NAMS Ltd) publishes guidance and hosts training courses on good practice in the development of levels of service. Water New Zealand and the Institute of Public Works Engineering New Zealand (IPWEA) assist in the promotion of best practice through published guidance, research, working groups and discussion papers.

Each year an independent consultant is commissioned by the Council to undertake a customer satisfaction survey. A telephone poll of 600 residents across the region is selected as a statistically representative sample of the population. The survey asks respondents to score each of the Council's activities, and the results are analysed and compared with responses from previous years. This provides a subjective assessment of Council's performance relative to recent history. Verbatim comments are also recorded and these provide a good source of information on the appropriateness of the levels of service and individual concerns.

The outcome of the customer satisfaction survey can be heavily influenced by recent events or media coverage of a particular topic.

In September 2020 a Levels of Service workshop was held to provide councillors with information on the current levels of service, to discuss the options and seek their feedback. No major amendments were identified as a result of the workshop.

Community involvement and acceptance is sought at the early stages of planning major water upgrade projects through the formation of Consultative Working Groups. Currently groups in Seddon, Renwick and Havelock are regularly consulted to discuss the options for water treatment and demand management.

The most significant recent example has been the Awatere Water Users Group. The Group has been set up with a formal constitution and the election of members from the Awatere community. The group has been heavily engaged in finding a financially acceptable solution to the water quality issues related to their supply. This is a particularly valuable approach when there isn't a single preferred solution and the cost to the community is high. Similar community involvement will be required to resolve the water capacity issues in Renwick and Picton.

Marlborough District Council reviews its business processes from a 'systems' perspective. The foundation of the 'systems thinking' approach is to consider the performance of the business from the point of view of the customers. Once the customers' experiences are thoroughly understood the business systems can be analysed to ensure they are aligned with delivering the best outcome. This is an important process because it has been frequently demonstrated that many business processes are adept at delivering internal objectives that are not necessarily aligned with providing the best outcomes for the customers.

In December 2014 a new asset management information system was introduced. This system enables customer service requests to be linked to work orders, making a clear linkage between reported problems and remedial actions. The database is able to provide both asset performance and customer service data.

National Benchmarking

Performance measures for Council activities are reported each year in the Annual Report. These have become a primary method of monitoring and evaluating progress towards the community outcomes and comparing councils throughout New Zealand. In 2013 Non-Financial Performance Measures were issued by the Secretary for Local Government in accordance with section 261B of the Local Government Act 2002. The rules to provide standard performance measures came into force on 30 July 2014 and were incorporated into the Council's reporting process in 2016. Sub-part 3 of the rules prescribe 14 performance measurements for water supply to be adopted by all local authorities throughout New Zealand.

Many of the new measures have the same intent as the Council's existing performance indicators for water quality with regard to: bacteriological and protozoa standards, the response and resolution time for urgent and non-urgent customer requests, the number of customer complaints under six categories, and water demand/usage. The benchmark measures are discussed in section 2.6.

2.5 What We Have To Do — Legal Requirements

Local Government Act 2002

- **Section 11A** — network services are considered a 'core' service of local government**.**
- **Section 101B** — Local authorities must prepare an Infrastructure Strategy.
- **Section 130** — confers an obligation on local government organisations to continue to supply water services and maintain capacity.
- **Section 125 & Amendments** — define the requirement to assess water and sanitary services within the Council's area of jurisdiction.

Building Act 2004

- This Act provides a legislative framework for the building standards in the Building Code. Buildings must be safe and sanitary and must not threaten the water supply through contamination.

Health Act 1956

- **Section 39** — houses must have a sufficient supply of potable water.
- **Part 2A** of the Act was added by the **Health (Drinking Water) Amendment Act 2007** and requires community drinking water supplies to comply with the legislation over a phased period, depending on the size of the community.
- The Act also requires water suppliers to have a comprehensive public health risk management plan for their supplies. It also facilitates charging for backflow protection.

Rating Powers Act 1988

- This Act gives territorial local authorities the powers to gather revenue in relation to water supplies by rating, to cut off a water supply when water rates are not paid and to install water meters.

Public Works Act 1981

- This Act provides powers to local authorities to procure land for waterworks activities where necessary.

Resource Management Act 1991

- The purpose of this Act is to promote the sustainable management of natural and physical resources.
- The impounding of streams and abstraction of water from various sources are controlled under the Proposed Marlborough Environment Plan (MEP) which will supersede two operative regional resource management plans (the Wairau–Awatere Resource Management Plan and the Marlborough Sounds Resource Management Plan).

Food Act 1981

- **Section 11C (2)** permits the Minister of Health to prepare and publish 'food standards' covering a number of issues.
- Whilst drinking water is clearly included in the definition of 'food' there is no specific reference to reticulated water and to date the legislation has been used in relation to bottled water only.

Health and Safety at Work Act 2015

- This Act provides for the occupational health and safety of staff, contractors and individuals involved in providing the water supply services.

Civil Defence Emergency Management Act 2002 & Amendment 2016

- **Section 60** requires operators of lifeline utilities (including water supplies) to prepare to function to the greatest possible capability during an emergency.

National Environmental Standards for Sources of Human Drinking Water

- This national environmental standard (NES) provides territorial authorities with powers to control both water abstraction and discharge consents in areas upstream of drinking water abstraction points. (It was enacted in June 2008.)

SNZ PAS 4509:2008 New Zealand Fire Service Firefighting Water Supplies Code of Practice

- Whilst the Code of Practice does not have statutory powers, it is the basis for the partnership between the Fire Service and local authorities for the provision of water for firefighting purposes in urban fire districts.

National Policy Statement on Urban Development Capacity 2020 (NPS-UDC)

The NPS-UDC specifically requires provision to be made for urban development in an area.

Objective A2: Urban environments that have sufficient opportunities for the development of housing and business land to meet demand, and which provide choices that will meet the needs of people and communities and future generations for a range of dwelling types and locations, working environments and places to locate businesses.

Policy PA1: Local authorities shall ensure that at any one time there is sufficient housing and business land development capacity according to the table below:

Table 2-1 Policy objectives of the National Policy Statement on Urban Development

Short term (the next 3 years)	Development capacity must be feasible, zoned and serviced with development infrastructure.
Medium term (3 to 10 years)	Development capacity must be feasible, zoned and either: • serviced with development infrastructure, or • the funding for the development infrastructure required to service that development capacity must be identified in a Long Term Plan required under the Local Government Act 2002.
Long-term (10 to 30 years)	Development capacity must be feasible, identified in relevant plans and strategies, and the development infrastructure required to service it must be identified in the relevant Infrastructure Strategy required under the Local Government Act 2002.

2.6 What We Currently Provide

Currently the Council has six levels of services related to water supply.

Achievement against the levels of service standards is judged through seven 'performance indicators' which are reported in the LTP/Annual Report.

LEVEL OF SERVICE: Customer Satisfaction — Provide an overall level of service that meets or exceeds residents' expectations.

Performance Indicator: Residents' satisfaction survey.

The survey scores achieved between 2008 and 2020 are shown below.

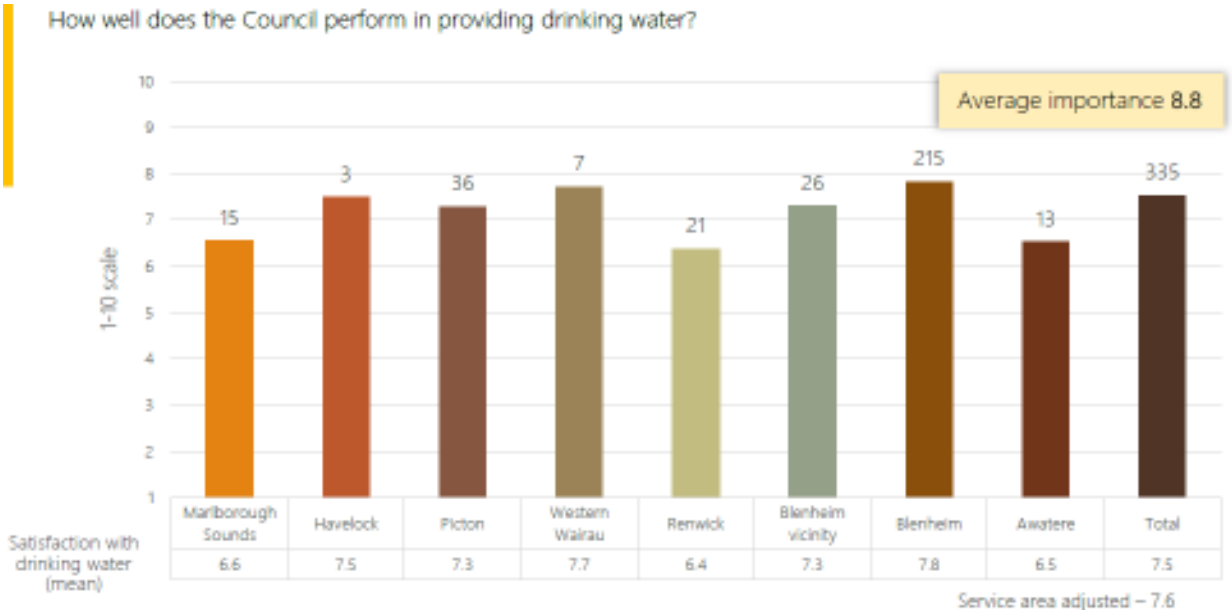


Figure 2-1 Customer Satisfaction Rating with Water Supply

The survey is introduced to the customer as follows — "The Council operates fresh water supply schemes servicing Blenheim, Renwick, Picton, Awatere, Seddon, Wairau Valley, Havelock and Riverlands/Te Koko-o-Kupe/Cloudy Bay business parks". Residents are then asked: "If you receive Council supplied drinking water — on a scale of 1 to 9 where 1 = not at all

well, 5 = neutral and 9 = extremely well, how well do you think the Council performs in providing this service?"

Water supply received the highest customer satisfaction rating of all Council services in the 2020 survey. This may have been unexpected as drinking water supply continues to feature heavily in the media. Locally, there has been implementation of whole of network monitoring in Renwick and Havelock. At the same time, on a national level, the Three Waters Reform has put a focus on to water suppliers.

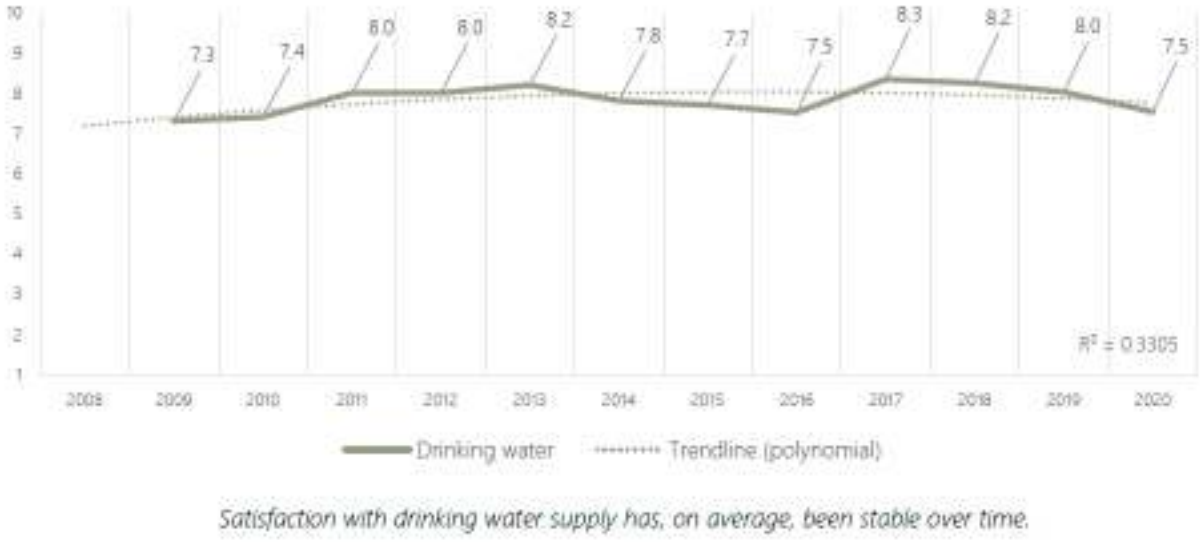


Figure 2-2 Customer responses to the 2017 satisfaction survey

The customers' responses are recorded along with any ad hoc comments. The results of the 2020 survey are shown in Figure 2-

Drinking water unprompted comments (coded categories)

	Positive	Count	Negative	Count
Drinking water	Good supply	56	Too much chlorine	3
	No issues	15	Other negative	3
	Good taste / smell	13	Poor taste / smell	2
	Improvements needed	10	Upgrades needed	1
	Other positive	4		

Drinking water satisfaction percentages by area

	Marlborough Sounds	Havelock	Picton	Western Wairau	Renwick	Blenheim vicinity	Blenheim	Awatere	Total
Drinking water	55%	100%	81%	87%	68%	79%	88%	63%	83%

Table 2-2 Drinking Water Satisfaction by area

Lower scores in the Renwick and Awatere are understandable. The implementation of whole of network monitoring in Renwick has caused some concern amoungst residents. By working through this process with a 12 month period of notifying users of consumption volume whilst not charging for actual water usage should aid in helping consumers to feel more comfortable about the change in charging regime. In the Awatere, these results are likely to be due to the continued disatisfaction with water quality.

Performance Indicator: The total number of complaints received by the local authority about any of the following: drinking water clarity, taste, odour, flow and pressure, and continuity of supply. Also any complaints about Council's response to any of the issues.

These measures were introduced with the national non-financial performance measures in 2015.

Table 2-3 Complaints received about the water supply

	Customer complaints (per 1000 connections)		
	Target	2018-19	2019-20
Clarity	1.3	1.39	0.06
Taste	1.9	0.21	0.25
Odour	0.65	0.32	0.06
Flow & Pressure	1.9	1.81	0.19
Continuity of Supply	1.3	1.17	0.13
Response to Issues	0.65	0	0.25

There are around 16,700 water connections to the Council supply. The statistics show customer complaints are generally at a low level, which is supported by feedback from the customer satisfaction survey (Table 2-3 Complaints received about the water supply.) When complaints received were traced to problems on private pipework and have been excluded from the reported statistics.

Customer perception is subjective and is often relative to an accepted 'normal' operating conditions. Changes in operational practices, whilst still within acceptable range, can be detected by the users and generate an enquiry to the Council. For example the supply to Picton can be either from the underground aquifer at Speeds Road or the impounding dam at Essons Valley. The water from these different sources has inherently different characteristics that can lead to enquiries regarding the taste or odour of the water.

Similarly, air that is dissolved in water under pressure is released as tiny air bubbles when the pressure is released. This can generate customer complaints regarding the clarity of water but is not a water quality issue and it is not the intention of the performance indicator to record this type of enquiry.

Performance indicators are used to identify intrinsic weaknesses in the water supply system to help guide investment decisions. Care must be taken when compiling and interpreting non-empirical data to avoid 'red herrings'.

LEVEL OF SERVICE: Safety of Drinking Water — Provide a level of water quality that meets community needs and is appropriate to the degree of public health risk.

The New Zealand Drinking Water Standards (DWSNZ) are detailed and complex. However, the overall principle is the water supplier must select treatment processes that will combine to progressively remove biological contaminants and make the water safe for public consumption. The number and types of treatment required is dependent on the quality of the original source water. Generally, water drawn from deep, confined underground aquifers requires less treatment than water sourced from rivers or an upland reservoir which is more susceptible to contamination from the immediate environment.

Table 2-4 Current Status of Water Treatment.
**Cost for treatment only pumps, storage, etc not included.*

Supply Zone	Population	Seasonal Population Increase	Water Safety Plan	Bacterial Treatment	Protozoa Treatment	Budget Cost*	Date Compliant
Blenheim	23,777		Y	UV	UV		2012
Picton	5,001	5,925	Y	UV & Chlorine	UV		2017
Havelock	630		Y	Chlorine		$7.35M	2024
Renwick	1928		Y	Chlorine		$5.46M	2022
Riverlands	68		Y	Secure		$11.3M	2023
Seddon	490	300-400	Y	Chlorine	Filtration		
Awatere	733		Y	Chlorine		$1.5M	2024
Wairau Valley	111		Draft	Chlorine		$0.7M	2022

The Blenheim supply has been compliant since 2012 when the Central Water Treatment Plant was commissioned. The Middle Renwick Road plant was upgraded in 2009. Chlorination of the Blenheim Water Supply is anticipated and is likely to be part of the current upgrade which is anticipated to be completed by 2024.

In March 2017 the Council commissioned the Speeds Road Water Treatment Plant (WTP). In conjunction with the Essons Valley WTP, the two plants ensure the water supply to Picton meets the DWSNZ for bacteria and protozoa. Both the Essons Valley and the Speeds Road Water Treatment Plants are planned for upgrades, due to be completed by 2024.

In 2019, the Seddon Water Treatment Plant was commissioned. This has removed the requirement for Boil Water Notices for the township of Seddon. Point of Entry Treatment for the rest of the Awatere Water Supply area is planned for 2024 in order to make this supply compliant.

Plans are underway for new treatment plant in Renwick, Havelock, Riverlands and Wairau Valley township and are to be commissioned between 2022-24.

The groundwater source for the Riverlands supply has been monitored for many years. The micro-biological testing has produced consistently good quality results. The testing has been undertaken to demonstrate the source water will qualify as a 'secure bore supply' under section 4.5 of the DWSNZ. The secure status is based on slow percolation of surface water through the aquifer to reduce contaminants. It is therefore given a lower priority for additional treatment. However, an outcome of the Havelock North water contamination inquiry[1] is an urgent recommendation that section 4.5 of the DWSNZ (secure bore) is immediately abolished.

The Riverlands ground,water also has relatively high levels of iron and manganese. These are not harmful to health but elevated levels of iron and manganese can cause discoloration and staining which can be a particular issue for some industrial processes. For this reason, a new source was sought and is located in St Andrews. The new wells have been installed plans for

[1] Report of the Havelock North Drinking Water Inquiry: Stage 2. Part 23. Dept. Internal Affairs (Dec 2017)

the new treatment plant and associated supply main to the Riverlands area are in progress. This work is planned to be commissioned by 2023.

The Awatere Rural supply has a long distribution system with a relatively low population density. The supply was initially installed as a rural water supply and much of the water is still used for agricultural purposes. It is likely that the most cost-effective method of treating this supply is to install individual treatment at the point of use. This would involve fitting a small filter/disinfection unit at the point of entry to each property and only treating the water used within the dwelling. The capital investment for this solution may be favourable but the ongoing maintenance to ensure the several hundred units are serviced and functioning correctly will be considerable. This work is planned to be completed by 2024.

Performance Indicator: The extent to which the local authority's drinking water supply complies with (a) Part 4 of the DWSNZ (bacteria compliance criteria) and (b) Part 5 of the DWSNZ (protozoal compliance criteria.) These measures became a mandatory national non-financial performance indicator following the amendment to the Local Government Act 2002, effective from 1 July 2015.

The Blenheim supply became compliant for both bacteria and protozoa with the completion of the treatment plant upgrades in 2012.

Picton, Renwick and Havelock have complied with the bacteriological standard for many years by virtue of the chlorine disinfection of the supplies. Chlorination is not effective against protozoa and additional treatment will be required to meet this standard. The upgrades to the Picton supply were completed in March 2017 and works are underway for Renwick, Havelock, Riverlands, Awatere and Wairau Valley (see section 4.5.1 of this plan.)

Table 2-5 Compliance with the DWSNZ

	Part 4: Bacteria		**Part 5: Protozoa**	
	2018-19	2019-20	2018-19	2019-20
Blenheim	Y	Y	Y	Y
Picton	Y	Y	N	Y
Havelock	Y	Y	N	N
Renwick	Y	Y	N	N
Riverlands	Y	Y	N	N
Awatere	N	N	N	N
Wairau Valley	N	N	N	N

To comply with the DWSNZ a comprehensive sampling programme must be implemented and rigorously adhered to at both the treatment plants and at sample sites from around the reticulation system. Failure to implement the sampling programme is recorded as a failure to comply with the requirements of the Drinking Water Standards. The recognised indicator of the bacteriological quality of drinking water is the absence of E.coli bacteria. The bacteria are derived from the mammalian gut and are very common in the wider environment. It is readily detected and is therefore used as an indicator of possible faecal contamination of the drinking water supply. Detection of the bacteria in a routine sample provokes an immediate investigatory sample survey of the source, treatment works and water distribution area in proximity to the positive sample. Confirmation of the infection will result in emergency disinfection of the water supply and flushing of the watermains. A precautionary 'Boil Water Notice' is issued to households in the affected area.

Regardless of whether or not the initial bacteria contamination can be confirmed by the investigation, the positive result is officially recorded and immediately reported to the Drinking

Water Assessor who monitors the progress of the investigation. The result is recorded as a 'failure' for formal reporting purposes.

The investigation must continue until three consecutive days of clear results are obtained. Failure to detect any further contamination after the first sample failure may be due to a transient 'slug' of infected water passing through the system or, alternatively, due to accidental contamination of the water or sample bottle during the sampling process.

The four new water treatment plants are continuously monitored by electronic sensors. Each month around 44,000 sensor readings from each plant are checked and reported to the Drinking Water Assessor to verify the plants are functioning correctly.

LEVEL OF SERVICE: Fault Response Times — Provide a service that is timely and responsive to customer needs.

Performance Indicator: Where Council attends a call-out in response to a fault or unplanned interruption to its networked reticulation system, the median response times set out in Table 2- are met.

It is inevitable that structural/mechanical systems will fail from time to time. Proactive monitoring, good maintenance practices, prioritisation of critical assets and built-in redundancy will help to minimise the frequency and impact of failure. However, once failure has occurred the Council can reduce the impact on customers by promptly responding to customer service requests. The target for the performance indicators has been derived through consultation with customers on what is considered to be a reasonable and acceptable service.

Table 2-6 shows the Council's performance against this indicator has been generally satisfactory. The response to an emergency event is interpreted as the arrival on site of a water officer or repair crew. Target times have been adjusted to reflect the travel time required across each network. The Council provides a 24/7 emergency call-out service however the number of requests that are issued as Urgent is high. This is predominantly due to staff error in the recording of customer requests and then the issuing of work orders. We report against the work orders as they are recorded and we need to do better to educate staff as to the urgency of all requests. There have been no complaints over these timeframes as to the response or resolution time of tasks.

Table 2-6 Response and resolution times for customer service requests

Performance Indicator	Target	2018-19	2019-20
(a) attendance for urgent call-outs: from the time that the local authority receives notification to the time that service personnel reach the site (in minutes), and	30 minutes	28 mins	
Blenheim	60 minutes		47 mins
Picton	60 minutes		168 mins
Riverlands	60 minutes		21 mins
Renwick	60 minutes		19 mins
Awatere	120 minutes		142 mins
Havelock	120 minutes		71 mins
Wairau Valley	120 minutes		11 mins
(b) resolution of urgent call-outs: from the time that the local authority receives notification to the time that service personnel confirm resolution of the fault or interruption (in hours), and	4 hours	3.5 hours	17.55 hours
(c) attendance for non-urgent call-outs: from the time that the local authority receives notification to the time that service personnel reach the site (in hours), and	3 working days	2.2 days	0.18 days
(d) resolution of non-urgent call-outs: from the time that the local authority receives notification to the time that service personnel confirm resolution of the fault or interruption (in hours).	10 working days	1.67 days	1.96 days

LEVEL OF SERVICE: Demand Management — Provide a reliable water supply service

Performance Indicator: The average consumption of drinking water per day per resident within the territorial authority district (in litres)

Table 2-7 Demand Management average daily consumption

Performance Indicator	Target	2018-19	2019-20
Average consumption per day per resident	780	1064	773

Average consumption is determined through the annual water balance and currently contains a lot of assumptions as to water allocation. The summer of 2018-19 was very dry and required water restrictions across Renwick and Picton. This also meant that water from Blenheim was supplied to industry and residences in the Marlborough Sounds. Until recently, we have been

unable to accurately record water supply data for the Blenheim area and have had to make a number of assumptions around levels of leakage and domestic demand. This issue has been rectified with two water filling stations being installed, one in Blenheim and one in Picton. With the installation of water meters across the entire supplies of Renwick and Havelock, we will be able to understand demand patterns and leakage rates with a lot more accuracy. There are still a lot of major users e.g. reserves, aquatic centre, who do not have water meters. Whole of network water metering projects are planned to be completed for Picton and Blenheim by 2024 and 2027 respectively.

LEVEL OF SERVICE: Maintenance of the reticulation network – the percentage of real water loss from the local authority's networked reticulation system.

Ensuring the water infrastructure is well maintained and fit for purpose is an important Council role and is one of the main purposes of asset management planning. The Secretary for Local Government has included the following indicator as one of the compulsory non-financial performance measures.

Performance Indicator: The percentage of real water loss from the local authority's networked reticulation system.

The targets set by Council and the performance achieved over the last two years is shown in Table 2-. The Council uses the minimum night-time flow to estimate losses and leakage in accordance with Water New Zealand's Water Loss Guidelines. The Council's approach to water losses is discussed in section 2.7.6

Table 2-8 Percentage of water losses

	Target	2018-19	2019-20
Blenheim	37%	41%	36%
Picton	32%	30%	30%
Havelock	38%	50%	38%
Renwick	32%	50%	39%
Awatere	15%	5%	5%
Wairau Valley	15%	22%	20%

2.7 What our Customers Would Like – Future Challenges

The Council is committed to supplying water to meet the current Drinking Water Standards (DWSNZ) and the proposed Water Services Bill, to provide a flow and pressure to meet the needs of fire-fighting, and to avoid imposing water restrictions except in extreme conditions. To achieve these levels of service whilst also ensuring the existing infrastructure does not deteriorate to an unacceptable standard will present a challenge to the Council and the community.

The Performance measures proposed in the 2021-31 Long Term Plan to indicate performance against the levels of service are shown in Appendix 2.

2.7.1 Affordability

Perhaps the most important challenge to be faced in the achievement of the levels of service is the question of affordability. As noted in Section 2.4 there is often a conflict between the

desired, or compulsory, levels of service and the ability of the community to pay for them. Meeting the requirements of the existing DWSNZ, the proposed Water Services Bill and the firefighting code of practice requires significant capital investment. Ensuring the infrastructure is resilient to natural hazards and is renewed before becomes inefficient to maintain incurs additional pressure on the budget. The Council is committed to core infrastructure as a priority however.

2.7.2 Future Challenges — Drinking Water Quality

Since the introduction of the Health (Amendment) Act 2007 water suppliers have been required to meet the Drinking Water Standards New Zealand (DWSNZ). The timeframe for compliance is based on size of population. The dates for compliance in section 69C of the Act have not been achieved in Marlborough. The expected compliance dates are shown in Appendix 2: Levels of Service 2021-2031.

The Stage 2 report from the Havelock North drinking water inquiry has made strong and urgent recommendations that mandatory measures are implemented to improve and ensure the quality of drinking water throughout New Zealand.

Major upgrades of the two Blenheim water treatment plants and two Picton plants have been completed to meet the standards. These plants are continuously monitored to ensure compliance with the standards at all times.

The new Water Services Bill, that is expected to come in to effect in 2021, is likely to require chlorination of existing water supplies where leakage is greater than 3%. The Blenheim Water Supply is currently not chlorinated, the bores will not qualify as being secure and the leakage of this network is calculated to be >30%. The cost to reduce this leakage to the required level will far out way the cost of chlorinating the water supply. Chlorination of the supply will however be a very political topic and will generate a high level of community engagement.

It is likely that ‘secure bore’ status in the existing drinking water standards will be abolished as a consequence of the Havelock North Drinking Water Inquiry. As a consequence treatment will be required for the Riverlands supply. The treatment plant is likely to include iron and manganese removal as the elevated levels in the groundwater are problematic to many of the industrial water users supplied from this water source. A new source has been located and the process for obtaining Resource Consent for this water supply is underway. It is anticipated that this new supply will be commissioned by 2024.

Both community and Ministry of Health acceptance is still required for ‘point of entry’ treatment devices to be fitted to properties on the rural Awatere supply. There are currently no nationally recognised standards for the installation and performance of such devices. It is therefore difficult to progress with an ‘acceptable’ proposal. A solution to this issue is becoming more pressing in light of the Havelock North incident. The service and maintenance of some 500 separate treatment units will present an ongoing challenge with relatively high operational costs. Further consultation on the best option and the actual cost of the improvements will take place with the affected communities in the coming years.

Gap Analysis — Upgrades are planned for all Water Treatment Plants in order to insure compliance with the current Drinking Water Standards and the anticipated Water Services Bill. Chlorination of the Blenheim Water Supply is likely to create a high level of customer engagement on this topic. Improvements to the level and accuracy of data in determining leakage, through metering, will improve our understanding of leakage across our networks.

2.7.3 Response and Restoration Time to Customer Service Requests

The current performance on restoration and response times appears to be in line with customer expectations, and there are few complaints regarding response/restoration times. It is unlikely that significant improvements could be made without considerable changes to standby rosters,

working practices and service contracts. Efforts will be focused on ensuring the current targets continue to be achieved in future.

Gap Analysis — Improve the accuracy of priority levels of work orders and recording of response and resolution times.

2.7.4 Customer Complaints

Similar to the response and restoration times, the performance of the Council's customer services appear to be satisfactory. In the two years since the adoption of a performance indicator related to complaints, no complaints regarding the Council's handling of initial enquiries have been recorded.

The levels of service workshop held with councillors in August 2017 did not promote any significant changes to the current levels of service for the water supply.

Gap Analysis — No significant changes to this level of service have been identified. The targets will monitored to ensure there is no deterioration as the infrastructure ages.

2.7.5 Water Losses

This performance measures require suppliers to measure and report water losses as an indication of the maintenance requirements of the reticulation system. Losses are relatively high in Marlborough (Table 2-2 Real Water Loss Performance Targets.)

Leaking water can drain away without appearing on the surface on gravel and sandy soils, so leaks are often undetected. Leak noise correlation and other leak detection methods require expensive specialist skills. In Marlborough the marginal costs of water production are reasonably low, whereas the fixed costs and capital investment is high. Active leakage detection becomes an efficient technique in areas such as Picton, Havelock and Renwick where the existing sources are becoming overused. Substantial savings can be made if the need to develop additional sources can be deferred by effective demand management (discussed in Chapter 3 — Future Demand). In summary, the relatively high target values for water loss chosen by the Council are a reflection of water availability, the marginal cost of water supply and the high cost of active leak detection.

The Council's policy is to repair identified leaks as rapidly as possible. Serious leaks are responded to as a matter of urgency, particularly if a customer's supply has been interrupted. Lesser leaks are classified as 'important' and are usually repaired within 24 hours. This policy helps to reduce water loss through leakage.

Active leak detection uses a number of specialist techniques to find leaks in the reticulation which are not visible. It can be costly and have variable results. Council continues to apply leak detection services when they are required. Detected leaks on the Council's pipework have been repaired and leaks on customers' pipes have been notified, and rectification notices issued. Reducing losses is part of the Council's overall water management strategy and may help to defer investment in accessing additional water sources. Whole of network monitoring is also assisting to identify leaks on private property and provide assistance for the property owner to fix these leaks.

The more whole of network installation of meters on customer service connections will provide valuable information on patterns of consumption, leakage on private property and accurate data for Water Loss calculations, removing unnecessary assumptions.

Gap analysis — Improved targets for water loss performance measure are included in the Long Term Plan.

Table 2-2 Real Water Loss Performance Targets

The percentage of real water loss from the local authority's networked reticulation system	Baseline	2021-22	2022-23	2023-24	2024-31
Blenheim	37%	37%	37%	37%	37%
Picton	28%	28%	28%	28%	28%
Havelock	28%	28%	28%	28%	28%
Renwick	28%	28%	28%	28%	28%
Awatere	15%	15%	15%	15%	15%
Wairau Valley	15%	15%	15%	15%	15%

Whole of network metering has been completed in Renwick and Havelock and these customers will be billed for their water usage from 1 July 2021. Reductions have already been made in water demand management in the initial non-chargeable period of this project. Metering is planned for Picton and Blenheim at an estimated cost of $2.82M.

The operational cost of metering – meter reading, maintenance, depreciation and volumetric charging will also become more apparent.

2.7.6 Water Consumption

Historically water has been freely available, and water abstraction consent conditions have not imposed onerous restrictions. However, public attention is focused on water availability. Abstraction by all users, both for industrial and rural water use and for drinking water supplies, is under scrutiny throughout New Zealand as it is becoming apparent that unrestrained consumption cannot be sustained. The Council has had to impose water restrictions more frequently, particularly in Havelock and Renwick, where the sources have the potential to be adversely affected by water takes. Objective B3 of the National Policy Statement for Freshwater Management (NPSFM) is "to improve and maximise the efficient allocation and efficient use of water." This is to be reflected locally through Chapters 4 and 5 the Marlborough Environment Plan and through the rules and conditions applied to subsequent resource consent applications.

In future the targets for water consumption will become more stringent. Discussion of water demand management is included in Chapter 3 of this plan.

Table 2-8 Water Consumption Targets

Performance Measure	Baseline	2021-22	2022-23	2023-24	2024-31
The average consumption of drinking water per day per resident within the territorial authority district	750L	750L	730L	710L	700L

The benefits of deferring or avoiding costly investment in developing new water sources are a key driver for the implementation of demand management. The consumption targets in **Error! R eference source not found.** are averaged across the region but per capita reductions are likely be significantly more in Renwick, Havelock and Picton where the development of new sources could be deferred.

Table 2-3 shows the number of days that water restrictions have been imposed in recent years. The frequency and duration of restrictions has increased in recent years and is likely to continue, particularly if the Table 2-3 effects of climate change increase the frequency of extreme weather events as predicted.

Table 2-3 Water restrictions in Picton, Havelock and Renwick

Water Restrictions (days)								
	2013-14	**2014-15**	**2015-16**	**2016/17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**
Picton	0	78	0	32	0	?	0	0
Havelock	0	78	0	0	0	0	0	0
Renwick	42	82	0	0	0	?	0	0

The service standards that have historically been used in the management of the water supply system have been based on the premise that water restrictions should not be imposed in the type of drought likely to occur once in 20 years, and a drought with a likelihood of happening once every 50 years should require no more severe restrictions than a hose-pipe ban. These criteria remain important guidelines in terms of planning the capacity of water storage and other water infrastructure, but are supplemental to the conditions of the resource consent.

Gap analysis — Targets for lower per capita water consumption have been set. The universal metering programme and other demand management techniques will contribute to achieving the lower target.

Chapter 3: Future Demand

Components of the Future Demand Section

3.1 Demand Drivers — Factors influencing the demand for water services.

3.2 Demand Forecast — How future demand has been evaluated.

3.3 Demand Impact on Assets — Asset additions, augmentation and utilisation to meet demand.

3.4 Demand Management Plan — Non-asset solutions to meet demand estimates.

3.5 Asset Programmes to Meet Demand – Major demand driven programmes and costs.

3.1 Demand Drivers

Future demand for water services is influenced by a number of factors working in combination.

Population growth — The forecast population projections for Marlborough indicate some population growth over the next 20 years. The 2020 population estimates from Statistic New Zealand indicate the Marlborough population is still growing at a rate of over 1% per year and is now 50,200 (estimate as at June 30, 2020)[2].

Domestic water consumption — As residents become more aware of their water usage through global messaging and water metering, domestic demand patterns are likely to reduce, however growth will continue to increase overall demand.

Industrial/Business consumption — Primary production and food processing industries often have a significant demand for water. Other industries and businesses also require water for processes, firefighting and staff facilities.

Community/Individual supplies — There are many small community water supply schemes. These can be relatively expensive to maintain and operate and are likely to become more so as Water Services Bill comes in to force in July 2021. A number of suppliers of community water schemes will need assistance from Council or wish to join the reticulated areas. Individual households outside the current supply areas may also request an 'out of district' connection.

Leakage/Unaccounted for water — All reticulation systems have an element of unfound water —the volume of water that arrives at the customers' taps does not balance with the amount of water put into supply. Leakage, unknown connections, unauthorised use of hydrants, and the difficulty of accurately assessing legitimately used but unmeasured water, all contribute to the volume of unaccounted for water.

Climate Change — Research and understanding around the implications of medium and long term climate change are improving. The implications for the water supply could be particularly significant in Marlborough where demand for water is closely related to the weather and irrigation (see section 3.2.13 of this plan).

[2] www.stats.govt.nz Estimated resident population at 30 June 2020

3.2 Demand Forecast

3.2.1 Marlborough Population Growth

Marlborough has had an increase in population by approximately 9% between the 2013 and 2018 Census. The graph below shows the increase from 43,416 in 2013 to 47,340 in 2018. This population increase is in line with medium to high projections rates produced by Statistics NZ and is driven primarily through net migration into the region.

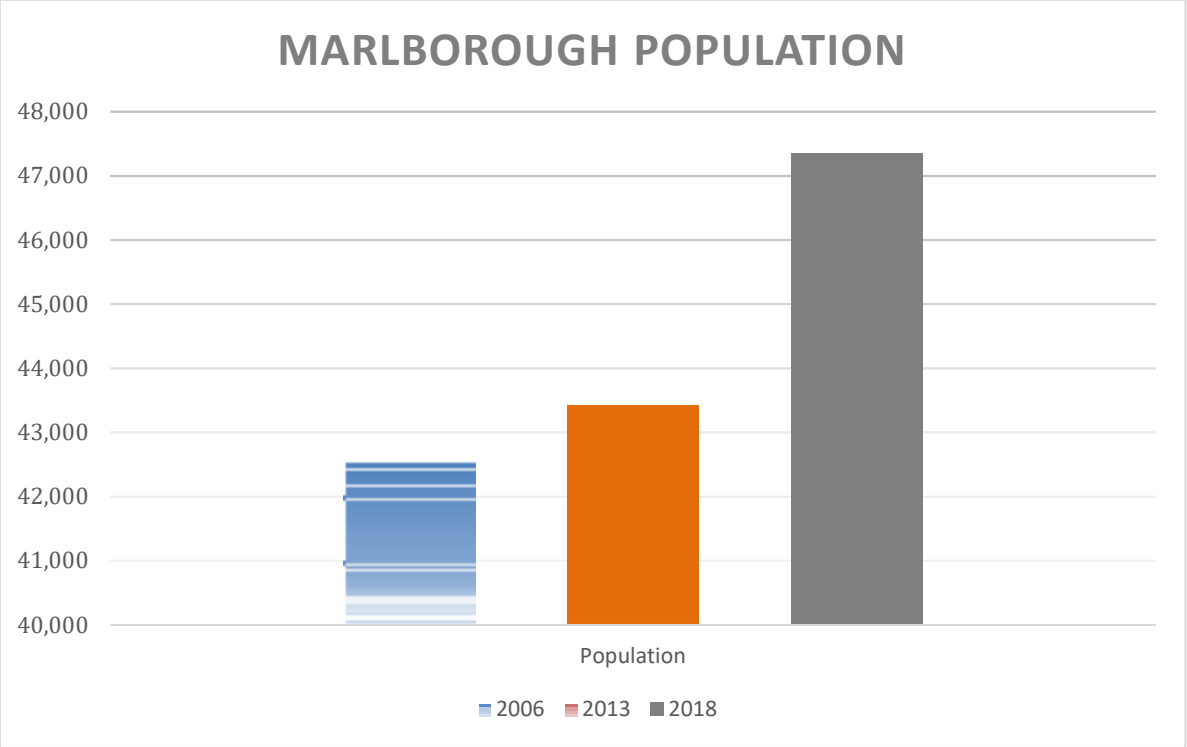


Figure 3-1 Marlborough Population 2006 – 2013 - 2018

The forecast population projections for Marlborough indicate some population growth over the next 20 years. The 2020 population estimates from Statistic New Zealand indicate the Marlborough population is still growing at a rate of over 1% per year and is now 50,200 (estimate as at June 30, 2020)[3]. More than 70% of this population live in Blenheim and approximately 16% in the Picton, Waikawa area.

Marlborough's population is ageing. The Marlborough population is expected to have a significantly larger number of residents aged 65 years and older with other age groups experiencing declines in population levels. This is similar to many parts of New Zealand (and the Western world).

Figure 3-2 highlights the population projections by age groups.

[3] www.stats.govt.nz Estimated resident population at 30 June 2020

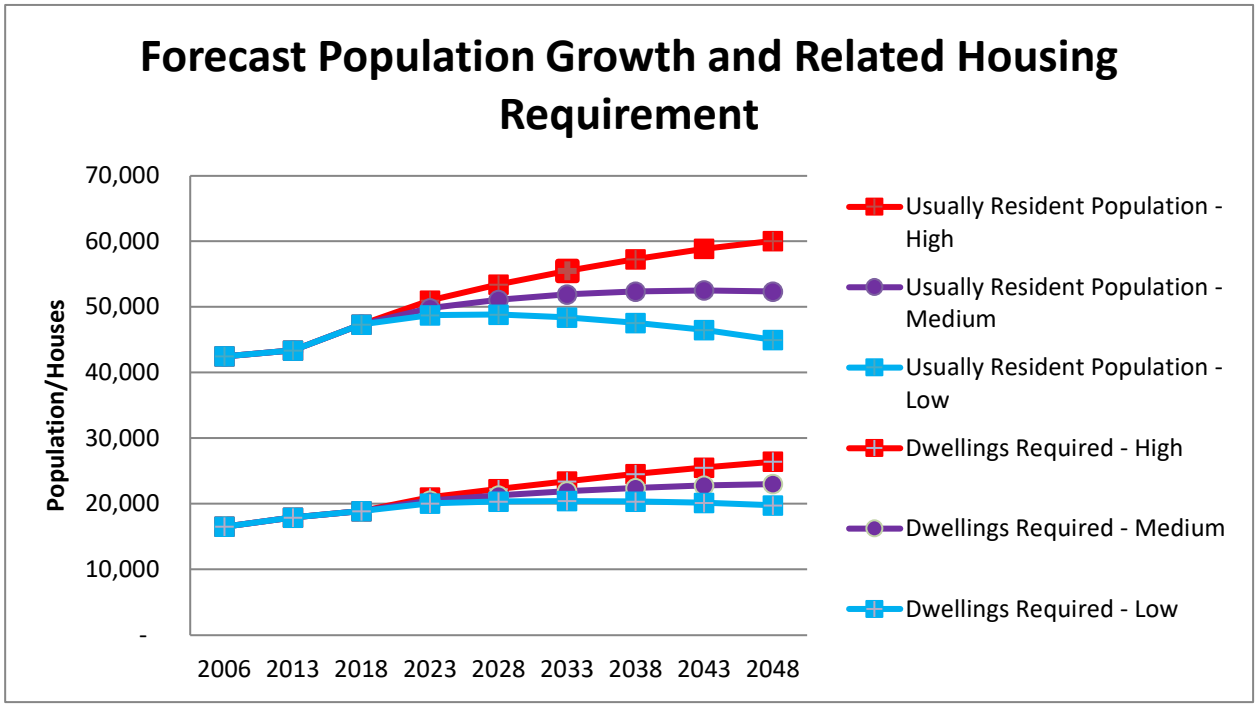


Figure 3-2 Population projections by age, 2006-2048

The increasing elderly population and fewer working people (50% rather than the current 60%) needs to be taken into consideration in financial planning, particularly when setting rates.

Regional variation — The trend for growing urban centres and fewer people living in rural areas is expected to continue, as older people generally prefer to live closer to the services provided in larger centres. The provision of infrastructure in smaller settlements and the method of funding may need to be considered in the light of these projections.

The main urban growth areas are the greenfield sites on the periphery of existing urban areas. Urban growth pockets have been identified to the north and west of Blenheim's existing town centre and these areas have been zoned for urban residential development.

Household sizes — The number of inhabitants per dwelling is also falling. This means the demand for housing will increase. With Marlborough's age distribution this could indicate there will be fewer wage earners per household, which has consequences for the future affordability of water services.

3.2.2 Planning for Growth

The current urban settlement pattern consists of an average of 10-11 properties per hectare. The Development Contribution Policy helps to encourage urban infill by offering reduced charges for the subdivision of small residential sections. Urban intensification would help to reduce further urban spread and subsequent extension to the linear infrastructure. Costs per connection would decrease and improve the affordability of these services.

According to historic Building Consent and Development Contribution information, growth is estimated to increase by 125 household equivalent units annually for the next ten years within Blenheim. This demand is expected to be much higher in the first few years, and drop off over time. Blenheim traditionally accounts for about 60% of all building consents for new dwellings, the remainder in the wider district.

When planning services with a long lead time, the anticipated increase in demand needs to factor in a margin of error. A 'just in time' approach is prudent both from the point of view of capital expenditure and the uncertainty of projections and assumptions. In contrast, from a

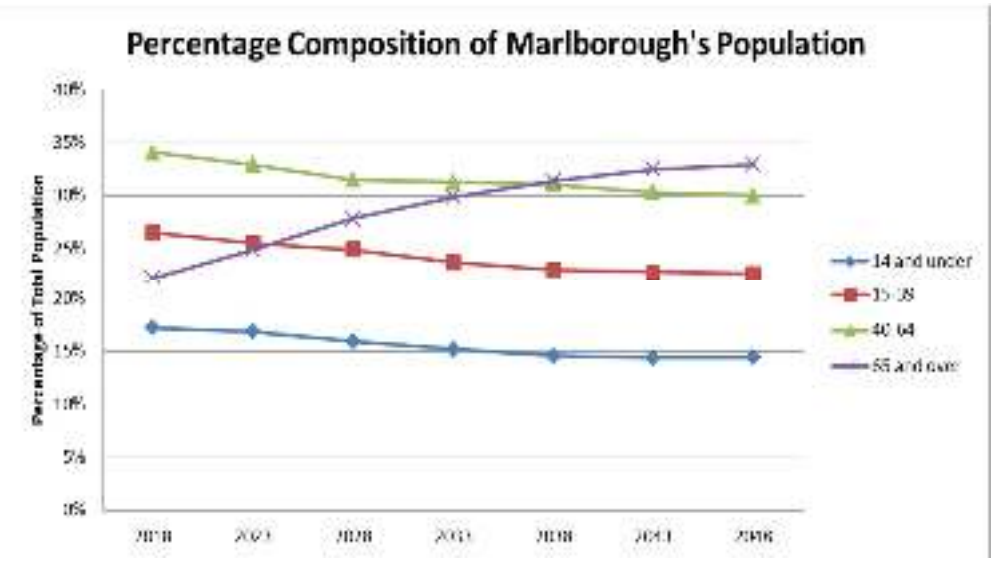
financial planning perspective, it is prudent to anticipate a slower growth in the rateable property base and income from development contributions, with a subsequent delay in cash flow returning to the Council.

A further consideration is that many infrastructure assets have a planned life in excess of 80 years. As a large proportion of the total assets costs occurs in the initial construction phase, it would be expensive to underestimate the long term demand and be forced to upsize assets. Thus, the tactic employed is to err on the high side for such long life components, use the medium scenario for the design of shorter life components, and for all assets build 'just in time' to meet demand.

3.2.3 Ageing Population

Marlborough's population is ageing. The Marlborough population is expected to have a significantly larger number of residents aged 65 years and older with other age groups experiencing declines in population levels. This is similar to many parts of New Zealand (and the Western world).

Figure 3-3 highlights the population projections by age groups 2018-2048



The increasing elderly population and fewer working people (50% rather than the current 60%) needs to be taken into consideration in financial planning, particularly when setting rates.

3.2.4 Other Factors Influencing Water Demand

Population growth is an important factor for the projection of demand for future services. However, population growth alone is a poor indicator of changes in demand for infrastructural services.

Changes due to other factors such as climate change, environmental standards, national legislation, significant natural hazards, levels of service and other social aspects also have a significant impact on the demand for the service. It can be difficult to assess and quantify these factors as there is a less empirical relationship between the causes and the effects on the demand. However it is important that these factors are included in assessments of future designs and included in planning and design of infrastructure.

Climate — By both national and international standards water consumption in Marlborough appears to be very high. The warm dry summers experienced in Marlborough, particularly in the south of the region are conducive to high water consumption. The relationship between the weather and water consumption is illustrated in Figure 3-6.

Household Factors — The Census information is also analysed for other data that may influence water consumption patterns such as the total number of properties, household occupancy rates, age distribution pattern and an estimation of temporary resident numbers.

Visitors — Tourists to the area can be a significant factor, particularly in Picton and Havelock. Current estimates are that the usual resident populations in Picton and Havelock can temporarily increase by up to 40% due to summer visitors.

Itinerant and seasonal worker populations can also be considerable, particularly in Renwick and Seddon. These people are not included in the 'usual resident' data, but estimates of temporary visitors are included when projecting peak demand for future water services.

Economic — The Council uses a number of sources of information on economic activity and future projections. The economy has a very significant influence on migration, both within the region and nationwide. The Council has a proactive economic development strategy that helps to encourage development of new opportunities, and assists and coordinates the growth of established business sectors.

The Council subscribes to BERL's (Business and Economic Review Ltd) information for relevant economic indicators.

3.2.5 Marlborough Urban Growth Strategy

In 2009 the Council embarked on a major project to develop a comprehensive urban growth strategy for the Marlborough region. Population projections were based on the previous Census which estimated growth over the next 25 years of approximately 9,300 additional residents across the region. The opportunity for infill housing and urban densification within the existing settlements was taken into consideration. Household and section sizes were also analysed and trends were projected into the future.

The data was used to inform a major consultative process with the public, other expert stakeholders and Council staff. The quantity of land required was estimated and areas with potential to be developed into urban growth pockets identified. Wholly new settlement hubs were considered unlikely and future growth was assumed to occur on the periphery of existing settlement nodes. All areas of the region were considered for their growth potential and capacity to provide for future growth.

Earthquake risk — The final strategy was accepted by Council and published in March 2013[4]. The Canterbury earthquakes occurred during the development of the strategy and early drafts had to be revised after land around Blenheim, particularly to the east, was assessed as susceptible to liquefaction and lateral spread. The strategy forms a valuable platform for planning future capacity upgrades of all services.

Residential and employment land uses — In the past three years, (21 Omaka, 22 Rose Manor, 8 Taylor Pass) 50 hectares of land have been released for development, most of which is residential. The Marlborough Environment Plan was adopted in 2020 and allows for an additional 240 hectares of urban-residential and 53 hectares of employment land to be developed. (31.5 + 41.8) A further 73 hectares to the west of Blenheim has been zoned as Deferred Subdivision areas and are shown in Figure 3-3 below.

Utility services — The provision of utility services was considered from the outset of the project. The supply of water was not a significant restriction for the Blenheim growth pockets. However, pipeline upgrades will be required to deliver water to the new growth areas. Estimated costs of $2.24M have been included in future budgets for the upgrades. These costs will be recovered from development contributions.

Simultaneous development of all sites identified for development would result in a significant capital investment. The recent population projections cast some doubt as to when that

[4] Growing Marlborough — A Strategy for the Future. District-wide Overview and Decision Summary (March 2013)

investment would be recouped from development contributions and the increased rating base. The Council has not specified a preferred sequence for development, but the full costs of developing in a non-logical progression will be borne by the developer.

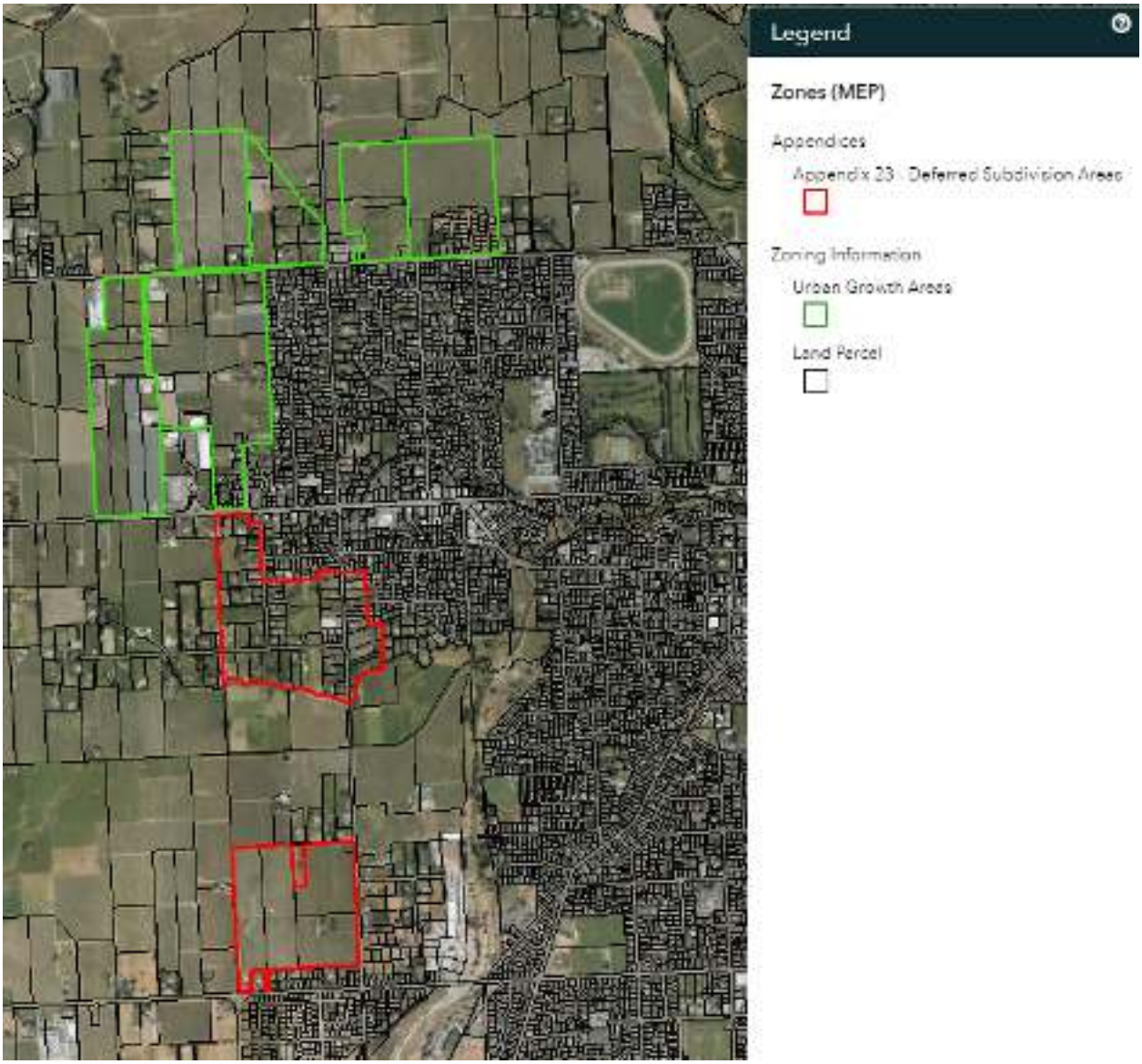


Figure 3-4 Urban growth pockets in Blenheim

Simultaneous development of all sites identified for development would result in a significant capital investment. The recent population projections cast some doubt as to when that investment would be recouped from development contributions and the increased rating base. The Council has not specified a preferred sequence for development, but the full costs of developing in a non-logical progression will be borne by the developer.

Renwick, Picton and Havelock — Providing a sufficient water supply for Renwick, Picton and Havelock may be more problematic. The water sources for these settlements are currently under stress during periods of peak demand. If the factors affecting supply and demand for water can be effectively managed, investment in accessing new water sources can be deferred or avoided.

3.2.6 Blenheim Demand

The Blenheim water supply is predominantly used for domestic purposes. The major industrial users are around the Riverland's industrial area, outside of the boundary of the Blenheim water supply area. Some larger consumers within the Blenheim area continue to use their own private bores. There is very little agricultural/horticultural usage from the reticulated supply.

Water consumption patterns in Blenheim are very heavily influenced by domestic usage. In the second half of the 20th century there was a significant increase in household water consumption through increased ownership of domestic appliances — laundry and dishwashers, as well as multiple bathrooms and toilets.

The base level water consumption is around 500 l/person/day but with a very high seasonal variation.

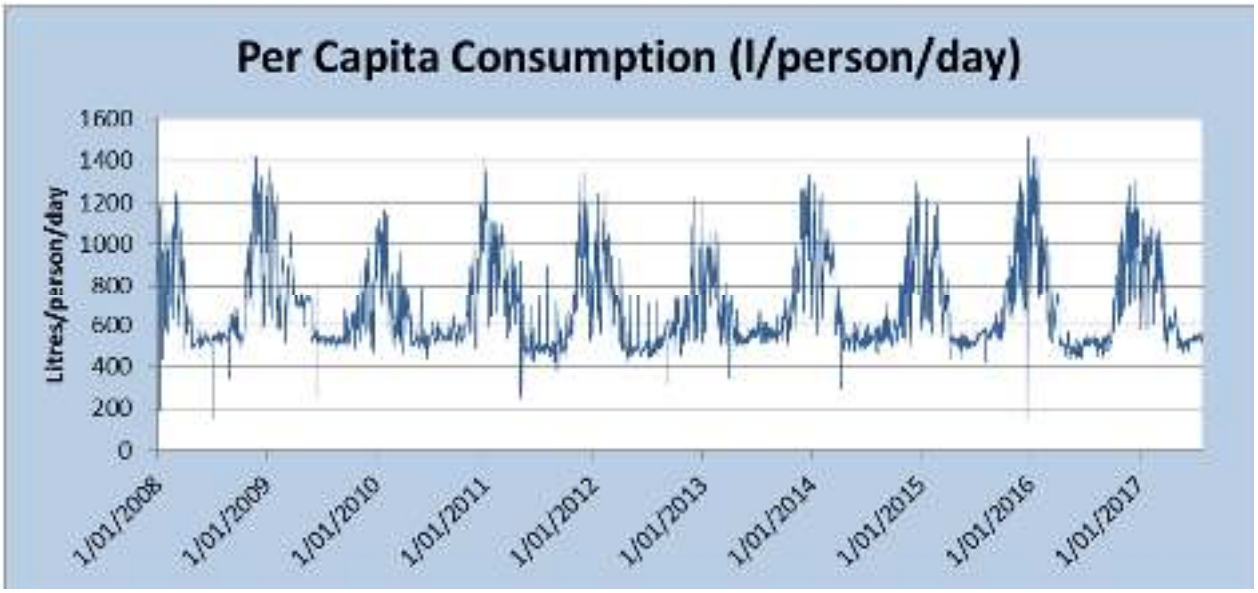


Figure 3-5 Per capita water consumption in Blenheim

Summer peaks — The peaks in demand for water occur during the summer months. Reference to Figure 3-6 shows the consumption of water in Blenheim is closely related to the evapotranspiration rates. The same pattern is repeated throughout the Marlborough region. The peaks of water consumption almost exactly match the days of high evapotranspiration when warm dry days cause a spike in watering the garden, and topping-up paddling pools and swimming pools.

The per capita figures are based on total water supplied into the system and therefore include the water used by visitors to the area and industry/commerce, as well as leakage and system losses. Most industrial/commercial properties are metered. The meter records show that around 9.5% of the total water supplied to Blenheim is used for business purposes.

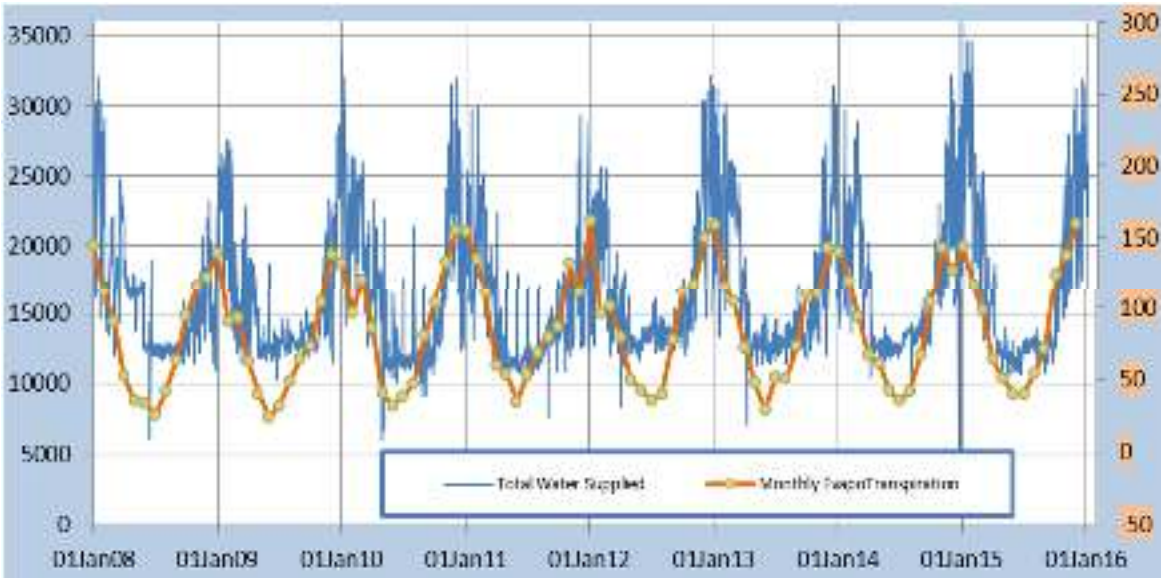


Figure 3-6 The relationship of water consumption and dry weather in Blenheim

The data in Figure 3-6 shows maximum daily demand peaks are approximately 1,300 litres/person/day, which is around one and half times the base usage. This has important consequences for the rate of abstraction and for meeting resource consent conditions. The service level targets must be met during the periods of peak demand, so infrastructure is designed and sized to meet this requirement. Flattening peak demand through demand management measures would have long term benefits for asset investment.

3.2.7 Picton Demand

The pattern of water consumption in Picton is similar to Blenheim. Population growth has levelled off in recent years and there is some evidence of a decline in overall consumption. This equates to a decline in per capita consumption (see Figure 3-). The average of 800 litres/person/day is higher than Blenheim but may be partially explained by the difference in business usage as the gross figures include industrial and commercial water usage. Based on a sample of four years of meter records, business consumption in Picton is around 20% of the total supply.

Peak demand days are similar to Blenheim at around 1,400 litres/person/day. This estimate is based on usual resident population and does not account for the influx of summer visitors. It is likely the corrected figure would be below the Blenheim consumption rate.

Analysis of the data has revealed that peak demand days are relatively rare. Over the period between 1998–2011 there were 57 occurrences when consumption was greater than 70% of the average (and only 18 days between 2003–2011.) The same relationship between consumption and evapotranspiration exists in Picton as Blenheim, suggesting large volumes of water are used for garden irrigation.

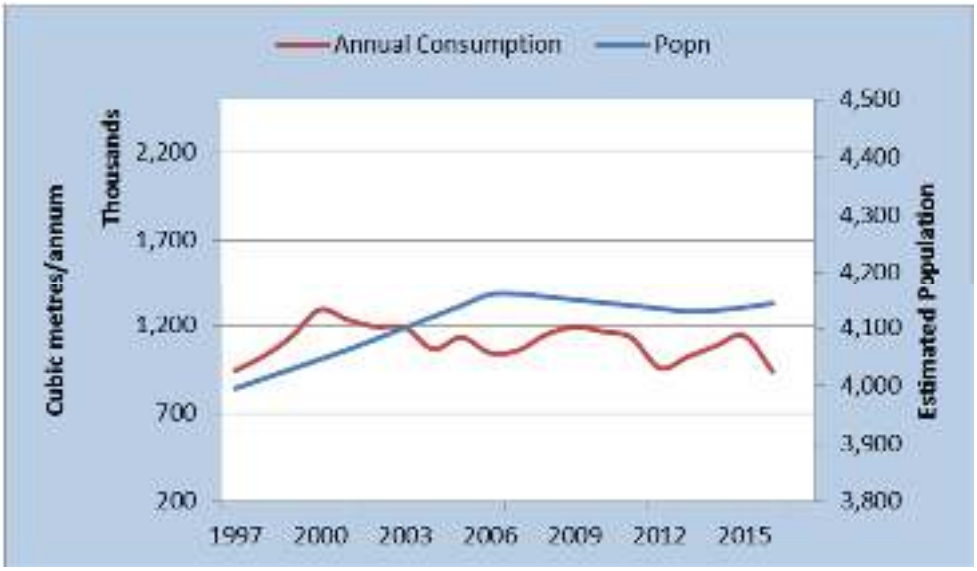


Figure 3-7 Water consumption in Picton

A detailed study of water consumption patterns and usage in Picton was undertaken in 2009[5]. The report estimated leakage at between 1,281 m^3/day and 1,400 m^3/day which is equivalent to around 40% of the total volume supplied. By most standards this is a high proportion of unaccounted for water. Leakage is likely to be a particular problem in Picton where water pressures are high. The report also considered seasonal usage, summer visitors, industrial/commercial consumption and irrigation of parks and reserves.

Figure 3-8 Water Consumption per capita/day in Picton

3.2.8 Havelock Demand

Future growth in Havelock is included in the Marlborough Urban Growth & Development Strategy — Picton, Havelock & Inner Sounds. The medium growth projection from Statistics New Zealand recognises positive but slow population growth over the next 30 years.

[5] Picton Water Supply Strategy: Background, CH2M Beca (2009)

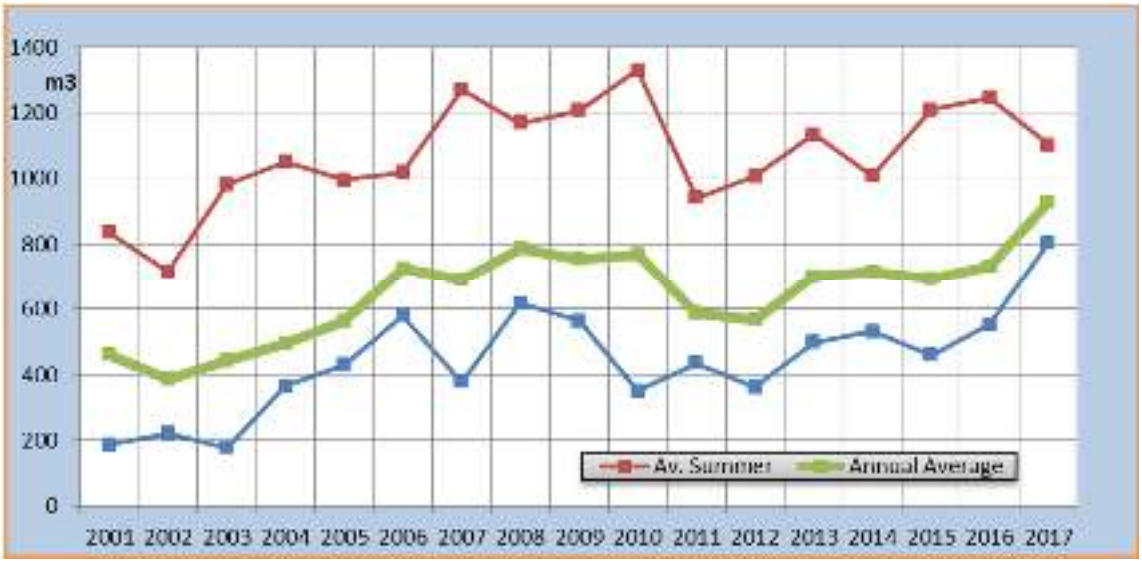


Figure 3-9 Water consumption patterns in Havelock

Havelock has many characteristics in common with Picton. Metered consumption by businesses is around 20% of total water delivery and is heavily influenced by the port activities. There was clear growth in demand up to 2010. Summer water restrictions and increased leakage control helped to suppress demand between 2010–2015 but there is evidence of increasing consumption since then.

Water leakage within the port area is a recurring problem. The Havelock port has an underground pipe reticulation beneath concrete or bitumen seal, making leaks difficult to detect and locate.

In the spring of 2017, 20 households in Havelock agreed to join a water metering trial. Advanced water meters fitted with radio transmitters were installed at the boundaries of the properties and will be read each week with 'drive-by' technology. The results of the trial will be invaluable in helping to target future water management efforts.

3.2.9 Renwick Demand

Demographic projections suggest that the expected slow-down in population growth will be most apparent in rural areas and settlements. Currently Renwick is resisting this trend. Renwick has experienced significant recent population growth as it would appear to benefit as a satellite settlement to Blenheim. Demand is largely for domestic usage and leakage is estimated to be very high.

Water restrictions occurred in Renwick in 2013, 2014 and 2015 and residents were asked to exercise voluntary restraint in 2016. Active leakage detection projects have also been deployed in the settlement over this time period. The impact of these measures can be seen in Figure 3-10 which also shows the relatively low usage during winter and a surge in demand during spring and summer.

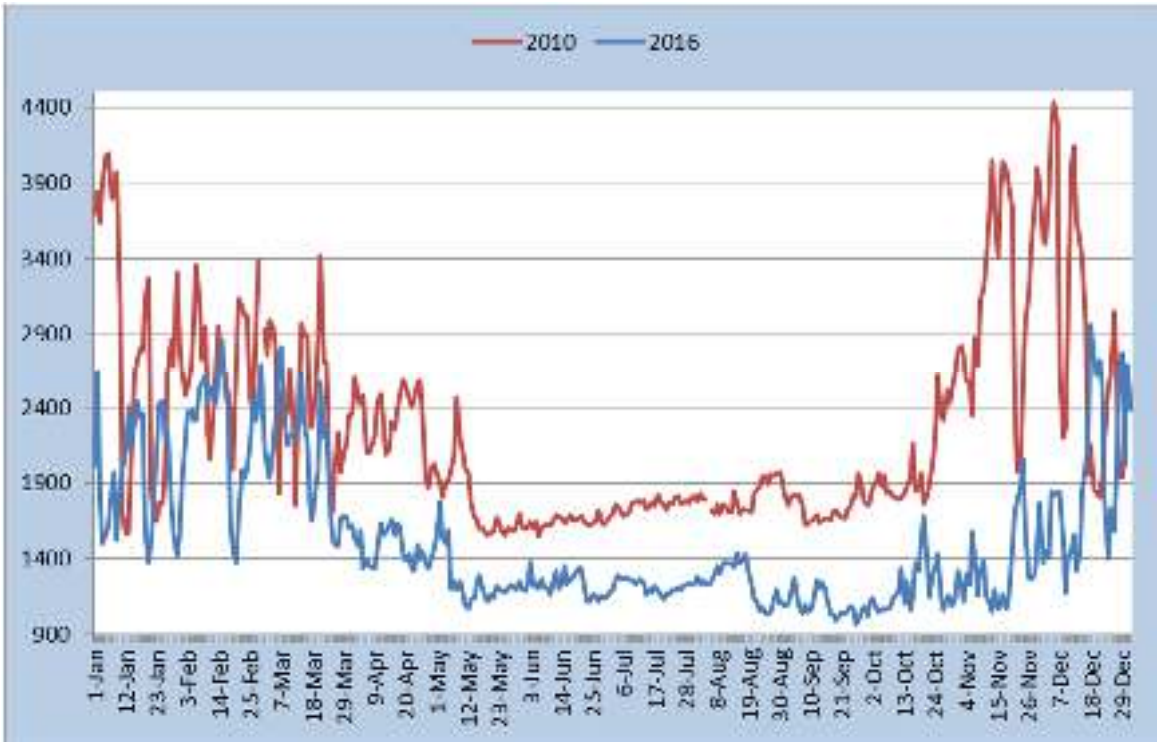


Figure 3-10 Comparison of water usage in Renwick in 2010 and 2016

Similar to Havelock, 'drive-by' water meters were fitted to the supply pipes of 44 households in Renwick who had agreed to join a metering trial in advance of universal water metering. The meters have been read weekly throughout the summer of 2017/18. The results of the trial will be used to inform future water management programmes.

3.2.10 Industrial Consumption in Marlborough

The world-wide success of Marlborough wine is creating demand of increased production. In 2016 the region produced 323,290 tonnes of grapes. The industry is predicting a 25% increase in production over the next 5 years. A large proportion of all winery capacity is based at the Riverlands Industrial Estate and Cloudy Bay Business Park.

A detailed study of industrial and commercial land use requirements was carried out during the development of the Urban Growth Strategy. The amount of land required, and the types of business that can be accommodated, are discussed in detail in the study alongside analysis of potential sites. The water demand of the businesses cannot be known. One of the recommended approaches in the Urban Growth Strategy is to:

"..cluster less visually attractive activities and activities with potential off-site impacts at large, well, buffered locations where they can be more visually and physically separated from existing and possible future sensitive uses."

The adoption of this principle is likely to result in new, high consumption industries gravitating to the existing sites in Riverlands, the port areas at Picton and Havelock or to out-of-town industrial parks.

Use of the resource consents process to manage demand — Increases in industrial and commercial water usage can also be managed through the resource consent process. Major changes to land use or site activity normally requires a resource consent. Applications are vetted by Asset & Services staff in terms of their water requirements and the capacity of the water supply source and network to provide the anticipated demand. It is likely that industries with significant water demand from the reticulation network could not be accommodated in Picton, Havelock or Renwick.

Many of the major 'wet' industries have developed their own private source of water using bores into the shallow aquifers, abstraction from surface water or on-site capture and storage. The allocation of resource consents for water abstraction is managed by the Council's Regulatory Department, and independent commissioners make decisions on the Council's own resource consent applications.

Review of the water allocation method — Permitted abstractions from the Wairau Aquifer have led to over-allocation of the resource when compared to the ability of the groundwater in the aquifer to recharge. However, recent improvements in the metering of water abstractions indicate that only a proportion of the permitted total allocation is used each year. A more effective method of allocating and controlling the resource is required. Consultation with stakeholders is underway as part of a formal review which is being led by the Council's Planning department for inclusion in the Marlborough Environment Plan.

Firefighting capacity — Modelling of the Blenheim reticulation has demonstrated that pipework to the industrial zone to the east of the CBD will need upgrading to meet firefighting demand. Mains upgrades costing around $3.8M have been identified and programmed over the next 10 years to resolve this issue. This information is considered when assessing resource consent applications for industrial development in the area.

Industrial water use — The industrial zones at Cloudy Bay Business Park (CBBP) and Riverlands Industrial Estate (RIE) are fed from bores at Malthouse Lane (P28w/1678 — Resource Consent U090179) and Hardings Road (P28w/1147 & 1148 — Resource Consent U130670). In 2002 the Council purchased the Hardings Road bores and much of the infrastructure on the CBBP from the Primary Producers Cooperative Society (who had previously operated a large meat processing facility.)

The primary source of water for the business parks is the Malthouse Lane bore. This has a daily capacity limit of 3,900m^3 as a condition of the resource consent. During peak processing in March, April & May demand from the wineries exceeds the daily limit and the supply is augmented from the two Hardings Rd bores. Two reservoirs on the estates are able to balance the water demand from the estates.

The recent renewal of the resource consent for the Council water supply from the Hardings Road bores will help to secure the future supplies to the Riverlands Industrial Estate and the Cloudy Bay Business Park.

Industrial Demand in Picton and Havelock — A large volume of water is used in the ports and by related industries. Records show there are a small number of high use consumers in Havelock which account for between 10–20% of total usage. Consumers who have a significant amount of underground pipework are encouraged to undertake on-site water balance audits to check for leaks within their property. This is good practice for all metered supplies.

3.2.11 Water and Sanitary Services Assessment 2018/2019

An updated Water and Sanitary Services Assessment was undertaken in 2018-19. This assessment built on the previous assessment undertaken in 2005.

In April 2019 the Drinking-water Register for New Zealand recognised 23 communities in the Marlborough region. In addition to the registered supplies any communities identified in the previous WASSA in 2005 but not on the MoH register were also included for reassessment.

Water Supplies	***Population Supplied***	***Communities registered***
Large	*>10,000*	*1*
Medium	*5,001- 10,000*	*0*
Minor	*501-5,000*	*6*
Small	*101-500*	*4*
Neighbourhood	*25-100*	*12*

The report includes an assessment of:

- The provision of water supply, wastewater and stormwater services
- The quality and adequacy of the service
- The current and future demand and
- The risks and resilience of the infrastructure and management

The report identified 47 water supply schemes in the Marlborough region, supplying a population of 35,166 people. Based on Statistics NZ estimate of the Marlborough population as of 30 June 2019 this is equivalent to 73.5% of the usual resident population. It is assumed that the remaining population is self-supplied.

All of the community supplies in the Wairau valley and south abstract water from underground aquifers. The majority of supplies in the Sounds and north Marlborough (with the exception of Picton and Havelock) are sourced from surface water. Generally all the water sources were sufficient and reliable in terms of volume although some of the supplies in the Sounds were under severe pressure during the peak summer season.

Nine communities are supplied with water that meet the DWSNZ for bacteria and protozoa. A total population of 30,000 residents or 61% of the regional population. A further 3,438 (10.2%) residents receive water that meet the standard for bacteria only.

An estimated 66% of the regional population, in 15 communities, benefited from supplies that have an approved water safety plan. A further eleven communities were in the process of drafting a plan.

Many properties within community supplies are known to have ‘point of entry treatment’ on the drinking water supply. However, as these are on private property it was not possible to collect data on them. Correctly installed and maintained point of entry treatment can supply drinking water to meet DWSNZ.

3.2.12 Leakage

All reticulation systems have some unaccounted for water, of which leakage is normally the largest component. In areas where all customers are metered it is possible to get an indication of pipeline losses by deducting the amount of water delivered from the volume leaving the treatment plants. In the absence of universal metering it is more common to estimate losses by analysing flows in the reticulation system during periods of minimum consumption. Midnight to 04.00 hours is a time of minimum domestic flows. Industrial/commercial usage can be measured or estimated during this time period. The Council has also used this minimum night flow technique to estimate water losses. These are reported annually as a non-financial performance measure.

Based on the International Leakage Index, four reticulation systems (Renwick, Blenheim, Picton and Dashwood) are classified as either ‘very inefficient’ or ‘poor’ in terms of leakage management. Two networks (Awatere and Wairau Valley) are classified as ‘B’ (further improvement.) Riverlands has been excluded from the calculations as the minimum night flow is difficult to estimate due to high industrial usage.

As noted in Chapter 2 of this plan, the marginal costs of supplying additional water in all areas is relatively low, whilst the costs of finding and fixing leaks is relatively high. In most cases active leak detection and prevention of losses only becomes efficient when it enables deferment of capital investment.

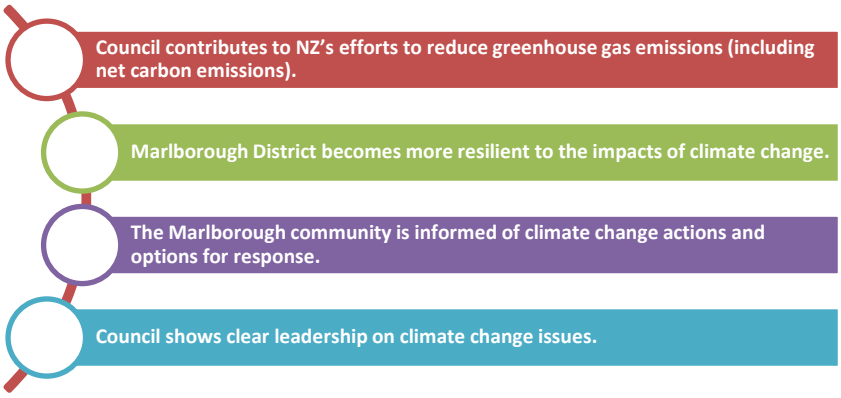
Whole of network metering installed in Havelock and Renwick in 2019 will improve Water Loss calculations by locating and repairing leaks on private properties and removing assumptions around domestic usage which can be applied across all networks.

3.2.13 Climate Change

The Climate is changing and the impact of this is constantly measured, monitored and assessed for the future impact that it will have on our infrastructure assets.

While the climate change predictions remain mostly unchanged from the 2018 LTP, our consideration and investigation in to the impact of these predictions has improved. A Climate Change Working Group has been established across the Council and a Climate Change Action Plan was adopted by Council in March 2020.

The Climate Change Action Plan has four main goals;



Climate change is a long-term influence that has been incorporated in to the planning and design of long-life infrastructure. The effects and impacts that climate change poses across the Infrastructure Assets are highlighted within this Asset Management Plan.

The demand for water throughout Marlborough is heavily influenced by the weather. The expectation that summer rainfall is likely to increase in Blenheim will help to suppress the demand for irrigation water. However, the effects may be countered by the increases in temperature and an increase in the frequency of extreme weather events that is also predicted.

The overall average annual rainfall is not expected to change, however there will be significant seasonal variation from the current pattern. A shift in the peak demand for water to the spring may eventuate as this season becomes drier and coincides with germination of many plants in the early growing season.

The rise in sea level has had implications for the bore at Havelock and Riverlands therefore alternative sources have been located, further upstream and in a different aquifer respectively.

3.2.14 Water Abstraction Permitted by Resource Consent

The Resource Management Act seeks to protect natural freshwater environments through the control of abstraction from all water sources. The Proposed Marlborough Environment Plan implements the Resource Management Act in this region.

Public water supply utilities are 'permitted activities' under the rules of the plan, and the following consent conditions apply to the Council's abstractions for water supply purposes.

Supply Areas	Source	Daily Consent Limit (m^3)	Peak Summer Daily Demand (m^3)	Average Winter Daily Demand (m^3)	Consent Expiry
Blenheim	Bomford St	43,500	36,400	14,500	1/12/2030
	Middle Renwick				
Riverlands	Malthouse	7,700	6,100	1,327	1/07/2029

	Hardings Road				1/08/2024
Renwick	Terrace Road	5,000	3,650	1380	1/11/2028
	Conders Bend				1/11/2028
Awatere	Black Birch Stream	8,000	2,820	1550	15/12/2029
Havelock	Kaituna River Catchment	2,000	1,150	500	1/07/2037
Picton	Speeds Road	7,900	6,210	2,970	1/10/2050
	Barnes Dam				30/09/2032
Wairau Valley	Wairau River	480	264	52	1/03/2048

Table 3-1 Resource consent conditions for water abstractions

3.3 Demand Impact on Assets

3.3.1 Blenheim – Sources and Treatment

The old Bomford Street Water Treatment Plant and the five bores associated with it had a consented capacity of 330 litres per second (l/sec) prior to the upgrade of the Blenheim water supply. The abstraction volume was increased to 530 l/sec by drilling three new bores and redeveloping one of the existing bores at Grove Road. One of the existing bores at Bomford Street and one at Auckland Street were abandoned.

The increased output from Bomford Street (renamed Central Water Treatment Plant) allowed the Andrew Street bore and treatment facility to be decommissioned. The site and building has been retained but all of the plant has been removed.

Table 3-2 Upgrades to the Blenheim water supply

	Pre-Upgrade			Post-Upgrade			
Plant	**Bores**	**Capacity**	**Treatment**	**Bores**	**Capacity**	**Treatment**	**Year**
Bomford Street/ Central WTP	5	330 l/sec	Lime pH Correction	6	530 l/sec	Lime pH Correction UV Disinfection	2011
Middle Renwick Road	3	180 l/sec	Caustic Soda pH Correction	3	180 l/sec	Caustic soda pH Correction UV Disinfection	2009
Andrew Street	1	75 l/sec	Caustic Soda pH Correction	De-commissioned			2012

3.3.2 Blenheim Storage

The Blenheim upgrades also included an increase in water storage capacity. This gives the Council additional capability to balance peak demands and provide security of supply during a power failure affecting the distribution pumps. A total storage capacity greater than 20,000 m^3 equates to the average daily demand, and two thirds of demand on a peak demand day.

Table 3-3 Capacity of Blenheim reservoirs

Blenheim Reservoirs	Capacity (m^3)	Year Installed
Weld Street	5,700	1971
Redwood Street	90	1996
Forest Park	175	2005
Blenheim Low Level	10,000	2010
Middle Renwick Road WTP	950	2009
Central WTP	2,900	2011
Blenheim High Level	2,000	2016

3.3.3 Blenheim Reticulation

As outlined in section 3.2.5 of this plan, the Urban Growth Strategy has provided a coherent plan of growth pockets for the anticipated population growth to around 2030, and this strategy will be vital to the design of future upgrades to the reticulation network.

A new reinforcing main has been identified to link With Booster Station to the south-western growth pockets around Omaka Aerodrome.

The Blenheim reticulation upgrades required to meet the firefighting code of practice are partially driven by growth and partially to meet the flow & pressure level of service. The works will be undertaken over the course of the plan as resources become available

Table 3-4 Blenheim Demand Related Project

Area	Project	Budgeted Year	Budget Cost
Blenheim	Wither Booster/Aerodrome Main	2018-19	$283,000
Blenheim	Watermains Upgrades	2017-28	$3,546,000
Blenheim	Universal Metering	2029	$7,275,000

3.3.4 Picton Sources

Resource Consent 41741 permits the Council to abstract up to 5,000 cubic metres of water per day from the three bores at Speeds Road. In 2014 Bore 3 was replaced with a new 450mm diameter bore of approximately 11m deep.

The Essons Valley Resource Consent (No. 071405) permits a maximum water take of 34 l/sec. In theory this would offer a maximum supply volume of 7937 m^3 per day. However, in drought years there is less available water than this in the Barnes Dam and in the aquifer below Speeds Road, restricting the total deliverable volumes.

The two watermains leading from Barnes Dam to the Essons Valley WTP were installed when the dam was built in 1958. Both pipes are exposed in places and access for maintenance is very difficult. The 225mm cast iron main is showing signs of deterioration and modelling has been conducted to assess if the treatment plant can function to capacity from one main only.

Both desktop studies and site investigations have been undertaken to find a further reliable, high quality water source to meet Picton's needs during droughts and increased demand as a result of future growth. Exploratory bores have been drilled at Grahams Valley, Speeds Road and Linkwater but the yields are unsatisfactory. The nearest reliable source is the Wairau Aquifer between Spring Creek and Tuamarina. To connect this potential source to the main Elevation Reservoir would require a trunk main of around 19 km in length, at a cost of $13M. There are no plans to use this source at this time. Recent population projections and demand management techniques will be used to delay the need for additional source development.

3.3.5 Picton Treatment

The Speeds Road Water Treatment Plant was upgraded and commissioned in March 2017. The plant is designed to produce a peak flow of 58 l/sec and an average flow of 25.5 l/sec of water. This is supported by water supplied from the Essons Valley WTP.

3.3.6 Picton Reticulation

A dynamic mathematical model has been created for the Picton water supply system. Future growth has been simulated within the model and a number of upgrades have been identified[6] to increase supply to low pressure areas.

The model has been used to identify areas where pressure reduction can be implemented to help reduce leakage and therefore help to manage demand. The first pressure management zone (PMZ) in central Picton was established in 2013/14. Further PMZs have been identified at Waikawa and Beach Road.

Table 3-5 Picton Demand Related Projects

Area	Project	Budgeted Year	Budget Cost
Picton	Universal metering	2021-22	$2,200,000
Picton	Pressure Management	2020-21	$260,00
Picton	Waikawa Pressure Management	21024-25	$503,000

3.3.7 Havelock Sources

Historically the water supply for Havelock was drawn from bores close to the shore of the current port area. These were abandoned due to increasing salinity and the current town supply is accessed via a bore further south in the Kaituna Valley, which was commissioned in 1992. Exploration of a deeper aquifer in 2006 proved to be low yielding and a second bore was drilled close to the existing supply in 2007.

Winter demand of around 600 m^3/day increases to 1,000 m^3/day during the summer. Current abstraction rates of 14 l/sec are expected to rise to a combined 25 l/sec, and the combined water allocation limit is 2,000 m^3/day. However in periods of low rainfall and high abstraction there is evidence of increased conductivity in the source water, indicating saline intrusion of the aquifer. A condition of the resource consent restricts abstraction rates as conductivity rises. Following extensive public consultation, universal metering has been adopted for Havelock and meters will be installed by 2019 to help manage demand.

Significant investigation has been conducted to search for an additional source of water for Havelock. Desk-top search and test drillings failed to find a reliable to the south along the Kaituna Valley. The nearest reliable source appears to be in Te Hoiere/Pelorus Valley. An outline budget of over $3M has been estimated for the new pipeline but this would appear to be conservative estimate

[6] O:\Corporatereference\WaterReticulation\Picton\Modelling\07pw

3.3.8 Havelock Treatment and Reticulation

The bores supplying Havelock access an unconfined aquifer that does not meet the DWSNZ criteria for 'secure bore' status. Chlorine disinfection is sufficient for treating bacteria but additional treatment is required to remove protozoa. A treatment plant to meet the standards is planned for 2019-21 subject to public consultation and approval

The old concrete reservoirs were replaced in 2011 with a single 360 m^3 steel tank which provides storage equivalent to approximately 50% of daily demand. A second steel tank is planned for 2019/20. The old 5 inch cast iron main in Lawrence Street was upgraded to 150 mm PVC in 2009. A new steel tank is currently being constructed with commissioning expected in 2021.

Havelock Reticulation

There is an active leakage detection programme to help reduce the level of unaccounted water. Universal metering has been agreed with the community to defer the requirement to develop the new source. Trials have been conducted with new 'drive-by' meters that can be read without the costs of manual reading. Around 350 new meters are planned to be installed in 2018-19.

Table 3-6 Havelock Demand Related Projects

Area	Project	Budgeted Year	Budget Cost
Havelock	Universal metering	2018-19	$236,500
Havelock	Pipelines	2020-21,2024-25	$763,494
Havelock	Second Reservoir	2019/20	$580,000
Havelock	Old Coach Road PMZ	2020/21	325,000
Havelock	Pipeline – New source	2028/29 Provisional date depending on demand management and further salt intrusion to aquifer	$3,105,00

3.3.9 Renwick Sources

The existing three bores supplying Renwick are located along a north-south alignment to the northwest of Renwick. The bores are drilled into a shallow unconfined aquifer that is recharged by infiltrating rainfall, surface and sub-surface seepage from the Renwick Terrace to the south and seepage from the Wairau River to the north. The Wairau aquifer influences the northern bore more than the southern bore.

The existing three bores at Terrace Road have three major problems:

- the unacceptable turbidity in the source wells when Ruakanakana Creek (Gibsons Creek) has very high turbidity
- the elevated concentration of nitrate and other contaminants that occur seasonally
- the inability of the supply to meet predicted summer demand in future. In the summer of 2014 water restrictions were imposed from 20 February to 2 April due to low levels of water in the abstraction bores.

New bores were drilled at Conders Bend Road in 2008. The results of an initial evaluation suggest the quality and the yield from these bores is satisfactory. A pipeline to connect the bores to the Renwick treatment plant will cost an estimated $1.6M. Test pumping of the bores was undertaken in the winter of 2017. These bores have now been drilled and the pipework to connect these to the existing water treatment plant is underway and expected to be commissioned in 2021.

3.3.10 Renwick Treatment and Reticulation

The Renwick source waters have been analysed to determine the number of log-credits required by the treatment process to comply with the DWSNZ. Detailed design of the plant will be completed in 2018/19, with construction scheduled for 2019/20.

A 2014 report on treatment costs considered two options. One option was based on the treatment of 2,000 m^3/day (with a peak of 4,200 m^3/day) assuming a 25% reduction in water losses and 35% population growth. The second option considered the scenario of 35% growth but no reduction in losses. Considerable capital and operational cost savings were predicted by reduction in water losses.

The Urban Growth Strategy considered the western edge of Renwick to be most suited to future development. This is in reasonable proximity to the treatment plant at Boyce Street and could be readily supplied from an extension to the reticulation. However, no plans have yet been received for this development.

The new reservoir was commissioned in 2020 and pipework connecting the new bores to the existing water treatment plant will be completed in 2021. Construction of the new Water Treatment Plant is planned to get underway later in 2021.

Table 3-7 Renwick Demand Related Projects

Area	Project	Budgeted Year	Budget Cost
Renwick	New Water Treatment Plant	2019-2022	$5.46M

3.3.11 Riverlands Sources and Treatment

The bore at Malthouse Lane and the two supplementary bores at Hardings Road draw from a confined aquifer which meets the Drinking Water Standards criteria for a ‘secure’ source. The water quality is generally good although the iron and manganese levels exceed the aesthetic quality limits. However, the status of ‘secure’ will be abolished following the outcome of the Havelock North Drinking Water Inquiry, based on the Stage 2 report recommendations published in December 2017. The Council will consider treatment options in 2018.

The primary supply is the Malthouse Lane bore with a Resource Consent limit of 3,900m^3 per day. During the peak processing season in April/May the demand exceeds this limit and the Malthouse bore is supplemented by the Hardings Road bores. The consent for the Hardings Road bores permits the extraction of up to 4,600m^3 per day during the peak processing period but is dependent upon the water level in the aquifer and electrical conductivity.

The resource consent for Hardings Road recognises the rights of existing water users and the risk of salt-water intrusion if the aquifer is over-taxed. The industry is forecasting a 25% increase in wine production over the next five years. The bores are closely monitored to ensure the increased demand for process water can be accommodated from the existing sources. Signs of deterioration in the water quality such as increased electrical conductivity or elevated levels of chloride may indicate the aquifer is over-taxed and alternative sources may be required.

A new source has been located in the St Andrews area and the application for the Resource Consent is currently underway.

Table 3-8 Riverlands Demand Related Projects

Area	Project	Budgeted Year	Budget Cost
Riverlands	New Water Treatment Plant	2021-23	$11.3M
Riverlands	New Pipelines from Source, Treatment Plant to Reticulation Network	2021-24	$5.46M

3.3.12 Wairau Valley Treatment and Reticulation

The scheme has been designed to service a total of 55 properties. At present there are 51 properties connected to the supply but within the supply area there are undeveloped properties with potential to be subdivided.

Universal metering was introduced to Wairau Valley in 2007 and successfully reduced demand by around 40%.

To extend the supply area would require a new consent, larger pump and an upgrading of the current 100 mm diameter reticulation pipes. The treatment system is due to be upgraded to meet the DWSNZ in 2019/20. A new source has been located and the application for Resource Consent is underway.

Table 3-9 Wairau Valley Demand Projects

Area	Project	Budgeted Year	Budget Cost
Wairau V	Extension of Existing Supply Area	2023-24	$385,000

3.4 Demand Management Plan

Many countries have found it necessary to investigate and implement non-asset solutions to meet future demands for water. Population growth, climate change, pollution of water sources and infrastructure costs have contributed to the urgency to develop demand management strategies. New Zealand is in the fortunate position to be rich in freshwater resources, but even so, some councils are looking to manage demand.

Some of the components of a comprehensive water management strategy are outlined below.

Universal metering — Metering of all customers is a proven, effective water management technique. Although the exact numbers can vary, universal metering can reduce the demand for water by 18%–35%. Metering also has the merit of being a ‘user pays’ approach and a more equitable method of charging for water services. However, there are significant costs to fitting meters to every connection and there can be considerable practical difficulties on shared service pipes. There are also ongoing costs for maintenance, reading and billing, as well as issues around establishing a tariff structure to encourage water conservation without threatening public health.

Metering in Renwick and Havelock also allows customers access to their water usage online. Leakage on private pipes has been easily detected and customers advised accordingly.

Pressure management — Reducing water pressure can reduce failures on pipes and fittings, resulting in fewer leaks. Reducing the pressure also reduces the volume of water that escapes from faulty pipes. Pressure reduction is particularly relevant in steep areas where system pressures need to be high to deliver water to the properties in elevated locations.

Water models have been used to identify pressure management zones in Picton and Havelock. Plans are in place to modify the reticulation and fit pressure-reducing valves in low lying zones of Picton. Pipework configuration and the need for firefighting water can restrict the number of suitable areas.

Small scale pressure management of rider mains and individual services may also be considered as a viable option.

Active leakage detection — Night line monitoring, leak-noise correlation, valve sounding, step testing, and find and fix contracts are all techniques that can be employed to assist in leak reduction.

There are significant costs in identifying and fixing leaks. This leads to the concept of an 'Economic Level of Leakage' which identifies the point at which the costs of finding the leaks is more expensive than the cost of the water wasted. In areas where the source water is scarce the cost savings of deferring capital works needs to be factored in to this equation. Generally, trying to reduce leakage below 20% is less economically viable in temperate climates.

However, leak detection technology is rapidly improving and costs reducing. It is likely that in the next ten years the economic level of leakage will be significantly reduced, water reticulation systems will be constantly monitored and leaks rapidly detected, accurately pin-pointed and fixed. The reduction in leakage will prolong existing water sources and reduce operational costs.

Asset performance monitoring — The establishment of District Metered Areas can be used to monitor the network performance and assist with leak detection. Water supplied to discrete areas can be measured and the data returned live through the telemetry system or recorded by data loggers. Absolute and relative data can provide valuable information on system performance and assist with targeting leakage detection, renewals programmes and other works.

Public education and voluntary restraint — Informing the public on water usage and conservation issues can be achieved by raising awareness of consumption through the media, libraries, billboards, dashboard indicators, leafleting and through the Council's website and social media. Setting consumption targets for communities can contribute to an overall strategy. Additionally, the community can be consulted on their willingness to accept imposed restrictions such as hose-pipe bans in periods of drought and high demand.

'Green Plumber/Gardener' service — Councils can assist consumers by providing a professional advice or subsidised plumbing service to repair leaks on private property, help identify and fix underground leakage, and implement water saving techniques. Equally consumers can be advised on planting drought tolerant species, efficient irrigation, mulching and water conservation techniques in the garden.

Water saving incentivisation — A water management strategy may include encouraging consumers to reduce, reuse and recycle water. Some councils have partnered with private businesses to promote low water-use plumbing fittings, showers, WC cisterns, and whiteware. Similar incentives can be employed to promote the use of rain water butts, grey water recycling and drip irrigation.

Planning and Legislation — Rules can be introduced into local resource management plans to require rainwater storage and reuse in new houses. Water bylaws can provide additional powers to address issues of leakage, misuse and undue consumption on private property.

Levels of Service — Consideration can be given to revising the existing levels of service. Currently adequate pressure is defined as 300 kPa at the property boundary. In future, with the consent of the community and the adoption of new firefighting practices, it may be possible to revise the standard downwards and reduce system pressures. Likewise, the system is designed to meet unrestricted use on peak demand days. With consultation and general agreement, customer expectations could be managed to accept a lesser service standard and more frequent restrictions, reducing the need for new capital expenditure in water supply infrastructure.

3.5 Asset Programmes to Meet Demand

To come

Chapter 4: Life Cycle Management Plan

Components of the Life Cycle Management Plan

4.1 Background Data – physical parameters, asset capacity/performance, asset condition, asset valuation, and historical data.

4.2 Risk Management — identification, assessment and management of risks.

4.3 Routine Operations & Maintenance Plan — maintenance decision making and costs.

4.4 Renewal/Replacement Plan — maintenance of the overall condition and performance of the infrastructure assets.

4.5 Creation/Acquisition/Augmentation Plan — process and costs for capital investments.

4.6 Disposal Plan — decommissioning and disposing of redundant assets.

The life cycle management plan aims to deliver the best value for money for the assets' owners whilst providing an acceptable service to the customers. This involves anticipating and managing risks and optimising decision making throughout the life of the assets. The lifecycle of an asset follows the progression shown below.

Table 4-1 Typical Life-cycle of Assets

Planning	The process of anticipating a need for new asset driven by growth, a need to meet a higher standard of service, or to replace an existing failing asset. The planning process involves engineering evaluation and community engagement to size, locate, programme and consider the design options, whole of life costs, non-asset alternatives and risks.
Creation	The purchase, construction or vesting of an asset to the Council. The management of the design and construction to ensure the required quality is delivered on time and at the agreed cost.
Operation & Maintenance	The day to day running of the infrastructure to ensure continual and cost effective service. The process involves proactive and reactive repair and servicing of the assets, taking into account the 'criticality' of the assets to the overall service.
Condition & Performance Monitoring	Regular, ad hoc and opportunistic assessment of the condition and performance of assets in relation to manufacturers' specifications. Projection of assessments using local and national experience to estimate life expectancy of assets.
Rehabilitation	Proactive restoration of existing assets to extend the serviceability and life expectancy in a cost effective manner.
Renewal	The replacement of assets that have reached the end of their useful lives.
Disposal	The removal of redundant assets by decommissioning, physical removal, sale or re-utilisation for different purpose/activity

4.1 Background Data

Marlborough District Council owns and operates seven water supply schemes — Blenheim, Picton, Havelock, Renwick, Riverland's, Awatere and Wairau Valley. The Council has resource consents to abstract a total of 74,580 m^3 of water. Around 82% of the population of Marlborough are supplied by the Council's reticulated water network. The majority of water is abstracted from shallow aquifers below the main river valleys of the region. The exceptions are:

- the Awatere system that abstracts water through infiltration galleries under the bed of Black Birch Creek
- the Essons Valley impounding dam that supports the Speeds Road bore supply to Picton.

Supply Areas	Source	Daily Consent Limit (m^3)	Peak Summer Daily Demand (m^3)	Average Winter Daily Demand (m^3)	Consent Expiry
Blenheim	Bomford St	43,500	36,400	14,500	1/12/2030
	Middle Renwick				
Riverlands	Malthouse	7,700	6,100	1,327	1/07/2029
	Hardings Road				1/08/2024
Renwick	Terrace Road	5,000	3,650	1380	1/11/2028
	Conders Bend				1/11/2028
Awatere	Black Birch Stream	8,000	2,820	1550	15/12/2029
Havelock	Kaituna River Catchment	2,000	1,150	500	1/07/2037
Picton	Speeds Road	7,900	6,210	2,970	1/10/2050
	Barnes Dam				30/09/2032
Wairau Valley	Wairau River	480	264	52	1/03/2048

Table 4-2 Marlborough Water Sources

Since the enactment of the Health (Amendment) Act 2007 major upgrades have been undertaken to two treatment plants in Blenheim and two plants in Picton to meet the New Zealand Drinking Water Standards (DWSNZ). New treatment plants are planned for Wairau Valley, Riverlands, Renwick and Havelock.

Ongoing capital upgrade planning to bring the other systems up to standard continues but affordability for the smaller communities is an issue. For a summary of the water supply infrastructure refer to Appendix 1 — Water Assets - Background Information.

4.1.1 Treatment

Water treatment in Marlborough has evolved to address local chemical and micro-biological risks. Chlorine disinfection was introduced at a number of sites from the mid -1970s onwards. In other areas dissolved carbon dioxide and low alkalinity combines to create water that is very corrosive to metal pipes and plumbing. Treatment through pH adjustment has been introduced to help resolve this problem.

Prior to 2009 there was no disinfection of the Blenheim water supply and the microbiological quality of the water relied upon a contaminant-free aquifer. Following the enactment of the Health (Amendment) Act in October 2007 two of the existing Blenheim treatment plants were upgraded with the installation of ultra-violet disinfection to meet the requirements of the DWSNZ. The third plant at Andrew Street was decommissioned.

Table 4-3 Current Water Treatment Plant Summary

Water Treatment Plant	pH Correction		Filtration	Disinfection	
	Caustic Soda	Lime		Chlorine	Ultra-violet
Blenheim Central		2000			2011
Blenheim Middle Renwick Rd	2000				2009
Blenheim Andrew St	2003	2012 De-commissioned			
Picton Speeds Rd		1977		1975	2017
Picton Essons Valley		1995	1995	1975	2012
Renwick Boyce St.				1975	
Havelock Kaituna				1993	
Awatere (incl Seddon) MIOX Blarich			2020	MIOX 2012	
Riverlands. Hardings Rd					
Riverlands. Malthouse Ln.					
Wairau Valley. Morse St.				1991	

In 2014 the Council sought, and gained, community approval to share the costs of water treatment across all water users. The decision, along with a Ministry of Health subsidy, helped to resolve the affordability issue at Seddon and stimulated renewed consultation with the communities at Renwick and Havelock. Further work on treatment plants is planned across the region as show in the table below.

Table 4-4 Planned Water Treatment Plant Upgrades

Location	Water Treatment Projects	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
Awatere Rural	Point of Entry Treatment		$1.5m				
Blenheim	Bomford Street Treatment Plant Upgrade		$0.19m				
	Blenheim Treatment Plant Lime, Chlorination Upgrade and Treatment of New Wells	$5.7m					$7.5m
Havelock	New Treatment Plant	$7,35m					
Picton	Essons Water Treatment Plant Upgrade, new filter media and pH	$0.34m					
	Essons Pipeline Upgrade				$1.2m		

Location	Water Treatment Projects	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27
	Speeds Road Water Treatment Plant Upgrade	$6.17m					
Renwick	New Water Treatment Plant	$5.46m					
	New Pipelines from Source to Treatment Plant	$1m					
Riverlands	New Treatment Plant	$11.3m					
	New Pipelines from Source to Treatment Plant	$5.46m					
Wairau Valley	New Water Treatment Plant and extension of supply main	$0.79m					

4.1.2 Reticulation

Analysis of the reticulation network shows some of the broad attributes of the pipelines.

Materials — The material type of the water network tends to reflect the era in which the pipes were laid. The common materials available for water pipes during the early years of urban development in Marlborough were steel and cast iron. The pipes were often protected from corrosion with zinc galvanisation or bitumen coating. The 1950s to early 1970s saw the ascendency of asbestos cement (AC) as the preferred material. During the late 1960s AC began to be replaced by plastic materials, first with PVC and later the polyethylene's. Steel remained a competitive material for larger diameter mains. Copper was used for small diameter mains and service connections but has been vulnerable to the naturally aggressive water and these copper pipes have largely been replaced

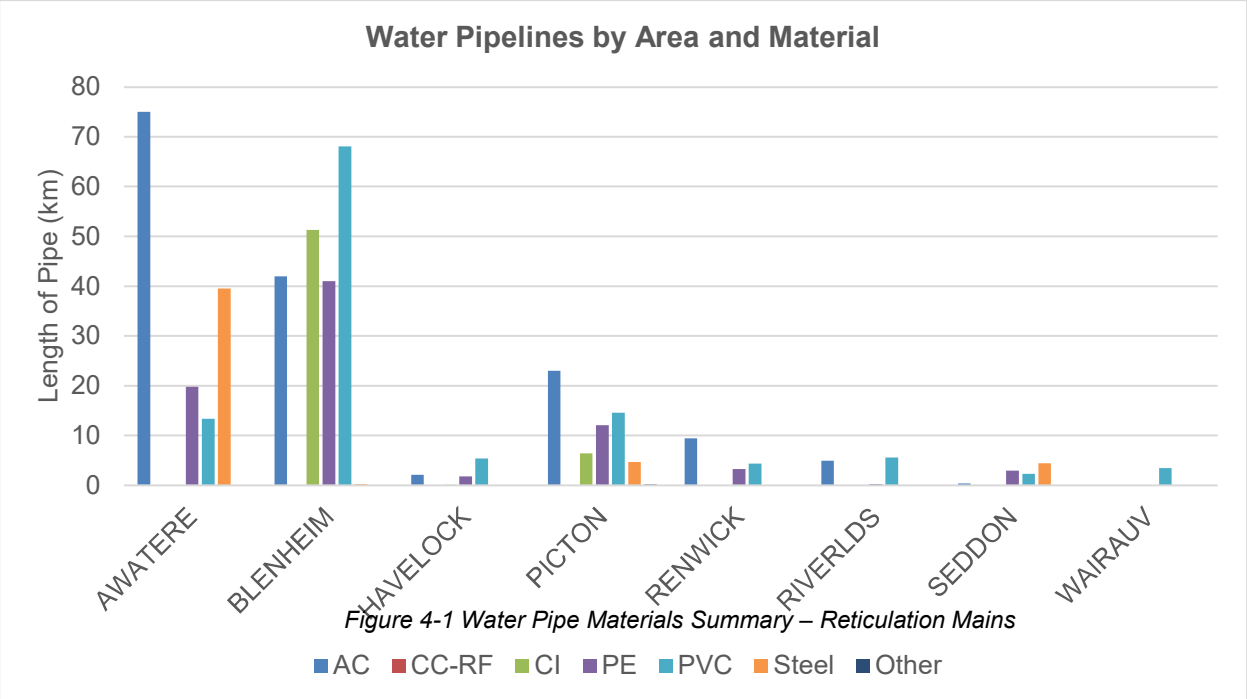


Figure 4-1 Water Pipe Materials Summary – Reticulation Mains

Age — The reticulation systems in Blenheim and Picton have evolved with the growth of the settlements they serve. The Awatere water supply project was instigated in 1942 as a rural supply for the largely pastoral community. Major extensions occurred in 1958 and 1967. The age profile of the water mains throughout the Marlborough supply areas is shown below and reflects the major periods of growth and the preferred material in use at the time.

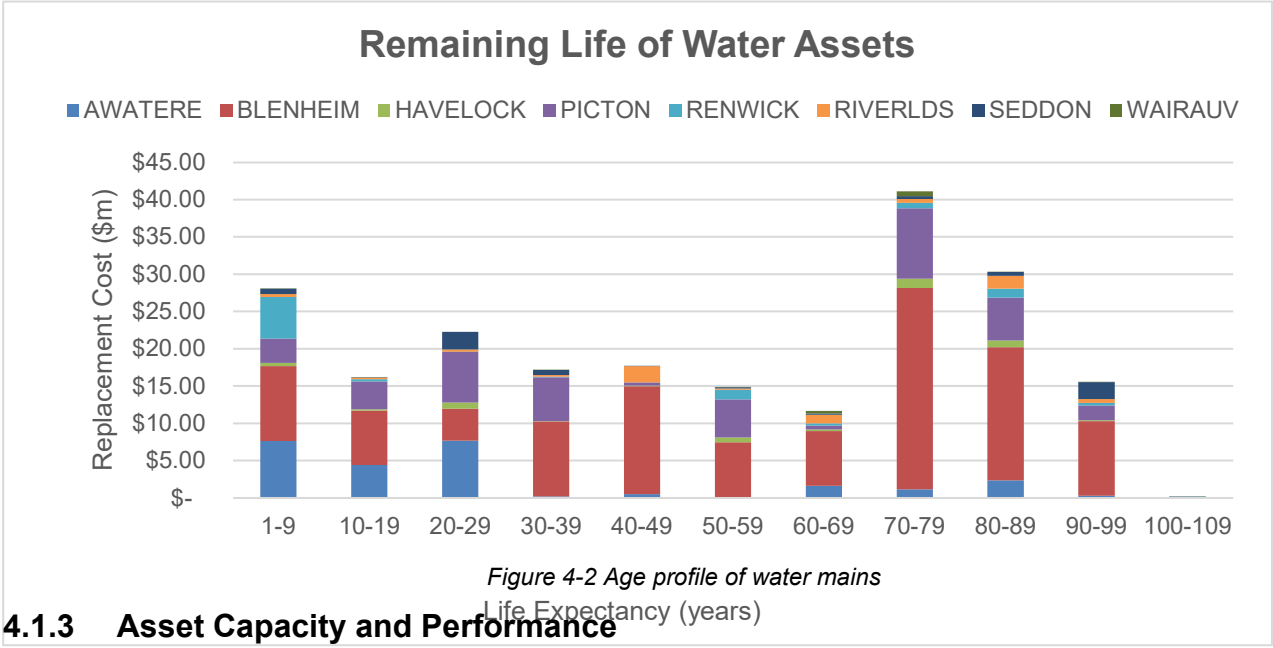


Figure 4-2 Age profile of water mains

4.1.3 Asset Capacity and Performance

The capacity of both the treatment plants and reticulation is discussed in detail in Chapter 3 — Future Demand.

4.1.4 Asset Condition

Condition of water assets is reported based on the percentage of remaining life available. This methodology is taken from IPWEA Practice Note 7: Condition Assessment and Asset Performance Guidelines. The majority (86%) of all water assets are within the Fair or Moderate to Very Good condition rating based on their replacement value as at the 2020 revaluation assessment.

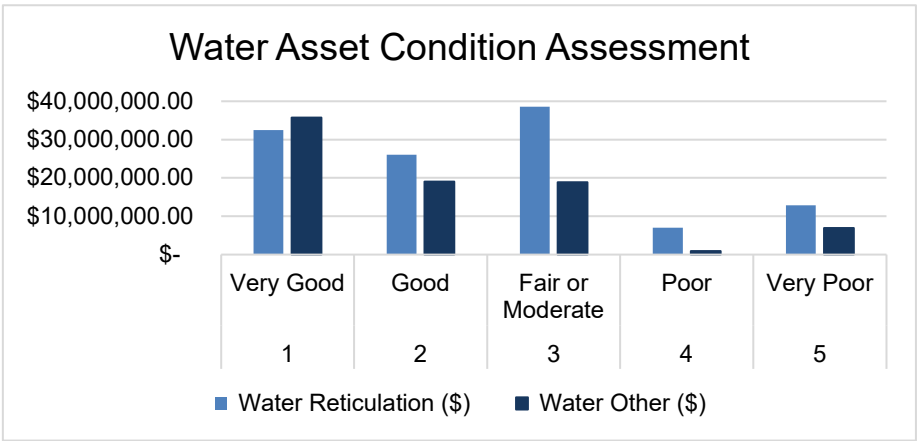


Figure 4-3 Water Asset Condition Assessment

Treatment — The condition of the treatment plants is considered to be very good. During upgrades the opportunity is taken to comprehensively appraise the serviceability of the existing components and insure high level asset data of new assets is captured. Treatment Plants are regularly inspected and maintained to a high standard. Progressive upgrades have been undertaken as necessary throughout their life.

Distribution and Booster Pumps — The majority of pumps are monitored through the Supervisory Control and Data Acquisition (SCADA) telemetry system and critical parameters relayed to operational engineers. Routine maintenance inspections and servicing is undertaken and the pumps are maintained to a high standard. Pump Station upgrades are planned from 2023 as shown in the table below.

Table 4-5 Planned Pump Station Upgrades

Location	Your Description	2023/24	2024/25	2025/26	2026/27	2027/28
Awatere Rural	Blairich Pump Station Relocation	$0.47m				
Blenheim	New Pump Station and Wells				$2.5m	
	Wither Road Booster Pump Station Upgrade				$1.78m	

Storage — Asset Condition — The storage reservoirs display a range of storage of material, size, age and condition.

Modern concrete reservoirs have recently been constructed at the Middle Renwick Road and Central water treatment plants, as well as at the Blenheim High & Low Level reservoirs and the Elevation reservoir in Picton. Polyethylene tanks have also been utilised at sites such as Forest Park, Blenheim, Boons Valley Picton, Marlborough Ridge and various smaller sites. All are in excellent to good condition.

Figure 4-4 Pre-cast concrete slab and ferro-cement reservoirs at Weld Street Blenheim. The Elevation in Picton prior to seismic strengthening and upgrade.

There are a number of older concrete slab and ferro-cement reservoirs at Weld Street Blenheim, the Elevation, Waikawa, Te Koko-o-Kupe/Cloudy Bay Business Park, and at the Renwick WTP. Inspection and structural assessment of the reservoirs at Weld Street and Te Koko-o-Kupe/Cloudy Bay was undertaken in 2008. Additional seismic strengthening and upgrade works were identified and have since been completed. Work on the Te Koko-o-Kupe/Cloudy Bay Business Park Reservoir was completed in 2014. Strengthening of the Weld Street Reservoir was completed in 2019 with further works ground works to protect the structure further completed in 2020.

Older type ferro-cement reservoirs at Wheelers Hill, Flaxbourne and Blind River Loop were damaged beyond repair by the Seddon Earthquake in August 2013. These have since been replaced by modern pre-cast concrete tanks.


All the ferro-cement reservoirs (except one) at Havelock were replaced with a sectional steel tank in 2011. An additional reservoir is being installed to provide additional capacity and continuity of supply and will be commissioned in 2021.

In 2020 a new reservoir was commissioned to replace the original smaller tanks which serviced Renwick. The new concrete reservoir provides more secure storage and protection of the Renwick Townships drinking water.

Inspections are carried out annually and maintenance of storage units is issued and recorded through the asset management information system (AMIS) and referenced to the Water Safety Plans (formerly called the Public Health Risk Management Plan) that has been developed for each supply area.

Reticulation Asset Condition — The useful life of buried pipes is dependent upon many inter-related factors including the manufacturer, operating pressures, soil conditions, groundwater levels, water chemistry, operational methods, installation workmanship, surface loading, depth and quality of bedding, pipe surround materials and jointing techniques. The rate of deterioration of the pipe wall, joints, fittings and service connections is a product of a combination of these various factors. Ultimately the combined effects will result in failure of one of the components of the pipeline. However, because of the complexity of the inter-related factors it is not easy to determine a predominant factor or to identify a trend that allows reliable forecasts into the future.

Some of the steel pipes laid in the ground are protected from corrosion by a coating of zinc galvanisation. High ground water levels and aggressive (acidic) soil chemistry can cause premature failure of the zinc coating and accelerated corrosion of steel pipe walls. This has been identified as a problem in the Awatere scheme and other areas. Galvanised steel pipes laid in an inert environment have a life expectancy of 80 to 100 years. In the aggressive local environments this has been reduced to 50 years. Further evaluation is required in relatively isolated areas, as corrosive soils can occur in localised patches. Accurate assessment of the remaining life expectancy of reticulation assets often requires destructive testing while only providing very localised deterioration rates. While this assessment can be used to further determine the remaining life of similar assets, it still requires a lot of assumptions. Where in depth testing of deterioration rates is deemed feasible, this work will be carried out. All other condition assessments will be recorded on work orders during reactive or schedule maintenance tasks or through non-destructive technology such sonar.

There is some evidence of reduced life expectancy for small diameter PVC and ABS pipes that have been jointed with solvent welded socket and spigot joints. This technique requires a rigorous standard of workmanship. Early jointing practices by some installers did not always follow manufacturer's recommendations and premature failure at joints has become evident. As a result, the planned life expectancy of the ABS pipes and PVC pipes up to and including 50 mm nominal diameter has been reduced to 40 years within the Awatere reticulation.

Asbestos cement was a popular material for the manufacture of pipes from the 1940s through to 1980. Experience has revealed a number of common failure modes. Acidic waters are capable of leaching the cement out of the asbestos/cement matrix, causing softening of the pipe wall and premature failure. An increase in pipe breaks in Renwick requiring emergency repairs indicates this may be a problem in the area. A pipe sampling programme was instigated in 2016 and short lengths of AC pipe were excavated, removed and sent to a laboratory for analysis (Figure 4-). The results revealed the 150 mm pipes were in worse condition than the 100 mm diameter pipes but in all cases the pipes were close to the end of their useful life. The Council has approved a budget for the replacement of all AC pipe in Renwick.

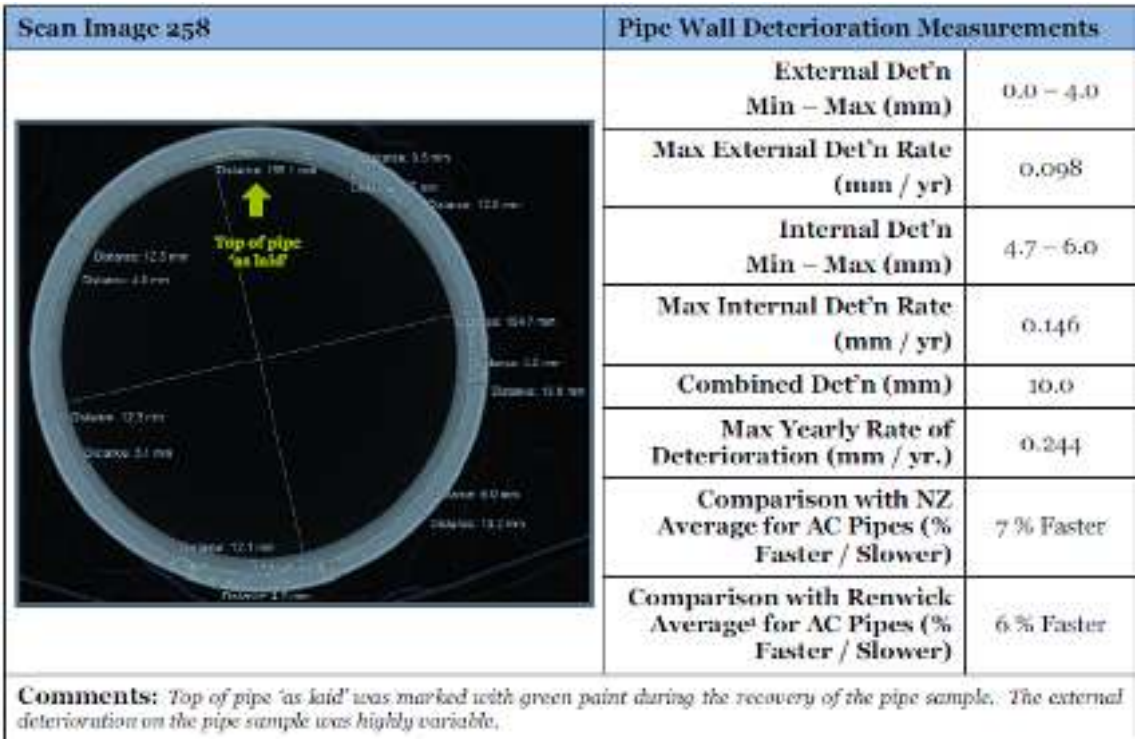


Figure 4-6 Extract from a pipe condition assessment report

Historical evidence has shown that steel bands within some types of joint socket are prone to corrosion and bolted gland joints can also corrode. Hillsides that are subject to erosion and the formation of under-runners can undermine the bedding and support of pipelines. AC pipe is a relatively brittle material which needs to be adequately supported, and point loading must be avoided.

The planned life expectancy of asbestos cement pipes in Marlborough has been adopted from the New Zealand Asbestos Cement Watermain Manual 2017[7]. The manual was updated from the 2001 version and compiled based on statistical analysis of additional pipe test results collected from a national survey of 42 water utilities throughout the country. The national data will need to be interpreted for local conditions.

The water abstracted from the shallow aquifers of the main river valleys (Blenheim, Speeds Road, Picton, Renwick and Havelock) has a naturally low pH (around pH 6) which means it is slightly acidic, and is aggressive to the cement binder in the asbestos cement pipe. The water leaches the cement from the AC matrix and accelerates the rate of deterioration. The rate of deterioration of the pipe wall is reasonably constant and therefore thin walled pipes (small diameter, low pressure rated pipes) are likely to degrade to the point of failure more readily than larger diameter pipes with thicker walls.

[7] New Zealand Asbestos Cement Watermain Manual 2017 (NZWWA, February 2017)

4.1.5 Asset Valuations

The water infrastructure assets are revalued annually. Details of the process and methodology are included in the Asset Valuation Report 2020 and summarised in section 5.3 of this plan. A summary of the main groups in each scheme is shown in Appendix 6: Valuation Details

4.2 Risk Management

The Council's approach to risk management is outlined in the MDC Risk Management Policy[8]. The strategy was initially developed by the Risk Management Steering Committee in 2001 in accordance with the AS/NZS 4360 Risk Management standard and later updated to ISO 3100 (2009). The latest update was completed in September 2019 and will be updated again in 2022.

The aim of the strategy is *to identify, assess, and manage risks in a consistent and demonstrable way.*

Our strategy is to:

- *introduce tools and internal assistance that enables sections to complete a risk analysis relevant to their operation*
- *ensure our decision making is consistent and demonstrable*
- *develop a 'risk aware' culture that encourages everyone to identify risks and associated opportunities*
- *promote and foster communication and risk monitoring throughout the organisation.*

This framework will be managed by the Contract and Risk Manager and supported by the executive management team.

The risks associated with all Council activities may be considered under a number of broad categories (Table 4-6 The risks associated with Council activities.) The wider council risks and assumptions are shown in Appendix 5: LTP Assumptions.

Table 4-6 The risks associated with Council activities

Risks Associated with Council Activities	
Legal	Events which may lead to criminal or civil proceedings taken against the Council.
Political	Events that prevent or restrict Council from leading the community and making prudent decisions on behalf of the community.
Economic	Events that cause a financial loss to the Council or cause loss or reduced profitability to commercial enterprise.
Environmental	Events which damage natural and man-made environments, resources and/or ecosystems.
Service Delivery	Events which cause an interruption of service, or result in a standard significantly below the levels of service agreed with the community.

[8] Risk Management Policy. V7 (Oct 2017) MDC

Risks Associated with Council Activities	
Community Health	Events that may cause harm to the health and welfare of residents or visitors to the region.
Human Resources	Events that adversely affect the people who are directly or indirectly employed by the Council.
Financial	Events that cause unplanned financial loss or prolonged financial inefficiencies for Council or within the community.
Information Management	Events which cause damage or disruption to the information systems and infrastructure supporting Council activities.
Reputation	Events that may damage the reputation, image or public confidence in the competence of the Council to perform its core duties.

Risk is defined in the AS/NZS ISO 31000:2009 as “The effect of uncertainty on objectives.” It is characterised as the product of the *likelihood* of an event occurring and the severity of the *consequences* that result. This common evaluation methodology has been used by the Council through a standard likelihood/consequence matrix.

It is possible for an event or situation within the water supply to affect the Council and community across several of the categories listed above. For example, a severe water shortage may affect the economic prosperity of the region and the health of the community. In extreme circumstances (such as a drinking water contamination issue) the event may have an impact on the reputation of the region and community health leading to consequences at a local or national political level.

4.2.1 Objectives of Risk Management

The objectives of risk management for the water supply are to:

- safeguard community health and wellbeing
- fulfil legal obligations
- maintain a core business activity and customer service
- safeguard continued economic activity
- protect the natural environment
- provide the most cost-effective service
- protect the asset value
- protect inter-generational equity.

4.2.2 Risk Assessment in the Water Supply Activity

Under the guidance of the Council’s Contract & Risk Policy a small team of senior operational staff, including the Operations & Maintenance (O&M) Engineer, assess the hazards associated with the water supply operation.

The water supply operation is analysed through its major constituent parts: water sources, treatment plants, distribution (the reticulation pipework, pumps and associated plant) and storage reservoirs. General management practices are also analysed.

The risks are also separated on a network basis so that risks to the Awatere system, for example, can be separately assessed and treated, compared to a similar risk in the urban Blenheim system.

The hazards are risk assessed on the standard Likelihood/Consequence matrix to establish a risk profile. The 'controls' for each risk are considered and assessed. The 'controls' are the plans, operational procedures, systems and regulations that can be implemented to mitigate either the likelihood or consequence of any given risk. Once the preferred controls have been identified, an action plan is prepared to implement the controls and ensure their efficacy. Finally, an assessment of the residual risk is made and either accepted or laid-off through insurance. High risks that cannot be readily mitigated are recognised and included in long term planning considerations.

The risk profile is reviewed and updated on an annual basis. New and modified infrastructure is included in the review and lessons from recent events are used to inform the assessments. Hazards are re-assessed in the light of any new information or research.

4.2.3 Water Safety Plans

The Health Act Amendment 2007 placed a statutory duty on water suppliers to introduce and implement a Water Safety Plan for each of its supplies. The Water Safety Plans was preceded by the Public Health Risk Management Plan (PHRMP). The PHRMP was a non-mandatory evaluation of the water supply system. Both plans provide a detailed and methodical framework to address all risks to the water supply.

The Council has developed a water safety plan for each supply area. The plans are submitted to the Drinking Water Assessor for approval. The current status of the Water Safety Plans is shown in Table 2- in Chapter Two.

4.2.4 Critical Assets

Critical assets are those which, if they failed, would cause widespread loss of service, serious public health risk, environmental damage or economic loss. Generally, in each of the water supply systems the critical assets are:

- water treatment plants
- main storage structures — dams/reservoirs
- trunk mains.

These general groups are supplemented by individual assets that serve locally significant businesses and facilities such as hospitals and retirement homes.

The criticality of particular components of the water infrastructure is recognised in the risk assessment process. Assets are assessed on the basis of the consequences of failure. The likelihood of failure is taken into consideration, as are alternative methods of supply or duplicated assets that can be reconfigured to keep water flowing.

The criteria for the criticality rating have not been rigidly defined as the impacts of failure can differ between communities. The general guidance shown below is based on either the total number of customers affected or as a proportion of the total population:

- high (1) >5,000 properties or 70% of the community affected
- medium (2) > 2,000 properties or 40% of the community affected
- low (3) < 2,000 properties
- not assessed.

The rating is stored on the asset management information system (AMIS) and can be readily displayed on the geographic information system (GIS) (See Section 6.1 of this plan for more information about AMIS). The rating is widely available to staff and is used to determine preventive maintenance schedules, risk mitigation activities and reactive maintenance priority.

4.2.5 Mitigation Measures

Infrastructure which is recognised as being critical to the water supply is subject to a number of 'risk treatments' to help mitigate the impacts of the hazard. Risk treatments can be applied through either:

- capital improvements — building new infrastructure to mitigate the risk, and/or
- operational treatments — implementing systems for the day-to-day operation of the water supply.

Capital improvements can be more readily incorporated into new or replaced infrastructure. Good design practice is to build in redundancy through duplication of assets, alternative sources, providing alternative supply routes and inter-connections, or through the provision of emergency standby facilities.

Operational treatments can include installing controls that are 'fail-safe', automated monitoring and control systems, rigorous Standard Operating Procedures, regular proactive maintenance, good alerting/response procedures for system malfunction and emergency call-out rosters.

4.2.6 Emergency Response Planning

The risk assessment process and the consideration of existing and future controls for residual risks provides a convenient framework for emergency response planning. For example, power failure is a significant risk to the water supply process. The consideration of the risk treatments (including backup network connections, emergency generators, mobile generators and gravity storage) provides the basis for an emergency response plan.

The risk management process is included in the preparation and review of Standard Operating Procedures used by operational staff. Emergency Management Plans have been developed for 'sites' (such as treatment plants and water storage sites) and specific 'events' that may affect multiple sites (such as earthquakes, tsunami and floods).

The Assets & Services Department has a well-prepared emergency response plan. In a major event an Incident Management team is mobilised and establishes a response centre in the Council offices. Available resources from Council staff and contractors are determined and staff rosters are prepared for long duration events. In major emergencies a staff member is deployed to the CDEM Emergency Management Operations Centre to liaise with CDEM Controllers and to act as the Lifelines Utility Co-ordinator.

A supply of emergency standby equipment is regularly tested and is ready to be deployed at short notice.

Existing service contracts include clauses for the provision of emergency services. There is a pre-determined communications plan to ensure communications are maintained during periods of possible disruption.

In recent years the emergency response plans have been regularly exercised through actual emergency events — including the earthquakes in 2013 and 2016 and local and regional flood events. Each event is subjected to a post-event evaluation at which the strengths and weaknesses are discussed and the emergency plans adjusted.

In 2020, the Pandemic Emergency Response plan was developed further to maintain continuity of service during the newly developed and implemented Alert Level requirements and restrictions. This part of the plan continues to be reviewed and developed as understanding of the current Covid-19 Pandemic continues.

4.2.7 Insurance

Council mitigates residual risk predominantly through insurance. The Council's Contract and Risk Policy Manager, with the assistance of an independent broker, considers all of Council's potential exposures. Insurable risk is mitigated through a combination of commercial insurance, insurance through the Local Authority Protection Programme (LAPP), and self-insurance (risk retention).

LAPP is a not-for-profit co-operative fund established by local authorities to provide mutual insurance for underground assets and other specialist structures that have in the past been difficult to insure through the commercial insurance market. The Council insures water, wastewater and stormwater reticulation, wastewater wet-wells and flood protection structures through LAPP. LAPP's reinsurance arrangements are managed by its broker AON New Zealand.

The Council's current threshold for claims is $3M at 100%. As the LAPP cover is for 40% of the claim after excess the threshold, once reached, is applied as an excess at $1.2M.

Central government has provided indemnity for 60% of the value of post-disaster recovery costs in relation to agreed critical community assets, on the condition that the local authority has made reasonable provision for the remaining 40%. However, the Government is currently reviewing this commitment.

Different criteria and thresholds apply to the 60% government funding. There is a summary available in the National Emergency management Agency (NEMA) Funding Guide.

In 2016 the Council employed AON/Tonkin & Taylor to undertake a Maximum Probable Loss assessment of water, wastewater, stormwater, roading and flood protection infrastructure. The study modelled two scenarios — a 1:500 year and a 1:1000 year earthquake event centred in the Marlborough region. The outcome of the study was a maximum probable loss prediction of $349M and $485M respectively. This was a significant increase on the previous estimate of $78M. The Council's current strategy is to use a combination of LAPP, government emergency funding, cash reserves and deferred capital expenditure to cover the costs of potential losses.

4.2.8 Engineering Lifelines

Assets & Services staff (including the O&M Engineer) are active participants in the Marlborough Engineering Lifelines Group, which has been chaired by the MDC Asset Management Engineer since its inception in 2008.

The Engineering Lifelines Group facilitates the exchange of information and planning with utilities such as Marlborough Lines and Marlborough Roads. The inter-dependencies between the Lifeline agencies are explored and plans are evolved within the NEMA 4R framework — Reduction, Readiness, Response and Recovery.

An annual action plan is prepared and agreed with all members. The Lifeline agencies also participate in civil defence exercises to test their response capabilities and to prepare for major events.

The Lifelines agencies contribute to the Marlborough Civil Defence Emergency Management (CDEM) plan[9]. The development of the existing plan included two regional risk assessment workshops. The workshops involved a thorough evaluation of the hazards in the region. A detailed risk assessment and prioritisation process was undertaken. Participation in the workshops provided insight into the relative risks and informed the discussion on the risk mitigation strategies required for the water supply.

[9] Marlborough Civil Defence Emergency Management Plan 2017-22 (MDC)

4.2.9 Resilience

Following the Christchurch earthquake sequence there has been substantial research into the resilience of utility infrastructure. This is particularly relevant to Blenheim as the Wairau Plains has many common geological/geographical features with the Canterbury Basin and comparisons can be usefully made.

Lateral spread of the land adjacent to watercourses was particularly damaging to stopbanks, buried utilities, bridge abutments and other nearby structures. New setback standards are being incorporated into new designs.

Differential settlement was also a problem, particularly for pipelines passing from normal ground conditions to rigid structures such as bridge abutments or connections to reservoirs. Similarly, buried chambers tend to 'float' in liquefied ground conditions, causing damage to assets. Flexible joints, paired gibaults and resilient materials are incorporated into the design of new and replacement assets at these transition zones.

Post-earthquake surveys have shown a marked difference in the performance of different materials. Modern materials such as PVC, and particularly polyethylene, were more resilient to ground shaking than some of the traditional materials such as earthenware, vitreous clay, un-reinforced concrete and asbestos cement.

The Stronger Christchurch Infrastructure Re-build Team (SCIRT) has been generous in publishing its findings and solutions. The team has created a depository of technical advice and engineering standards which will help local authorities to design and build more resilient infrastructure in future.

The National Disaster Resiliance Strategy has been developed by NEMA and came in to effect on 10 April 2019. This strategy outlines the vision and long term goals around sustainability, participation, planning, integration and co-ordination with the overarching intent for a resilient New Zealand.

Further understanding of the impacts of climate change on water assets as well as all Lifeline Utilities is being undertaken by Climate Change Working Group, made up of MDC staff across a number of departments. The knowledge gained from the research projects currently being undertaken will further develop how we replace, upgrade and extend networks across the region.

4.2.10 Natural Hazards — Learning From Experience

New Zealand is exposed to a range of serious natural hazards — volcanoes, earthquakes, tsunami and numerous severe weather storms. By definition, the most severe events are less frequent. However, the less frequent, lower intensity events also test both the structural integrity of the infrastructure and the management systems in place to respond to natural hazard events.

In July 2013 a 6.5 Magnitude earthquake off the coast of Seddon was followed by a sequence of after-shocks. The initial shake damaged water service reservoirs on the hilltops at Wheelers Hill, Blind River and Flaxbourne on the Awatere system. Major cracks developed in the ferro-cement walls around the base of the tanks. The tanks were rendered unserviceable and six were replaced at Wheelers Hill and Blind River, and three at Flaxbourne in 2014.

On 14 November 2016 the simultaneous rupture of a number of faults around Culverden generated an earthquake of 7.8 Magnitude — the third largest earthquake recorded since European settlement. Once again, the Awatere system experienced the greatest damage. A dozen major breaks were discovered and repaired in the three days immediately following the shake. A number of remote properties were without water for up to 72 hours whilst the sources of the breaks were found and repaired. The recently replaced tanks at Wheelers Hill performed well but the differential movement between the tanks and the buried pipework caused the connections to be pulled apart (see photo in Figure 4-7). It took several days for the outlets and pipes to be realigned and the tanks to be returned to service.

There were extensive power outages along the east coast south of Blenheim following the earthquake. The power supply to Upton Downs Pump Station was interrupted which caused downstream water shortages.

In Blenheim the watermain to Elizabeth Street was ruptured when the footbridge to which it was secured shifted during the earthquake. Downstream supplies to around 250 houses in the Riversdale part of town were adversely affected until a temporary connection could be made.

Severe weather storms have less impact on the public drinking water system. The exceptions are the Awatere and Renwick water supplies. On the Awatere system high rainfall events in the Black Birch catchment can cause high turbidity through the intake gallery. The MIOX water treatment plant is ineffective in highly turbid water, and the treatment plant is switched off after severe rain storm events. The water supply to Renwick can also be affected by high turbidity in Gibson's Creek. Careful management of the bore abstraction, and the use of storage, can reduce the impact on the water supply services.

After each major event a debriefing review is undertaken to examine the lessons learnt. Operational practices are updated where necessary, specifications are modified and design improvements are incorporated into future construction works.

Figure 4-7 The effect of differential movement between the tanks and buried pipework

4.3 Routine Operations and Maintenance Plan

The operation and maintenance of the water supply system involves the procedures and tasks necessary to deliver the agreed level of service to the customers whilst preserving and extending the serviceability of the infrastructure to maximise its useful life.

The strategic purpose of the water supply system is threefold:

- to facilitate public health and well-being
- to provide a resource for economic activity
- to preserve the environment.

This plan seeks to achieve these objectives through the following commitments.

Operational Works — Routine operational works will be undertaken by suitably trained and supervised staff or contractors at sufficient intervals to ensure the efficient functioning of the system.

Repairs — Reactive repairs will be assessed and undertaken in a timely fashion to minimise disruption to the service, meet the customer service standards, minimise collateral damage and avoid unnecessary water wastage.

Preventative Maintenance — Planned maintenance schedules will be established and implemented to minimise the risks and costs of premature failure or service interruptions, promote the effective and efficient functioning of assets, and optimise the whole life service potential of the infrastructure.

Operational management — Operational activities are undertaken by Assets & Services engineering officers and technicians under the direction of the O&M Engineer to ensure the outcomes and service standards are achieved in the most efficient and cost effective manner.

System Control and Monitoring — The water supply system will be continuously monitored and a procedure implemented to respond to detected abnormalities according to need.

Incident management — Assets & Services staff will prepare and plan for managing emergency incidents; to mitigate the effects of a major system failure and return to business as usual as soon as possible.

4.3.1 Reticulation Maintenance Activity

Below, Table 4-7– Work Orders completed on Water Supply Network 2018-20 shows a summary of the number of work orders across the 2018/19 and 2019/20 financial years and what component of these tasks were generated by customer requests. The tasks have been broken down further to show the number and the value of tasks that are planned and tasks that are reactive.

Maintenance around tobies and connections makes up the majority of the number of work orders, customer requests and the highest value of reactive maintenance.

Maintenance Type/ Task Type	Financial Year									
	2018/2019					2019/2020				
	Planned		Reactive		*CRM*	Planned		Reactive		*CRM*
	#	$	#	$	#	#	$	#	$	#
Additional Connection	44	$185,681.18				31	$ 130,799.94	2		
Additional Pipe	2	$ 58,191.68								
Additional Water Meter	25	$ 35,574.40				24	$ 19,773.98	1		*1*
Backflow Prevention	88	$217,506.30	23	$ 10,830.46	*15*	71	$ 184,006.50	14	$ 4,543.64	*10*
Meter Maintenance	8	$ 7,222.57	53	$ 26,798.11	*20*	8	$ 2,723.00	61	$ 30,601.46	*21*
Meter Reading	1	$ 43,864.82	*75*	$ 5,382.78	*1*			57	$ 3,317.14	
Monitoring			1	$ 104.76						
PS Building/Civil	2	$ 5,306.71	2	$ 2,108.13				1	$ 155.21	*1*
PS Electrical	1	$ 4,632.35	11	$ 11,450.58	*2*	1	$ 2,938.05	8	$ 19,976.00	
PS Mechanical	5	$ 56,729.38	10	$ 14,674.48	*2*	8	$ 34,187.30	9	$ 14,931.31	
PS Other	4	$ 1,111.60	16	$ 9,245.49	*3*	1	$ 885.00	6	$ 14,432.27	
PS Power			1	$ 1,712.00				1	$ 225.35	*1*
PS Telemetry			3	$ 4,284.41		1	$ 567.80	2	$ 1,712.29	
Hydrant Maintenance	1	$ 7,015.43	43	$ 17,179.26	*38*			30	$ 18,888.09	*26*
Infiltration/Leakage	1	$ 8,700.02	2	$ 289.60				2	$1,176.17	*2*
Toby Maintenance	2	$ 2,332.73	562	$ 185,109.53	*455*	16	$ 14,198.32	573	$ 286,783.25	*436*
Connection Maintenance	17	$ 21,620.33	533	$ 506,410.62	*389*	38	$ 40,495.33	412	$ 397,034.52	*342*
Main Maintenance	58	$ 10,541.72	166	$ 175,266.62	*129*	74	$ 46,418.42	149	$ 390,234.37	*115*
Valve Maintenance	9	$ 20,791.02	54	$ 34,448.01	*31*	4	$ 2,152.34	79	$ 76,623.77	*58*
Connection Renewal	1		9	$ 75,226.41		2	$ 22,048.93	5	$ 17,590.17	*1*
Pipe Renewal			1	$ 9,122.06		1				
PS Renewal								1	$ 8,459.81	
TP Costs	174	$ 86,298.89	29	$ 48,410.00	*4*	221	$ 217,872.76	41	$ 55,062.75	*2*
TP Monitoring/Testing	2	$ 1,269.14	3	$ 16,016.14				1	$ 9,837.00	
TP Power	1	$ 379.31				1	$ 371.00			
TOTAL	**446**	**$774,769.58**	**1597**	**$ 1,154,069.45**	***1089***	**502**	**$ 719,438.67**	**1455**	**$ 1,351,584.57**	***1016***

Table 4-7 Work Orders completed on Water Supply Network 2018-2020

A Water Service Repair database was introduced in March 2010 to improve the recording of customer service requests. That database has now been replaced with the Customer Service Requests in the Asset Management Information System (AMIS), introduced in December 2014.

All maintenance tasks are recorded in AMIS. The number and cost of maintenance tasks is associated to the appropriate assets. This process allows to data quality checking and the results can be reviewed and used to identify assets which are beginning to fail, hot spots across networks and when further maintenance is no longer feasible and renewal or replacement should be considered.

4.3.2 Operational Management

General maintenance and repairs on the water supply system in Blenheim, Renwick, Havelock and Wairau Valley are undertaken by the Works Operations staff within the A&S Department. Similar work in Picton and Awatere is undertaken by a term contract in each of the areas. The term contracts were originally three years with the opportunity for two, two year extensions. Both are now in the final year of their second extension and are due for renewal in

November 2021. The new contracts are likely to be three years with the opportunity for a single two year extension. The length of the new contracts will likely be determined by Central Governments proposed Three Water Reform.

The contract is managed by a dedicated MDC engineering officer. The conditions of the contract specify the operational procedures, skills of the operatives and the quality of materials and fittings to be used. Renewal of the contract is reliant upon meeting minimum key performance indicators.

The Works Operations team and contract labour repair and maintain the reticulation and provide a 24/7 call-out service. Routine maintenance of the treatment plant and pumps is undertaken by the engineering officers whilst more specialist work is contracted out.

A full-time technician is employed to oversee the maintenance of electrical and telemetry components within the system. More specialist work is contracted out to specialist electrical, mechanical, telemetry or civil engineers.

The major components of the water supply system are monitored by a SCADA telemetry system and many routine functions are controlled by automatic PLC (programme logic control) computers. The telemetry data is returned to the engineering officers who have direct access to the information and can monitor real time data and trending of the parameters. A 24/7 standby roster is maintained to monitor the system and an automated tiered alerting system is employed to ensure staff respond to system alarms.

4.3.3 O & M Decision Making

The maintenance decision making process seeks to resolve conflicting issues, as outlined below.

Uninterrupted service versus risk and costs — A guaranteed uninterrupted 24/7 water supply can be delivered to the Marlborough customers. However, the cost of engineering and maintaining such a service has to be balanced against the willingness and ability of the community to pay for it, and managing the risks and consequences of occasional interruptions.

The additional costs of providing improved service levels can become disproportionate to the marginal benefit. For example, improving the target for restoring a water supply interruption from 10 hours to 8 hours has a relatively small marginal cost. However, to further improve the response time to four hours or less would involve significant additional cost in terms of manpower and disruption to scheduled work programmes. The current levels of service have been developed to provide risk-based prioritisation and to balance cost and customer expectations.

Asset maintenance versus renewal — The A&S Department seeks the optimum balance between the cost and disruption of ongoing maintenance and renewal of assets that have reached the end of their useful life. Currently, achieving this balance is based on the judgment of the operational engineers. One of the priority aims of the upgraded asset management information system is to provide good data on maintenance costs and frequency to support the engineers' decisions. Maintenance versus renewal is regularly reviewed based on the factors considered in 4.4 Renewal/Replacement Plan.

Planned versus unplanned maintenance — A well planned preventative maintenance schedule may reduce disruption to services, increase the life expectancy of assets, reduce the whole life costs and reduce the risks associated with failure. Planned and scheduled work can often be undertaken in a more cost effective manner than reactive maintenance.

Maximum efficiencies are gained by recognising the appropriate intervention interval. In cases where the risks of failure are low it can be cost-effective to allow the asset to fail and respond to the breakdown. Planned maintenance schedules have evolved for the critical components of the water supply infrastructure. More formal documentation and evaluation of the current process is required, as the current reliance on the experience of individual staff may not be sustainable.

Efficient asset utilisation versus risk reduction through redundant capacity — There can be serious consequences from the failure of some critical assets, and a level of redundancy or contingency options can mitigate the risks. However there is an obvious cost to duplicating assets that are not fully utilised in normal operating conditions.

Blenheim and Picton both have two independent but inter-connected sources of supply. Most distribution pumps are duplicated with a duty/standby arrangement. Both systems can operate from a single source only. The main trunk mains are able to meet demand although restrictions may need to be introduced at peak demand periods.

Storage reservoirs help to provide a continued supply in the event of power failure. In recent years storage capacity has been increased to improve resilience. Wherever possible water distribution pipelines are configured into inter-linked networks that can provide alternative supply routes in the event of a pipe failure.

Resolving these conflicting issues exists within the context of risk. The function of each of the components of the infrastructure is assessed for its critical contribution towards achieving the desired outcomes. Maintenance tasks and programmes are planned accordingly.

4.3.4 Summary of Operational Costs

The main items of operational costs are shown in Figure 4-8 below.

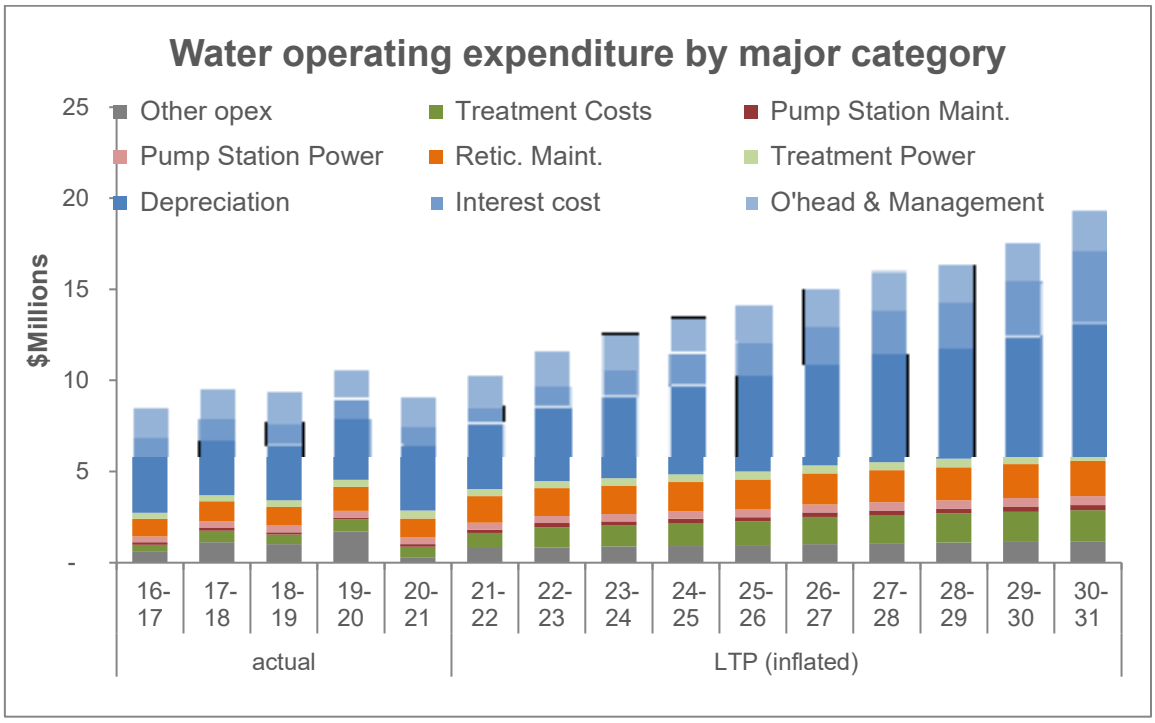


Figure 4-8 Summary of operational expenditure 2016-31

The graph shows the significant increase in operational costs over the past five years. The cost of depreciation has risen, the asset base has increased, and experiences such as the Christchurch rebuild have provided more data on asset replacement costs.

Good energy management techniques combined with negotiated price contracts with energy suppliers have helped to manage the costs of water treatment and pump station operation.

The cost of finance increased significantly between 2009 and 2011 as new treatment plants and reservoirs were under construction but this has remained reasonably steady since then.

4.4 Renewal/Replacement Plan

The renewal strategy is designed to maintain the overall condition and performance of the asset infrastructure through a continuous, progressive cycle of replacement. Assets are analysed to determine the intervention point at which it is most cost effective to replace the asset. See Table 4- for a list of the major capital investment projects from 2021-31. The renewal programme is formulated from the following criteria.

Age — Age is generally the most consistent indicator of an asset's position in its life cycle. The installation date of each asset is recorded in the asset management information system (AMIS). A nominal useful life for every asset is allocated based on industry standards. The nominal life is modified from experience, individual assessment or fault trend analysis.

Condition — To date the condition of assets is assessed through observation during reactive or routine maintenance/servicing. Specialist consultants are employed to assess complex structures such as reservoirs. Pipe sample analysis is used to investigate specific concerns and was recently employed to investigate the condition of the asbestos cement mains in Renwick. This type of analysis will be undertaken as and when it is deemed feasible and beneficial.

Performance — Information is gathered on the performance of assets through the SCADA system, on site monitoring and customer requests for service or complaints. The full network is assessed and reported against the performance measures set by the agreed Levels of Service every six months.

Maintenance Costs — Routine and reactive maintenance is recorded against individual assets. Both the quantum of maintenance and the costs are used to assess the full life cost of asset ownership.

Customer Service Delivery — Requests for service and customer complaints are analysed.

Economic Obsolescence — The availability of spares, skills, techniques or restricted access through resurfacing may pre-empt reductions in the useful physical life an asset.

Renewal of water assets is planned by the O&M Engineer and the Planning & Development Engineer. A schedule of potential renewal schemes is maintained and updated by the O&M Engineer.

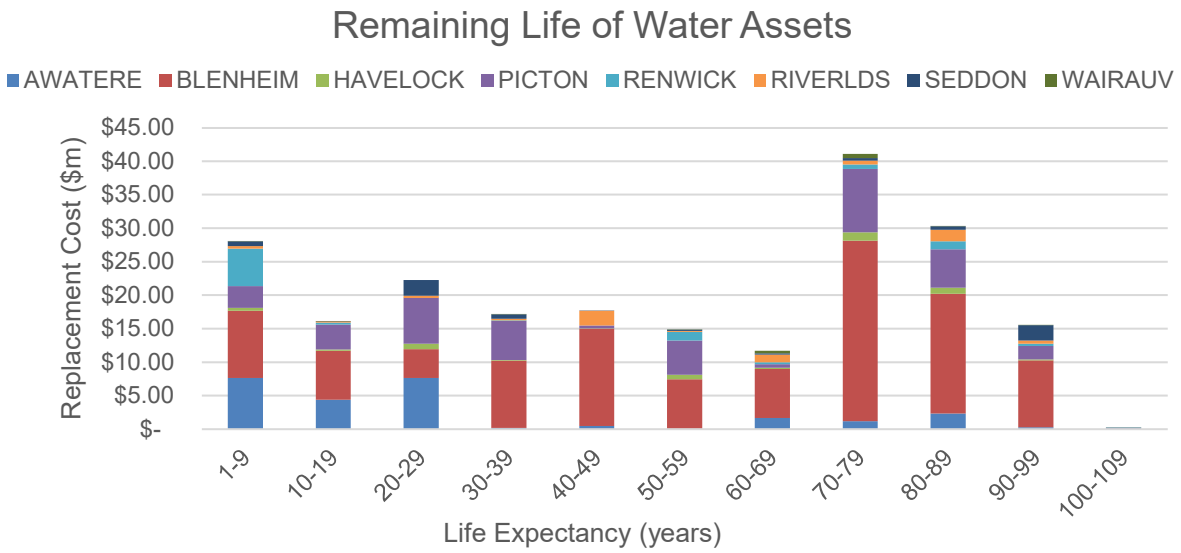
Project prioritisation is based on a number of factors including a risk assessment of repeated failure of an asset. Intervention points are established based on the criticality of the asset. Pipes and pumps that provide a critical water supply are given greater priority. The critical assets are routinely monitored and maintained. Deterioration is monitored and renewal planned to avoid service failure.

Similarly, additional priority will be ascribed to projects where the existing asset is under-performing and causing a level of service issue. The costs of all capital projects are distributed between the main drivers — renewals, improvement to levels of service, and growth.

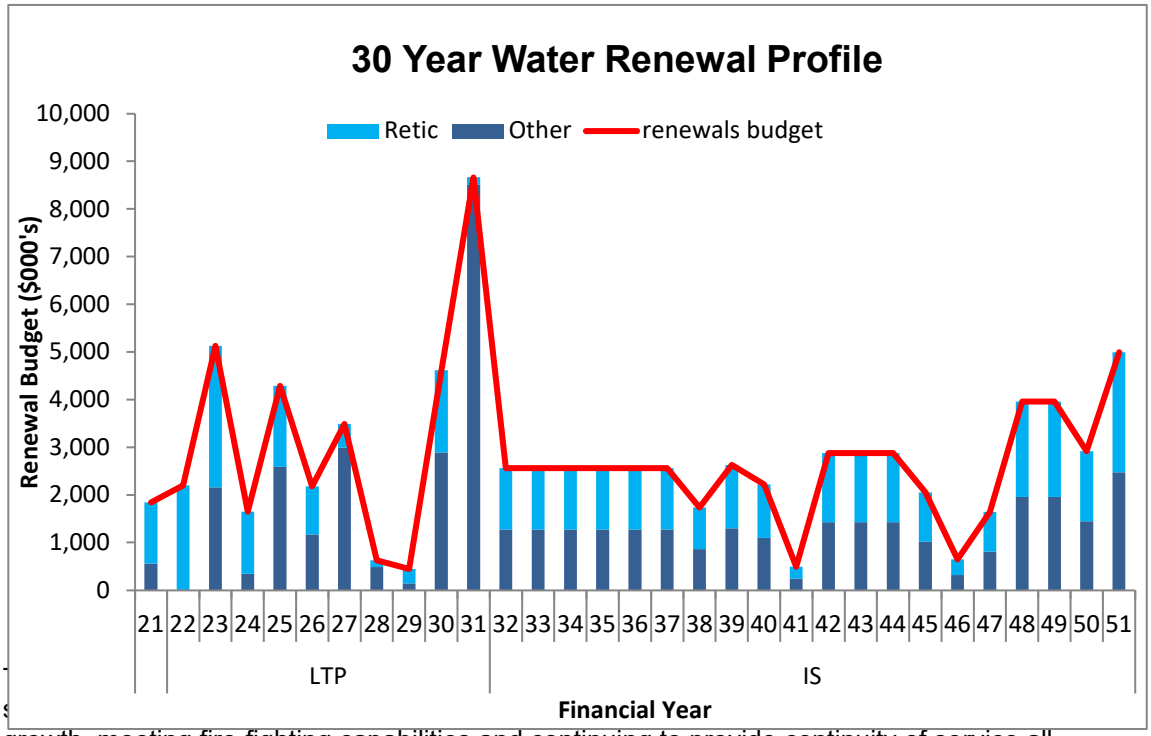
Wherever possible the renewal programme is coordinated with capacity upgrades. The continued growth in urban development provides a limited number of opportunities to renew infrastructure and apportion costs accordingly.

Currently non-critical assets are allowed to fail and are renewed when the cost of maintenance or service interruptions become untenable. This strategy ensures the useful life of the asset is maximised and delays renewal as long as possible. This is considered a rational approach at this time.

The condition of the whole asset base has yet to be determined through comprehensive survey and assessment. The sequence and detailed design of the urban development pockets is also yet to be established. These are good reasons for delaying renewals whilst the overall strategy and condition monitoring becomes more highly developed.



of water assets within the system. The data suggests an average annual renewal expenditure of around $2.9M over the next ten years will be required. Based on the 2021-2031 budget and priority of asset renewals, what is physically possible and what is feasible beyond 2031, the renewals profile has been smoothed and is shown below.



growth, meeting fire-fighting capabilities and continuing to provide continuity of service all contribute to planning for renewals of water assets. As our understanding of the performance and condition of the network increases, more accurate useful service lives can be assigned and improve the certainty of the forecasted renewals profile beyond 2031.

As data is collected from whole of network metering employed across Renwick and Havelock, our understanding of consumer demand will improve and so will our assumptions across our water loss. This data will help to identify leakage across networks and the most efficient means of dealing with this.

Asset upgrades are included in the capital programme and the costs apportioned between growth, renewal and improved level of service, as shown in Table 4-8 Major capital investment projects 21-31.

4.5 Creation/Acquisition/Augmentation Plan

All capital upgrade projects for the water supply infrastructure follow a process from inception though to construction and commissioning. At critical points in the process reports are prepared and submitted to higher levels of governance for approval. Generally projects are over seen by the Executive Management Team, the Assets & Services Committee and the Council depending on the complexity, cost and community sensitivity. The process is as follows.

Identification of Need — New or upgraded infrastructure is identified as necessary for a variety of reasons. Drivers include: as a result of community consultation, higher standards (eg; Drinking Water Standards), structural weakness and inability of critical structures to withstand earthquakes, and increased growth in demand.

Project prioritisation — Projects are prioritised through a risk management process of considering the effects of not providing the new or upgraded infrastructure and taking account of budgeting constraints. Upgrades driven by the Drinking Water Standards generally have prescribed time limits which drive the capital works programme.

Alternatives and Options — Alternatives including non-infrastructure solutions are considered before examining different design options.

Once an outline design solution has been agreed detailed design can proceed. Further options or unforeseen problems may be encountered at this stage and the decision-making process may need to be reviewed. Additional specialist consultancy, and peer review for larger projects, continues through the process.

Project Approval — This is usually done through the annual plan and LTP processes. Where options are available with significantly different costs and/or risks, those options are typically presented to the Council's Assets and Services (A & S) Committee for consideration.

The outline budget costs and the sources of funding are considered during the annual plan process and aligned with the objectives of the Long Term Plan. The decision of the A & S Committee is forwarded to the full Council for ratification.

Detailed Design — An approved project will progress to the detailed design stage. Specialist engineering consultants are often employed as they have greater experience in the design of major works. Draft designs are submitted to the Planning & Development Engineer and may be passed on for peer review. Generally, all engineering works are designed to national or international specifications and standards. The standards may be amended to local conditions.

Tender — Once a final design has been proposed and agreed with Council engineers, most construction projects are advertised for competitive tender. The Council has a rigorous procurement policy which was recently subjected to scrutiny from an independent lawyer following unsupported allegations of corruption. Tender submissions are typically evaluated on the basis of a series of pre-determined weighted attributes. The weighted attribute methodology is designed to provide the best possible overall outcome and may consider such matters as health and safety, value for money, productivity, certainty of outcome, previous experience, innovation and risk. Occasionally a lowest price conforming method is used.

It is usual for specific contracts to be prepared for every tender. Each one is updated to include the latest standards, materials and techniques. A specialist contract lawyer is employed to check and review larger contracts prior to tendering.

Construction — The construction phase is normally managed by the Council's project engineers supported by specialist consultant project managers and supervisors. A risk register is compiled at the beginning of each project and is monitored throughout construction to help ensure smooth progression and a successful outcome.

Significant variations in the final design may have to be returned to the Assets & Services Committee for verification and approval.

The capital works programme is led and planned by the Planning and Development Engineer. The main drivers of the capital programme are categorised between growth, levels of service improvement and renewal, and the costs are apportioned to each category.

4.5.1 Capital Investment Strategy

A number of techniques have been developed to identify and prioritise the demands for new and upgraded infrastructure. These are discussed in more detail in the chapters relating to levels of service and future demand (chapters 2 and 3).

Dynamic mathematical models have been developed to provide detailed and accurate predictions of flow and pressures throughout most of the reticulation networks. The models for Riverland's and Wairau Valley are less advanced.

The models are built to represent the individual characteristics of each of the distribution systems. They are then used to simulate a demand pattern or system configuration. The outputs of the models are compared with the actual flow and pressures experienced in the system so the models can be calibrated and verified.

Areas of poor flow or low pressure can be found through the models. The causes of localised problems, such as under-sized pipes or restrictive fittings, can be identified and solution options considered.

New developments, requests for connections to the system, or increases in demand, can be added to the model in order to predict the likely effects. The benefit of dynamic models is that multiple combinations of demand parameters can be compiled into different scenarios, the consequences can be quickly determined and possible remedies tested.

The models are used both in-house and by specialist design consultants to derive preliminary design solutions. Depending on the size and costs of the project, the design options may be peer reviewed. The models are constantly under review and development. They were recently used to determine the number, size and configuration of distribution pumps at the Central Water Treatment Plant in order to meet current and future demand at optimal efficiency, within the constraints of the site. The models are also used to determine the expected flow and pressure within the system to comply with the Firefighting Water Supply Code of Practice.

Construction costs are one of the criteria to be considered when evaluating major investment projects. The whole life costs of the new infrastructural assets are evaluated along with the cultural, social and environmental implications. Tools and techniques such as Cost/Benefit Analysis, Assessment of Environmental Effects and Cultural Impact Assessments have recently been employed on major projects and will continue to be used.

The Council uses a variety of methods to communicate with communities that may be affected by proposed capital works, including consultation through the annual plan and long term plan (LTP) processes, meetings with residents' associations, distribution of pamphlets to households and information on the Council's website. Consultative working groups are particularly valuable for specific larger projects. Many community concerns can be raised and addressed through the group meetings.

The Awatere Water Users Group has been actively involved in seeking an economically acceptable solution to the water treatment issue in Seddon and rural Awatere. The Smart & Connected strategy has formed working groups in many of the small communities. These have proved useful conduits for initiating consultation in Renwick and Havelock regarding both demand management and water treatment options.

Vested Assets — The Council will accept ownership of assets constructed by private developers. These are normally extensions to the reticulation to serve new subdivisions. The assets will only be accepted if they are designed and constructed to rigorous standards. The process is supervised by the Infrastructure Project Engineer and subject to their final approval regarding their quality.

Purchased Assets — The Council has previously purchased water supply assets or taken them over by agreement from private owners. There are no plans for similar acquisitions in the future. However, the future of small community supplies will come under close scrutiny as a result of the Havelock North Drinking Water Inquiry. There is potential that local authorities may be required to take on more responsibility for these private schemes in future.

4.5.2 Summary of Future Costs

In the past the water supply capital works programme has been adjusted to meet the overall Council rating target. Deferment of major capital expenditure has been one of the techniques used to reduce overall Council expenditure and balance the budget.

The capital budget is shown in Table 5-2 in Chapter 5. The budget is based on the Council engineers' estimates or outlines cost estimates and includes contract costs, design, supervision, land purchase, access costs and a contingency sum. The estimates are moderately to highly accurate. However, the programme has traditionally been optimistic as it assumes the optimum progression through the feasibility, design, public consultation, consent approval and land purchase processes. This is a conservative, but necessary, assumption to ensure that all necessary funding is in place for the programmed start date. However, the progression of construction projects is seldom straightforward and unspent finance is carried forward to future budgets. This needs to be carefully managed to ensure undue costs are not incurred through capital funds being misaligned with expenditure.

Table 4-8 Major capital investment projects shows the distribution of costs between growth, level of service and renewal for the major capital schemes proposed over the next ten years. The capital investment outline over 30 years is shown in the Infrastructure Strategy 2021-51.

Project		Growth	LoS	Renewal	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	2025/ 2026	2026/ 2027	2027/ 2028	2028/ 2029	2029/ 2030	2030/ 2031
Awatere Rural														
Storage	Lions Back Reservoir Renewal			100%	$1.2m									
Pipeline	Marfells Beach Road Pipeline Renewal			100%	$0.375m									
Pipeline	Pipeline Renewals, Replacements and Upgrades	4%	31%	65%			$0.208m			$0.69m			$0.205m	
Source	Headworks Pipeline Renewals			100%			$0.388m							
Storage	Reservoir Renewals, Replacements and Upgrades	40%	12%	48%	$1.59m									
Seddon														
Pipeline	Pipeline Upgrades	70%	10%	20%	$0.328m									
Blenheim														
Metering	Water Metering			100%	$0.6m									
Pipeline	Muller Road Watermain Renewal			100%	$0.894m									
Pipeline	Pipeline Upgrades for Fire/Capacity	40%	27%	33%	$2.62m									
Pipeline	Pipeline, Meter and Airvalve Upgrades	9%	91%		$0.08m							$10.725m		
Havelock														
Source	Pipeline for new source	40%	40%	20%									$5.56m	
Pipeline	Pipeline Upgrades and Renewal		74%	26%			$0.18m		$0.12m			$0.15m		
Storage	Reservoir Upgrades	12%	88%		$0.5m									
Picton														
Storage	Elevation Reservoir Upgrade		100 %		$0.57m									
Pipeline	Pipeline Upgrades and Extension	98%	2%		$0.12m			$0.5m						
Pipeline	Speeds Road Pipeline Renewal			100%	$4.195m									
Pipeline	Connection Renewals			100%	$0.275m									
Pipeline	Pipeline Renewals			100%	$0.35m									
Metering	Water Metering	20%	70%	10%	$2.12m									
Wairau Valley														
Pipeline	Watermain Extension	60%		40%			$0.385m							
Regional														
Pipeline	New Water Connections	100%			$1.1m									
Pipeline	Pipeline Renewals - Renwick, Havelock, Riverlands			100%	$1.018m									

Table 4-8 Major capital investment projects 2021-31

4.6 Disposal Plan

Disposal planning recognises there are costs and consequences associated with the decommissioning and disposal of redundant assets.

Underground assets are generally left buried but capped to prevent them from acting as land drains. Surface features are removed and the surface reinstated. Component parts are salvaged and reused wherever practicable. Decommissioned pipelines may have value as ducts for other service providers although their value is not formally recognised in the revaluation process. The position of the pipelines remains on the geographical information system (GIS) and they are archived as ‘expired’ assets in the AMIS.

The new water treatment plants at Renwick and Havelock and the Speeds Road Watermain renewal will replace a number of existing assets.

Chapter 5: Financial

The Water Supply activity accounts for around 8.5% of Council activity expenditure. The asset management plan therefore has important implications for the overall budget and consequences for developers, ratepayers and other sources of funding which contribute to the activity.

The drivers to improve the quality and quantity of water supplied have been discussed. Affordability has been highlighted as a key challenge in the Infrastructure Strategy and throughout the asset management plan as more infrastructure is built and maintained to meet the demands. The challenge is exacerbated by the anticipated change in demographics for the region over the medium/long term.

Generally financial data and projections are for the ten year period 2021-31. Longer term forecasts are included in the Infrastructure Strategy.

Components of the Financial Section

5.1 Financial Strategy and Projections

The Council has developed a number of key strategies and plans that meet statutory requirements and explain how future financial demands will be met. Documents such as the Financial Strategy, the Revenue and Financing Policy, the Treasury Policy and the Development Contributions Policy form the basis for the Council's financial planning

These policies and plans are regularly reviewed and updated. The cycle corresponds with the three-year update of the Long Term Plan.

The Council's financial statements are published in detail in the Long Term Plan and the Annual Reports. They are prepared in accordance with the Local Government Act 2002 and comply with Generally Accepted Accounting Practices in New Zealand. They comply with New Zealand's International Financial Reporting Standards (NZIFRS) and other applicable financial reporting standards as appropriate to public benefit entities. All documents are scrutinised and approved by Audit New Zealand.

The Financial Strategy was updated and published for public consultation in March 2021. The strategy seeks to demonstrate how Council will:

- ensure that the levels of rates and borrowing are financially sustainable and kept within pre-set limits
- maintain levels of service
- maintain the assets it owns on behalf of the community
- provide for growth and changing demand patterns within the District
- fund improvements to infrastructural and other community facilities
- manage Council's investments and liabilities.

Council's responsibility for financial prudence is defined by statutory obligation and is recognised in the strategy.

"Under section 101 of the Local Government Act 2002, Council considered its financial management responsibilities where it must manage revenues, expenses, assets, liabilities, investments and general financial dealings prudently and in a manner that promotes the current

and future interests of the community. The Council also considered whether it was sustainable to undertake the level of capital expenditure proposed in the Long Term Plan together with increased operating costs associated with the higher debt level. If the Council has too much debt then future ratepayers will subsidise current ratepayers. If population growth, which is expected to fund the growth portion of assets incorporated into the capital expenditure programme, does not occur or occurs at a slower rate this may either increase rates or slow the delivery of capital projects."

The strategy continues with regard to maintaining the assets in the following way:

"The policy of fully funding depreciation except for Community Assets has been continued in the Long Term Plan 2018–28 and is considered an appropriate measure to ensure the concept of intergenerational equity is maintained. That is, current ratepayers will pay for its use and a share of its replacement cost in relation to the assets provided."

Regarding growth the strategy states:

"Council believes that, as development increases the consumption of its current infrastructure capacity and accelerates the requirement for new infrastructure, developers should bear the cost of this increased demand.

"Through the application of its Development Contributions Policies to fund the cost of this additional infrastructure, Council is seeking to achieve an appropriate balance between encouraging growth and reducing the potential for additional burden on the ratepayer.

"Undertaking development in a planned, co-ordinated manner can reduce costs as infrastructure development is not responding to "adhoc requests" for isolated, scattered, piecemeal development. Responding to adhoc development can mean that parts of the infrastructure networks are replaced earlier in their life than optimum while allowing other parts of the network to remain comparatively underutilised."

Regarding levels of service the strategy states:

"During the development of the 2018-28 Long Term Plan, the Council considered how to maintain its current levels of service, operating expenditure and capital expenditure needed to replace existing assets and provide new infrastructure and facilities to meet the levels of growth that are forecast within the 10 years of the Long Term Plan. The Long Term Plan as presented should, for the majority of activities, enable Council to maintain current levels of service."

For the water supply activity the level of service will undergo significant improvement over the course of the Long Term Plan as water treatment plants are constructed to comply with the existing DWSNZ and proposed Water Services Bill requirements.

The Financial Strategy makes it clear that to achieve the required financial prudence there were four main factors to consider:

- "*The estimated expenses of achieving and maintaining the predicted levels of service provision set out in the Long Term Plan, including the estimated expenses associated with maintaining the service capacity and integrity of the assets throughout their useful life;*

- *The projected revenue available to fund the estimated expenses associated with maintaining the service capacity and integrity of assets throughout their useful life;*

- *The equitable allocation of responsibility for funding the provision and maintenance of assets and facilities throughout their useful life;*

- *The funding and financial policies."*

Council's Financial Strategy sets out the strategic financial direction; the external and internal factors expected to have a significant impact (in particular over the next 10 years); and the approaches used to fund this scenario in a prudent manner.

The strategy identifies that in general:

- growth driven capital expenditure is funded by Development Contributions
- capital expenditure to increase levels of service, e.g. improve quality of drinking water supply, is funded by borrowing
- renewals capital expenditure is funded from revenue — rates and charges — set to recover depreciation expense, and accumulated until spent. This funding source emphasises the importance to Council of continually fully funding depreciation on infrastructural assets.
- In practice any funds available are used before new loans are drawn down, to avoid paying interest unnecessarily; except in the case of Development Contributions which are only ever used to fund growth projects.

The major water supply projects are primarily to

- build water treatment plants to ensure the water supply is safe for human consumption
- facilitate water demand management to ensure there is an adequate supply in the future
- reinforce the reticulation network to ensure there is sufficient water for firefighting.

The renewals expenditure based on expected useful life has been budgeted to “fill the gaps” between the major projects.

Beyond the planning horizon of the asset management plan and into the later 20 years of the Infrastructure Strategy 2021-31 the focus of capital expenditure is forecast to move predominantly to renewals and continuing to meet levels of service.

5.1.1 Operational Maintenance Expenditure

There are increasing pressures on the operational expenditure from a number of causes:

- improved water quality levels of service will require additional water treatment staff, chemicals, electrical power and plant maintenance
- growing infrastructure will require additional maintenance and depreciation costs
- finding and fixing leaking pipes to help meet water demand management targets will incur additional costs
- maintaining an ageing infrastructure will require additional maintenance
- mitigating risks through insurances will fluctuate as national and international insurance markets respond to demand and claims.

The financial impact of these decisions has been estimated and included in budget projections into the future.

Historical operational expenditure is discussed in Chapter 4 — Life Cycle Management Plan.

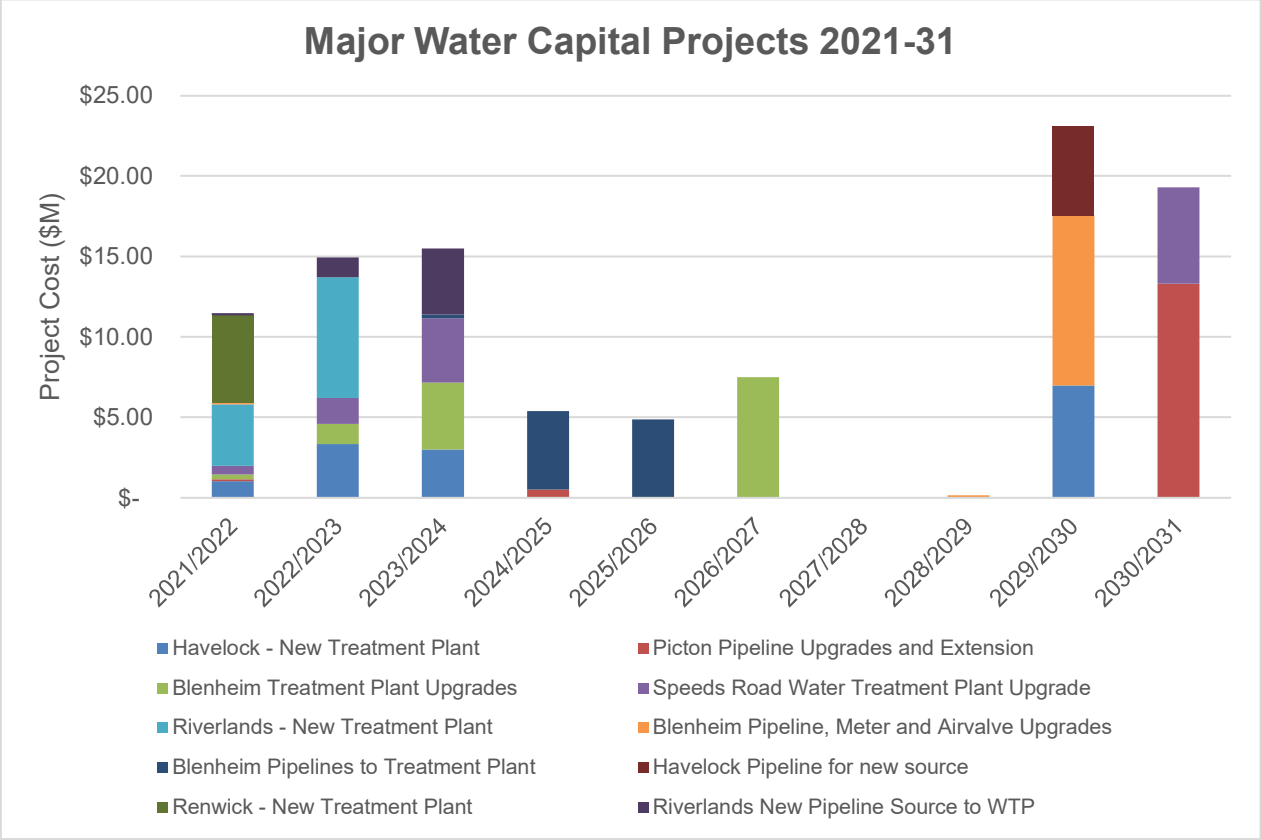
	Water Supply - 2021-31 (inflated)									
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Insurance costs	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Reticulation - connection maintenance	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Reticulation - mains maintenance	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Treatment - Power	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pump stations - power	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Reticulation - Key maintenance	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Backflow prevention	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Treatment - monitoring/testing	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Reticulation - valve maintenance	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pump stations - mechanical	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pump stations - other	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Reticulation - hydrant maintenance	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pump stations - chemical	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Metering	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pump stations - building/civil	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pump stations - electricity	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Reticulation - [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
total infrastructure costs	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
operating costs	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
internal charges	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
depreciation	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
interest expense	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
overheads allocated	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
total operating costs	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 5-1 Projected Operational Expenditure 2021-31

5.1.2 Capital Expenditure

The major focus for capital expenditure over the first years of the programme will be the construction of water treatment plants to ensure water quality meets the existing NZDWS and proposed Water Services Bill.

The following chart shows the major projects of the capital investment programme. It illustrates the major areas of investment, the types of infrastructure project and the time line for delivery. Minor projects, management and overhead costs and non-specific renewals have been removed from the data for clarity.



and certainty of contract cost and delivery. It is common to underestimate the time required for project preparation to ensure Council approval and funding is sourced in good time. However, unnecessary finance servicing costs can be incurred if funds are secured too early and not spent.

In the past five years the Council's actual Capital Expenditure on Water Supply has ranged from $3.12M in 2016 to $7.529M in 2018 with an average of $6.085M. In the previous 5 years, on average 84% of the budget has been spent. This is shown in Figure 5-2 Water CAPEX Budget vs Actual.

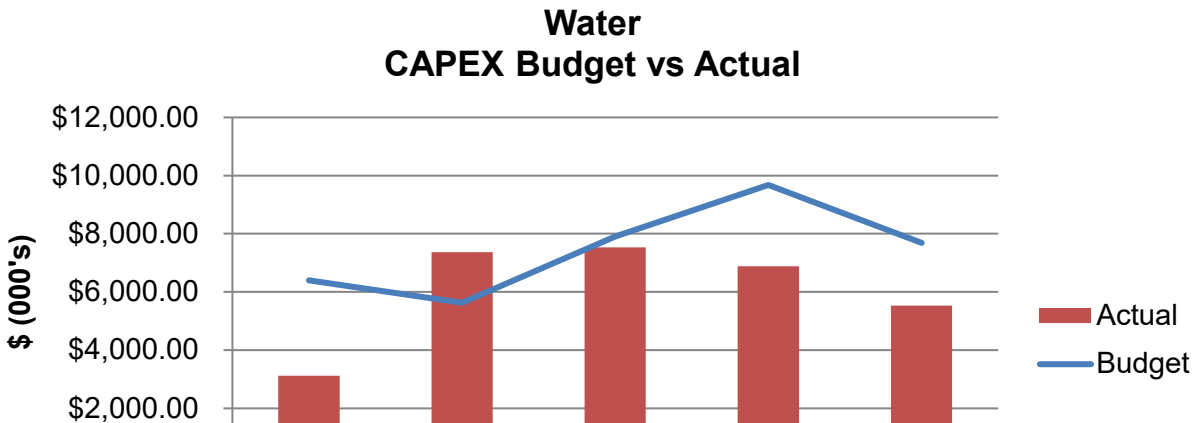


Figure 5-2 Water CAPEX Budget vs Actual

Capital project timing has been delayed due to:

- finalising community consultation
- obtaining land access
- obtaining resource consents
- the availability of external professional expertise
- receiving acceptable contract price and contractor availability.

As described throughout the Infrastructure Strategy, there are many projects and some demand for improved services from all of the core activities. However, it is unlikely that projects will rapidly overcome the obstacles described and accelerate much beyond an annual expenditure of $71M. It has therefore been decided to limit capital financing to $71M per annum for the first three years of the LTP. The effect that this has on the Water Supply Capital Programme is shown in detail below.

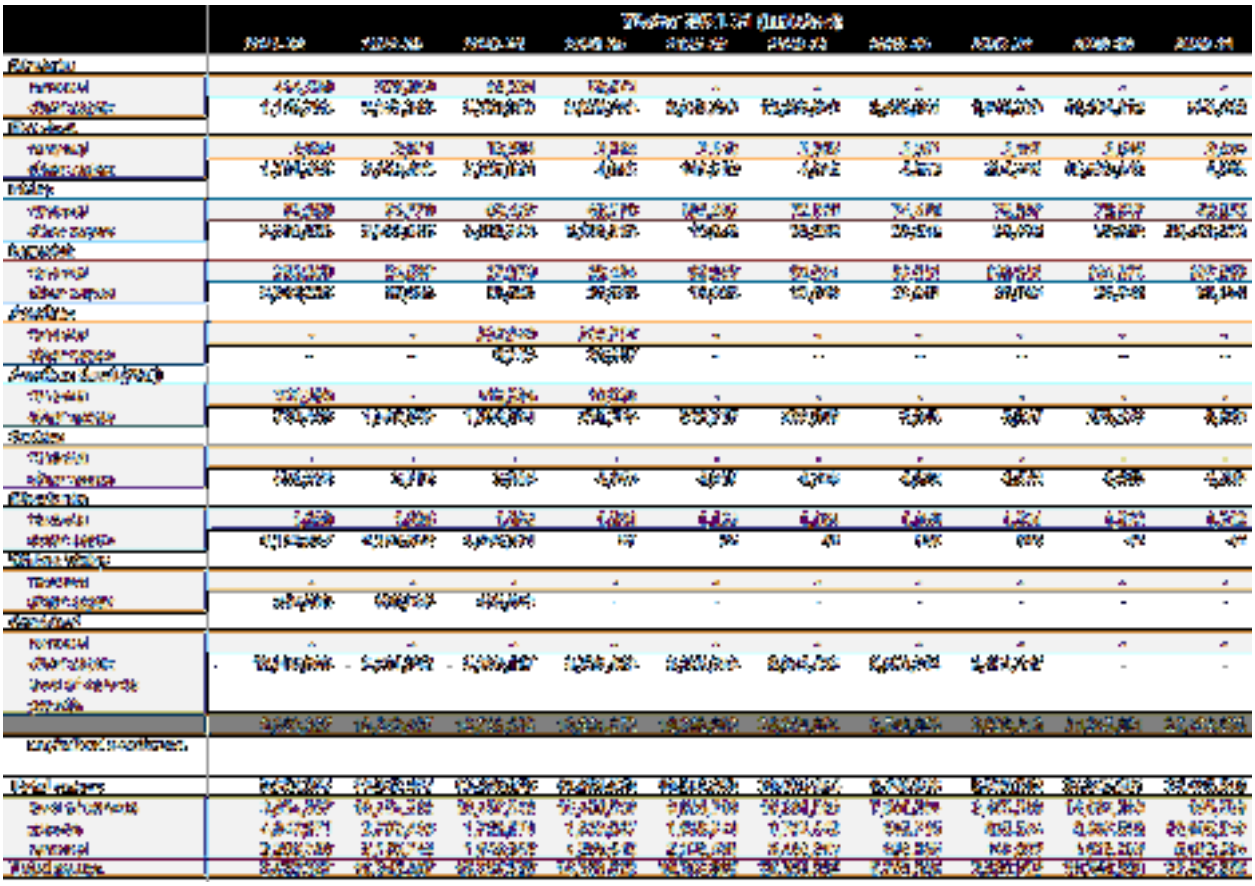


Table 5-2 Capital Programme 2021-51

The following table shows the projected capital expenditure through to 2051 and corresponds to the objectives in the Infrastructure Strategy.

	Water 2021-51 (Inflated)					
	21-26	26-31	31-36	36-41	41-46	46-51
Blenheim						
renewal	1,140,313	-	-	-	-	-
other capex	22,146,529	32,018,612	-	-	-	-
Havelock						
renewal	22,302	12,320	-	-	-	-
other capex	8,695,960	16,757,008	-	-	-	-
Picton						
renewal	369,310	385,367	-	-	-	-
other capex	16,943,422	26,370,334	-	-	-	-
Renwick						
renewal	603,509	505,117	-	-	-	-
other capex	6,707,007	115,727	-	-	-	-
Awatere						
renewal	501,319	-	-	-	-	-
other capex	30,061	-	-	-	-	-
Awatere Rural (POE)						
renewal	805,291	-	-	-	-	-
other capex	4,900,694	515,473	-	-	-	-
Seddon						
renewal	-	-	-	-	-	-
other capex	547,255	22,873	-	-	-	-
Riverlands						
renewal	5,311	6,160	-	-	-	-
other capex	17,665,872	375	-	-	-	-
Wairau Valley						
renewal	-	-	-	-	-	-
other capex	1,245,610	-	-	-	-	-
Combined						
renewal	-	-	17,720,902	15,253,420	20,555,482	36,226,560
other capex	- 9,422,964	15,337,586	-	-	-	-
level of service						
growth						
	72,906,803	92,046,953	17,720,902	15,253,420	20,555,482	36,226,560
capitalised overheads			639,713.72	550,639	742,040	1,307,757
Total capex	**72,906,803**	**92,046,953**	**18,360,615**	**15,804,059**	**21,297,523**	**37,534,317**
level of service	45,521,598	44,556,853	21,010,941	18,085,351	24,371,786	42,952,336
growth	11,943,618	29,651,189	13,131,838	11,303,344	15,232,367	26,845,211
renewal	15,441,587	17,838,911	18,384,573	15,824,682	21,325,313	37,583,294
Total capex	**72,906,803**	**92,046,953**	**52,527,352**	**45,213,376**	**60,929,467**	**107,380,841**

Table 5-3 Projected Capital Expenditure 2021-51

5.1.3 Growth/Levels of Service/Renewals

In accordance with Schedule 10(3) of the Local Government (Financial Reporting) Regulations 2011, capital expenditure budgets are apportioned between three elements — renewal, improvement in levels of service and growth. Correctly apportioning the costs is important to ensure funding is retrieved from the appropriate sources. It is normally obvious at the outset of a capital project as to the main 'driver' — growth, level of service or renewal. The Council's strategy to apportioning costs is to assess the expired/remaining life of an asset and to attribute the depreciated value of the life-to-date to 'renewal'. This value is obtained from the annual asset revaluation. The remaining costs are apportioned between growth and level of service according to the additional capacity or improvement to be experienced by the customers.

In instances where new assets are built or modern, serviceable assets are replaced, it is possible to assign costs to growth and/or levels of service only.

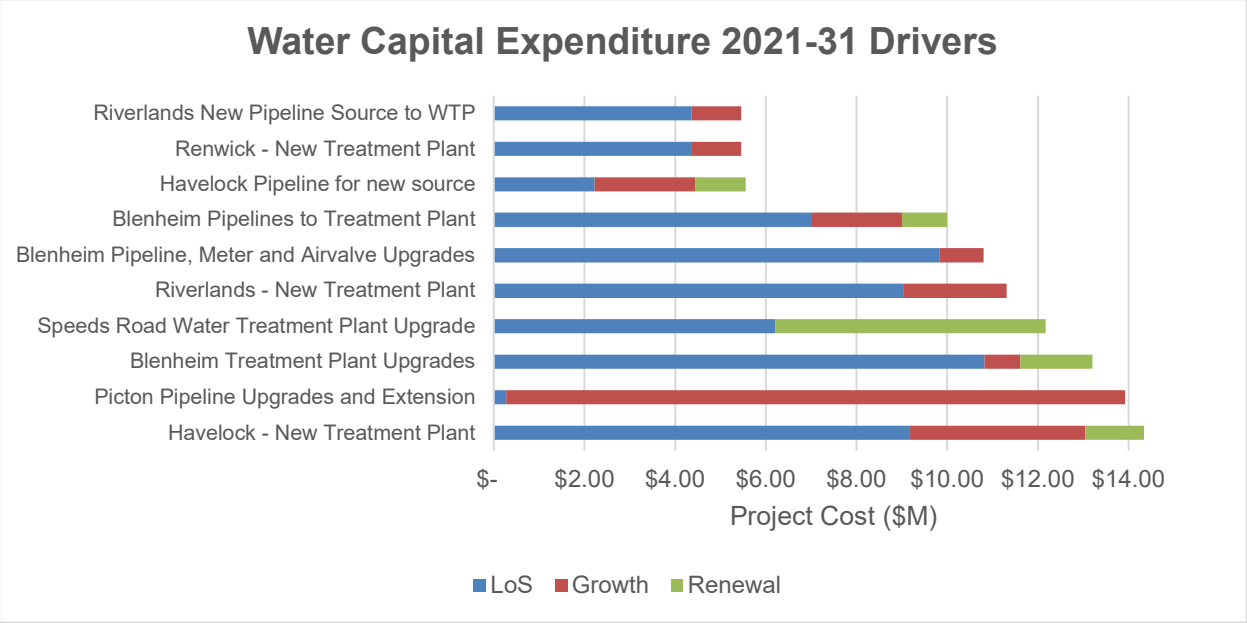


Figure 5-3 Water Capital Investment by Main Drivers

Figure 5-3 shows how the costs of the major capital projects have been attributed to the major drivers – growth, level of service and renewals.

5.2 Funding Strategy

The Revenue and Financial Policy sets out the sources of funding available to Council and how the funding source is allocated between different activities and the drivers for expenditure (growth, level of service and renewal).

Sources of funds available to Council are as follows:

- general rates
- targeted rates
- lump sum contributions
- fees and charges
- interest and dividends from investments
- borrowing
- proceeds from asset sales
- development contributions
- financial contributions
- grants and subsidies
- other sources permitted by statute.

In determining which funding sources were appropriate, Council considered the following matters in relation to each activity to be funded:

- the community outcomes to which the activity primarily contributes
- the distribution of benefits between the community as a whole, any identifiable part of the community, and individuals
- the period in or over which those benefits are expected to occur
- the extent to which the actions or inaction of particular individuals or a group contribute to the need to undertake the activity

- the costs and benefits, including consequences, for transparency and accountability, of funding the activity distinctly from other activities
- the overall impact of any allocation of liability for revenue needs on the current and future social, economic, environmental, and cultural well-being of the community.

Council's approach to the different sources of funding is listed in the Revenue and Financing Policy, which highlights the funding sources for every Council activity and any sub-activity which may exist. The policy shows the rating tools which Council has determined to be fair and equitable for each activity.

"Ratepayers who are connected to the water schemes are creating the need for the Council to undertake work relating to the availability of potable water. It is considered appropriate for these people to fund the work through targeted rates. Developers who are adding to the demands placed on schemes which require the Council to undertake new capital; works related to growth will contribute to these costs."

5.2.1 Separate Targeted Rates and Charges

Targeted rates and charges are levied to meet the full cost of water and sewerage schemes. The Council considers separate targeted rates are the most equitable funding mechanism based on the benefits assessed for the targeted area.

Council has adopted differential land value rates to fund the debt servicing requirement of the combined sewerage and water schemes, which takes account of the median land values for each scheme; and a differential uniform annual charge for the Combined Water Scheme. The most significant benefits derived from these combined sewerage and water funding schemes are a smoothing of rating spikes in smaller schemes and better cash flow management through the timing of capital works.

Note: The combined sewerage and water rates and charges do not include the initial debt servicing requirements for any new schemes not paid by lump sum contributions.

The overall costs of providing the water supply are made-up of the day-to-day operational expenses and the capital costs of developing, improving and renewing the infrastructure.

Operational Expense Funding

There are several sources of funding for the water supply activity — general rates, targeted rates, lump sum contributions, fees and charges, interest and dividends from investments, borrowing, proceeds from asset sales, development contributions, grants and subsidies and other sources as permitted by statute.

Prior to determining the "residual amount to be funded by general-type rates", Council identifies all other funding sources appropriate to the type of cost incurred for the water supply service after the exclusion of fees, charges, subsidies, grants and general revenue.

Fees and Charges — These have been set at a level to recover private benefits where it is practical and economic to do so, unless there have been determinations arising from previous funding reviews to fund all or part of such benefits from rates.

Grants and Subsidies — These are sought and applied for whenever they are available.

General Revenues — these are allocated to geographic rating areas in proportion to the gross general-type rates and charges.

The Council has determined the fair and equitable charge for the operational costs of the water supply service to be funded through a combination of general rates, uniform annual charge and metered charges. The allocation of charges is dependent on geographical location and the details are included in the Long Term Plan.

5.2.2 Funding of Capital Investment

The sources of funds for capital expenditure are as follows:

- development and financial contributions
- capital grants and subsidies (where available)
- user charges
- general revenue sources
- Council's financial reserves, including Depreciation Reserves
- loans
- targeted rates (directly charged).

5.2.3 Development Contributions Policy

The purpose of the Development Contributions is to recover an appropriate proportion of the costs of growth-related capital expenditure from participants in the property development process, rather than from general rates or any other indirect funding source. The full policy is included in the LTP.

Marlborough District has experienced significant growth over the last decade. Although this is often hailed as positive for the community, growth also presents a number of challenges. Not least is Council's task of expanding infrastructure networks to support the increased use of essential services.

The cost of expanding these networks is often high, and the issue of funding inevitably arises. Funding the expansion of these core networks entirely from general rates (or other indirect means) is inequitable, because existing ratepayers may neither cause these works to occur, nor materially benefit from them. As a result, alternative means for funding these capital works must be considered. Development Contributions is one such source.

Council considers the use of the Development Contributions mechanism under the Local Government Act 2002 to provide a fair and robust means of recovering the cost of growth as compared to charging ratepayers.

Council adopted a Development Contributions Policy that became effective 1 July 2009. The Development Contribution Policy is reviewed three yearly and updated based on the latest forecasts.

The latest review of the full policy is included in the Long Term Plan 2021-31. The Development Contributions Policy replaces the Financial Contributions that were operative under the Resource Management Plans.

Charges are calculated for each catchment and each activity on the basis of:

- the expected scale and timing of capital works required to service growth
- the expected rate and timing of developments for which the works are required.

The growth projections used to determine income from Development Contributions in the modelling are based on long run straight line averages using the Department of Statistics population projections.

The capital expenditure used for modelling what the appropriate charges include:

- expenditure previously incurred to create spare capacity to enable future development to occur
- expenditure beyond the ten year programme which is required to cater for the cumulative effects of growth
- an assessment of expenditure which relates to future growth beyond the life of the LTP.

Development Contribution amounts are calculated and applied in terms of Household Equivalent Units (HEU) for each respective service.

At the time of Development application including Building Consent, Resource Consent, and Service Connection applications, the Household Equivalent Unit calculation is completed for each respective service and multiplied by the corresponding amount to achieve the Development Contribution payable to Council.

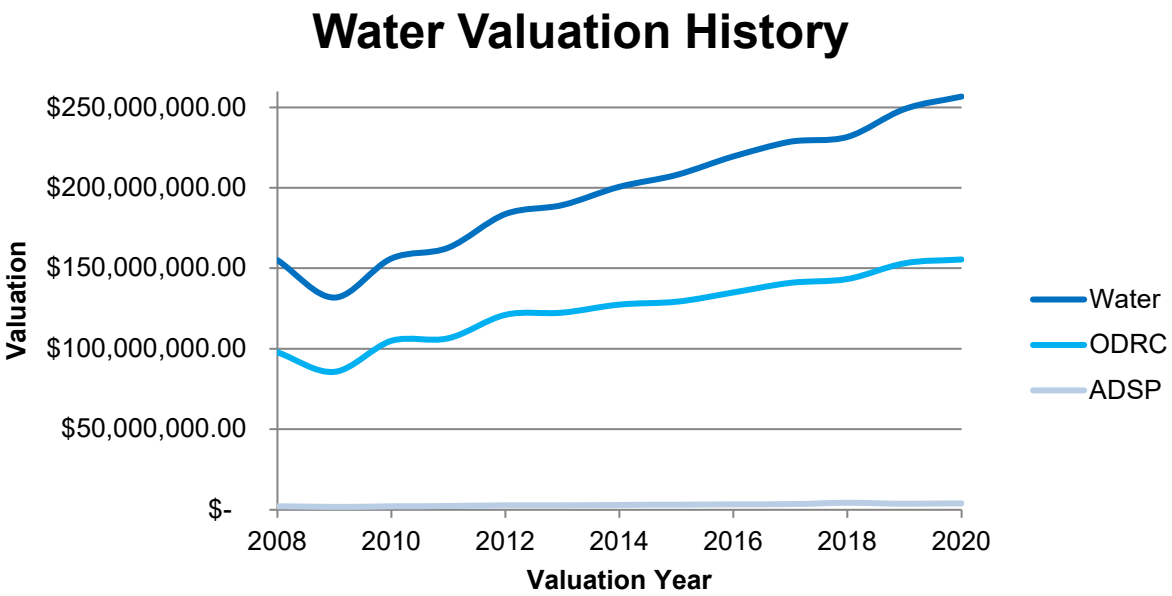
The due date for payment is typcally:

- For subdivision resource consents – prior to issue of the section 224(c) certificate
- For other resource consents – 180 days from granting or prior to the commencement of consent, whichever is earlier.
- For building consent – 180 days from granting or prior to Code Compliance Certificate, whichever is earlier.
- For certificates of acceptance – prior to granting the Certificate.
- For service connections – prior to connection.

5.3 Valuation Forecasts

5.3.1 Asset Valuation

The asset valuation has been undertaken annually since 2008. The asset register of water reticulation consists of 571.7km of pipes and over 2600 individual non-reticulation assets with individual specific asset and life expectancy characteristics. A data set has been collected of the out-turn costs of water pipeline renewal contracts. From this data set a cost curve has been established and unit rates for pipe-laying estimated. The rates are reviewed and updated each year and used in the revaluation. A summary of recent valuations is shown in Appendix 6: Valuation Details.



reflects the additional traffic management, greater density of other underground utilities and reinstatement costs of urban pipe-laying.

New assets are added to the register as they bought, built or vested to the Council. The value of all Water Assets continues to increase. Major works continue in Renwick, with the replacement of the water source, reservoir, treatment plant and asbestos cement mains. Renwick and Havelock will have water meters installed on every water connection before the next valuation.

In 2020, depreciation of water assets was valued at $134.895M. Depreciation is fully funded through the rates. The balance is held in reserves and used as internal loans to fund other capital projects. There is a significant spike in renewal expenditure in 2029-30 as a new water source is anticipated for Havelock and full network water metering is planned for Blenheim.

5.3.2 Depreciation Methodology

The Gross Replacement Cost is the sum of the replacement costs of each of the components if it is replicated with *modern equivalent asset* and recognises the use of modern materials, standards and installation techniques to replicate the existing system.

The Depreciated Replacement Cost distributes the value of the asset across its useful life.

"The way in which depreciation is allocated over the life of the asset must reflect the pattern in which the assets' future economic benefits are expected to be consumed by the entity." (NZ International Accounting Standard 16).

The above straight line depreciation is considered appropriate for the assets included in this valuation. The Depreciated Replacement Cost has therefore been calculated by:

Depreciated Replacement Cost = Replacement Cost x (Remaining Life/Life Expectancy).

The Annual Depreciation (Decline in Service Potential) spreads the current value of the asset across the remaining life of the asset. (Depreciated Replacement Cost /Remaining Life).

It is Council policy to fully funded depreciation. The Annual Decline in Service Potential is used for determination of Council's general and targeted rates for the funding of future infrastructure renewal. The Annual Decline in Service Potential of Water Assets at the time of the 2020 Valuation was $3.613M.

The valuation provides fundamental information for the Long Term Plan as required by Schedule 10 of the Local Government Act 2002. It has been prepared in accordance with the New Zealand Accounting Standards Board Public Benefit International Public Sector Accounting Standard 17 – Property, Plant & Equipment (PBE IPSAS 17) and follows the guidance provided by the National Asset Management Steering Group (NAMS) in the New Zealand Infrastructure Asset Valuation and Depreciation Guidelines, Version 2 (2006).

An annual report is compiled by the Asset Management Engineer in collaboration with the engineering managers. It is peer reviewed by an independent external valuer and scrutinised by auditors from Audit NZ.

A sharp increase in the valuation occurred in 2008 when the unit rates were re-assessed. Prices had increased as a result of high global demand and an economic boom in many international markets. Since then prices have stabilised substantially although there is evidence that the current rates are again under pressure. The rates have not been increased in response to the latest data as it is not clear if the prices are a transient spike or a long term trend.

5.3.3 Revaluation Rates

In recent years the revaluation rates have been increased by the application of an index derived from the Capital Goods Price Index published by Statistics New Zealand.

A cost curve has been established by graphing the out-turn costs of pipe renewals contracts undertaken within the region. The data is updated with all new contract costs. Between 2013 and 15 an additional 8% was factored into the rates for pipe-laying and 12% for plant and equipment. The increase to contract rates covers design, supervision and other overheads.

Recent tender prices have shown a sharp increase in pipe-laying costs, particularly at larger diameters. Whilst these have been added to the data, the cost curve has not been realigned as

there is some doubt as to whether this a permanent increase in prices or a transient peak. Council will continue to review and adjust them as necessary.

In 2017 revaluation rates were exchanged with five other local authorities and information from a survey by Hayes Consulting. No immediate adjustments were required as a result of the comparison.

In the foreseeable future depreciation will continue to be calculated on a straight line basis.

There are significant and unpredictable risks to the valuation process – including prices of raw materials, local plant and labour costs, and fluctuations in international exchange rates. Perhaps the major risk to future valuations is a significant shift in life expectancy of a large group of assets, if either a material type is deteriorating faster than expected or an external influence is causing accelerated deterioration to an assets group.

The earthquake in November 2016 caused some damage to the reticulation in Awatere but overall there was little damage to the water supply infrastructure. Subsequent CCTV surveys have shown significant damage to the stormwater and wastewater earthenware pipes.

5.3.4 Optimisation

The Marlborough water supply systems are relatively young and continuing to expand as the population continues to grow. None of the systems are over-designed or have significant redundant capacity. There are very few opportunities for optimisation.

The reservoir at Aerodrome Road, Blenheim is unlikely to be needed for the drinking water supply but may be required as a similar store of water may be needed for firefighting purposes due to its close proximity to the airfield.

Due to the problems of water quality in the Barnes Dam (Picton) and the extreme difficulty of access to rebuild the dam it is unlikely to be replaced. However, an equivalent source will need to be developed and an equivalent sum has been included in the valuation. The impacts of water demand management could prove to extend the timeframe for which an additional source is required. Water metering in Picton is planned to be completed by 2024.

5.4 Key Assumptions

The key assumptions including the level of uncertainty, risk and financial impact for all Council activities are described in the Long Term Plan – See Appendix 4. Topics include legislation, inflation, interest rate on Council borrowing population growth, economic life, subsidy rates, natural disasters, taxation framework, asset ownership and valuation, sources of funding for capital projects, climate change, the emissions trading scheme and resource consents.

Issues specific to water assets are described below or in greater detail elsewhere in this plan.

The life expectancy of the water supply pipes is based on the NAMS Guidelines with the exception of asbestos cement which is based on the tables in the New Zealand Asbestos Cement Watermain Manual 2017. The life expectancy varies with the diameter of the pipe and the subsequent wall thickness. Life expectancy of the diameters has been capped at 100 years.

Replacement of reticulation pipework will be with modern materials — PVC, polyethylene, ductile iron, steel or concrete. All plant and equipment will be replaced with modern equivalents.

Pipe-laying rates are inclusive of manholes, valves, hydrants, air valves, fittings apparatus and branch connections. The rates are an average across all ground conditions and depths, and include trench support and de-watering.

Reticulation pipework below a nominal diameter of 75 mm is assumed to be predominantly installed in non-carriageway locations and with a proportion of low-dig installation techniques.

Service lines are valued separately at the connection fee rate. An adjustment is made if meters are included in the rate, and the meters are valued separately.

The life expectancies that have been adopted suggest there is a significant amount of pipework that is beyond its theoretical life. This is particularly apparent for asbestos cement pipe in the Awatere. However there has not been an equivalent increase in mains bursts or repair activity. A pipe sample assessment of asbestos cement pipe in Renwick showed the pipe to be in poor or very poor condition. The 150mm diameter pipe had deteriorated faster than the 100mm pipes however all asbestos cement mains will be replaced in Renwick by 2024.

The life expectancy of plant and equipment assumes the continuation of the good standard of planned pre-emptive maintenance currently undertaken. The NAMS guidance on life expectancy has generally been followed unless there is clear local evidence to the contrary.

Reticulation Assets	Diameter (mm)	USL (years)	National AC Pipe Manual USL Envelope (years)
Asbestos Cement	20-40	38	
	50	38	38-40
	75-80	43	14-42
	100	53	17-52
	150	72	17-67
	200	90	21-70
	225	100	21-75
	250	98	39-67
	300-375	100	21-99
	≥ 450	38	28-135
Asbestos Cement in Renwick	All	*4	
Aluminium	All	75	
Cast Iron	All	100	
Cured in Place Pipeline (CIPP - Relining)	100-150	77	
	225	80	
	250	98	
Concrete	All	80	
Copper	All	40	
Drum	All	50	
Ductile Iron	All	100	
Earthenware	All	77	
Earthenware WW & SW in Blenheim & Picton	All	*4	
EW Relined	All	*60	
Fibreglass	All	100	
Field Tile	All	75	
Novaflow	All	60	
PE	All	100	
PVC	All	100	
Ribstop (Relining)	All	75	
Steel	All	100	
Steel - Galvanised Seddon/Awatere	All	40	
Vitrified Clay	All	80	

Non-Reticulation Assets	Civil	Electrical	Mechanical
Pump Station	80	20	40
Source	100	20	40
Storage	80	20	40
Treatment Plant	80	20	40
Meters			15

Table 5-4 Asset Life Expectancies used in revaluation

5.4.1 Data Confidence

The data quality is regarded as good. Of the pipes recorded in the asset management database one or more of the attributes (age, diameter or material type) was missing for around 1% of records. Estimates were made for the missing data based on adjacent pipes or the known history of land drainage in the area.

Table 5-5 Estimated asset data quality provides an indication of the quality of data held regarding the water reticulation asset data.

Quality of Asset Data - Critical Water Mains								
INSTALLATION DATE RELIABILITY								
Reliability		# assets		Length (m)		Value ($)		
0	Unknown	0	0%	0.0	0%	$	-	0%
1	Actual data known	123	90%	10038.4	85%	$	4,885,153.14	88%
2	Data based on confidence of other attributes	11	8%	1607.7	14%	$	603,645.63	11%
3	Best guess to nearest decade	3	2%	151.1	1%	$	68,547.68	1%
MATERIAL RELIABILITY								
Reliability		# assets		Length (m)		Value ($)		
0	Unknown	2	1%	10.5	0%	$	3,194.61	0%
1	Actual data known	131	96%	11777.5	100%	$	5,549,857.22	100%
2	Data based on confidence of other attributes	3	2%	8.2	0%	$	3,985.16	0%
3	Best guess to based on dia or install date	1	1%	1.0	0%	$	309.46	0%
DIAMETER RELIABILITY								
Reliability		# assets		Length (m)		Value ($)		
0	Unknown	2	1%	10.5	0%	$	3,194.61	0%
1	Actual data known	133	97%	11781.7	100%	$	5,552,604.56	100%
2	Data based on confidence of other attributes	0	0%	0.0	0%	$	-	0%
3	Best guess to based on material or install date	2	1%	5.0	0%	$	1,547.28	0%
TOTAL DATA QUALITY								
Reliability		# assets		Length (m)		Value ($)		
0	Unknown	4	1%	21.0	0%	$	6,389.22	0%
1	Actual data known	387	94%	33597.6	95%	$	15,987,614.92	96%
2	Data based on confidence of other attributes	14	3%	1615.9	5%	$	607,630.79	4%
3	Best guess to based on other attributes	6	1%	157.1	0%	$	70,404.42	0%

Quality of Asset Data - Critical Water Mains	**B**

Table 5-5 Estimated asset data quality

Data quality is rated from A to E as outlined below.

A = Highly reliable — Data is based on sound records, procedures, investigations and analysis, documented properly and recognised as the best method of assessment. Data set is complete and estimated accuracy is +/- 2%.

B = Reliable — Data is based on sound records, procedures, investigations and analysis, and documented properly but has minor shortcomings, for example some data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or extrapolation. Dataset is complete and estimated to be accurate to +/- 10%.

C = Uncertain — Data is based on sound records, procedures and 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 50% is extrapolated data and accuracy is estimated to be +/- 25%.

D = Very Uncertain — Data is based on unconfirmed verbal reports and or cursory inspection and analysis. Dataset is substantially complete and most data is estimated or extrapolated. Accuracy is +/- 40%.

E = Unknown — No, or very little data, is available.

5.4.2 Risks and Assumptions

The risks and assumptions considered in the plan are shown in Appendix 5: LTP Assumptions

Chapter 6: Plan Improvement and Monitoring

Council asset management practices and processes are continually evolving to help improve decision making related to the operation and investment in high value infrastructure. New data collection practices are being deployed. Advances in electronic data management and performance monitoring technology are providing improved information to support key decisions.

Previous asset management plans and subsequent decisions are reviewed and the plan is adjusted to meet the changing demands of customers and stakeholders, and to match the financial realities of the future.

Components of the Plan Improvement and Monitoring section

6.1 Status of Asset Management Practices — current and desired state of AM processes, data and systems.

6.2 Improvement Programme Progress and Update — review of progress on the 2018-28 Improvement Programme and Improvement Programme for 2021-31.

6.3 Monitoring and Review Procedures — includes three yearly AMP reviews, annual asset revaluations, and six monthly monitoring of levels of service.

6.4 Performance Measures — including the national non-financial performance measures.

6.1 Status of Asset Management Practices

6.1.1 Asset Management Information System

The Assets & Services Department has used proprietary databases for the collection of asset data for over 20 years. A project was commenced in 2011 to upgrade the asset management information system. The project was led by the Information Systems Department and a small team of subject experts. External consultants were employed to examine the asset management information needs throughout the Council including Reserves, River Control, Regulatory, Fleet, Libraries, Property, the Harbour Master and others.

In February 2013 the Works and Assets module of the TechnologyOne software was purchased. Extensive effort was required to build and configure the software to meet the needs of water, wastewater and stormwater asset management. The project evolved to include the revision and integration of the financial accounting system. In December 2014 all data from the previous (Hansen) database was migrated and the new system went live.

The register of assets and their attributes is stored in the Asset Management Information System (AMIS) along with the maintenance history, maintenance schedules and performance data. The system is linked to service requests, the Council's document management system and the financial expenditure database.

The AMIS has universal access across the Council. Editing rights are controlled but ownership of the data is devolved as close to the source of the data as possible.

The quality and completeness of the stored data is continually improving. Data is extracted from a variety of historical and contemporary records — service record plans, property files, new connection records, as-built records (internal and contractor) and maintenance works orders. The quality of historical data can be variable and considerable effort is deployed to check the accuracy of the data sources.

Ensuring there is consistency and accuracy in contemporary data collection is also a challenge. Discussions with staff throughout the A&S Department has resulted in the development of a protocol that defines a common understanding of the accuracy of asset data and the confidence in the source data. In conjunction with this, there has been a continued effort to ensure consistent contract specifications are included and in-house record checks are undertaken.

6.1.2 Geographical Information System

The ESRI ARCMap GIS system has become a cornerstone for information management within the Council. The AMIS has an automated interface with the GIS. The GIS has many tools and features that can be leveraged by the AMIS and a well-developed integration was a prime criterion in the selection of the AMIS upgrade.

Water asset information can be viewed by all staff across the Council through the GIS viewer, Local Maps. Brief details of the asset are available in an inquiry window within Local Maps, including the asset reference number to use to access additional information.

6.1.3 Computer Modelling

The Council has very high quality in-house network modelling capability which is augmented by specialist consultants. Models are used extensively to predict the behaviour of the reticulation network and as a planning tool for future designs.

Models are verified by on-site observations and measurement and have a high level of reliability. They are extensively used to predict flows and pressure in the water supply system, and to model the effects of infrastructure upgrades and operational configuration.

6.1.4 Financial Forecasting

An extract/transform/load programme has been developed to undertake the annual revaluation of assets from the asset register. Unit rates and prices are updated from contemporary contract prices and where possible are verified with rates from other councils. Where insufficient direct information is available, historical construction/purchase costs are inflated through nationally published construction cost indices.

Current financial forecasts are considered to be moderate to good. Asset condition grading and subsequent determination of life expectancy is being improved. Further refinement of asset components and unit rates estimation may be expected in future.

The quantum of capital expenditure forecasting is good/very good. Project costs are regularly reviewed as they progress or particular cost pressures become apparent. Estimation of the timing of capital works is more challenging. Public consultation, land purchase and resource consent applications can be very time consuming and the outcomes are difficult to predict. Project budgets are normally scheduled on a best case scenario to ensure sufficient funds are available for projects to proceed on time.

6.1.5 Customer Service Data

The introduction of the Water Services Database in 2010 and the accurate logging of customer service requests have added great value to asset management. The database was superseded in December 2014 following the introduction of the TechnologyOne AMIS and the use of the Customer Request Module.There is now a good mechanism for registering customers' calls and recording response times. This data is used to monitor performance of assets and assess renewal programmes.

6.1.6 Asset Data Collection

Asset data is constantly being updated and checked. Assets & Services staff are converting the hard copy asset records to a digital format in the linked Geographical Information System (GIS) and the AMIS database. The spatial information on the location of assets, zones and catchments area is kept in the GIS whilst the individual asset attributes are stored in the AMIS.

A small team of staff systematically 'sweep' through a networked area, trawling through the data sources to extract accurate attribute details in order to test the systems are operating correctly. A new 'sweep' is currently being carried out across all three water networks and was started in Renwick and Havelock and is now in Blenheim and Seddon. The 'sweep' of Picton will be carried out when the Water Metering project is carried out between 2022-24.

% Completed	Blenheim	Picton	Havelock	Renwick	River-lands	Awatere	Wairau Valley	Grove'n/ Spring Ck
Water	75	50	90	100	95	75	90	na
Wastewater	75	50	90	100	85	60	na	80
Stormwater	75	50	90	90	80	50	na	40

Table 6-1 Data capture completion

Information sources include as-built drawings supplied when the asset was constructed. These are produced when the asset is built and can therefore be quite old. Quality can be variable and many drawings are in imperial measurements. Recent as-built drawings can be either hard copy or electronic CAD drawings. These are carefully scrutinised by the Asset Development Officer and the asset will not be accepted for adoption by the Council until the drawings meet the specified standard.

From time to time specific surveys are undertaken. Often plans and long-section drawings are produced and data such as depth and invert levels of underground pipes recorded. Closed circuit TV (CCTV) surveys of sewer and stormwater pipelines are generally undertaken to investigate specific problems or confirm particular requirements. The surveys are reviewed by engineering staff and pipe condition grades are assessed and recorded. The location of laterals can also be ascertained and recorded.

Applications for connections from the mains to new properties or subdivisions are kept as separate records. The Council's property files often record the location, size and material of underground services within the property boundary.

The repairs and maintenance operatives return records of the assets they have worked on. In the past the quality of the records has been variable, with little consistency in how they are provided. Recently efforts have been made to improve the quality of this source of information. Field staff have been trained and mentored in the data requirements. The current status of data quality is shown in Table 6-4 Estimated Asset Data Quality

Cost Effectiveness

Under Section 17A of the Local Government Act the Council is required to review the cost effectiveness of its governance, funding and delivery of good quality local infrastructure.

A paper prepared by the Chief Financial Officer was presented to the Council's Planning, Finance and Community Committee in June 2017. All Council services were reviewed. It was decided that the three waters activities will be exempt from further review under Section 17A until the outcome of the Havelock North Inquiry is known.

6.2 Improvement Programme Progress and Update

During the preparation of this asset management plan, improvements have been identified that will assist in the management of assets and delivery of services in the future. Improvement is required as technology progresses, the operating environment changes and the aspirations of stakeholders evolve. The provision of water services is also subject to changes in the legal framework and the political climate. Business processes need to continuously adapt to meet new demands.

Progress on the 2018-28 improvement plan and the 2021 improvement plan is detailed in the table below.

	2018 Improvements	2018 Responsibility	2018 Target Date	2021 Update	2021 Improvements	2021 Responsibility	2021 Target Date
WATER ASSET MANAGEMENT - IMPROVEMENT PLAN							
MODELLING	Development of dynamic hydraulic models for remaining reticulation systems (Havelock, Renwick, Awatere, Riverlands)	Planning & Development Engineer, Services Development Engineer, Consultants	Completed (but Awatere needs updating)	Pressure loggers installed in Awatere to improve data	Calibrate Awatere Model	Planning & Development Engineer, Services Development Engineer, Consultants	2022
ASSET DATA	Correction of "best estimate" data in the asset register	Asset Management Engineer	Ongoing	Continually improving asset data	continue to improve data quality	Data Capture Team	Ongoing
	Continue "sweeping" network areas to transfer hard copy plans to electronic data	Asset Management Engineer	Ongoing	Continually improving asset data	continue to improve data quality	Data Capture Team	Ongoing
	Prepare and implement business intelligence reports from the new AMIS	Asset Management Engineer	2018/2019	Continually improving asset data to improve reported data	continue to improve quality of reports	Data Capture Team	Ongoing
	Continued improvement of field data capture and the "back-office" approval system	Asset Management Engineer, Operations Manager	2018 onwards	Continually improving asset data	continue to improve data quality	Data Capture Team	Ongoing
UNACCOUNTED FOR WATER	Continue leak detection contracts in Havelock and Renwick and consider extending to other targeted networks	Operations Engineer	Ongoing	Completed	Use whole of network water metering to identify and repair leakage	Operations & Maintenance Engineer	Ongoing
	Evaluate the domestic water metering trial in havelock and Renwick. Consider the consequences for future demand management plans	Planning & Development Engineer, Operations & Management Engineer, Asset Management Engineer	2018-2020	Ongoing	Charging for water consumption begins 1/07/2021 for all water users in Renwick and Havelock. Increased Water Meters will improve understanding of domestic usage and improve assumptions in the water balance around water that is unacconted for.	Operations & Maintenance Engineers, Asset Management Engineer	2024
GROWTH		Infrastructure Projects Engineer	Ongoing	Continuing as development continues, working with Developers, Planners and Engineers	Develop sequential planning as areas are released for development and reliability of growth trends improve	Infrastructure Projects Engineer	Ongoing
	Continue to monitor population growth trends and adjust infrastructure plans accordingly	Planning & Development Engineer, Infrastructure Engineer, Asset Management Engineer	Ongoing	Housing Assessment and Development Contribution data has determined future growth of 125 HEU's annually.	Continue to improve these projections as census data and improvements to national trends are released	Planning & Development Engineer, Infrastructure Engineer, Asset Management Engineer	Ongoing
FINANCIAL	Ensure operational and financial asset reconcilliation is achieved and maintained	Asset Management Engineer, Accountants	June 2018 onwards	Completed			

	2018 Improvements	2018 Responsibility	2018 Target Date	2021 Update	2021 Improvements	2021 Responsibility	2021 Target Date
WATER ASSET MANAGEMENT - IMPROVEMENT PLAN							
ASSET CONDITION	Develop operative skills in identification and recording of asset condition	Operations & Management Engineer, Asset Management Engineer	Ongoing	Using Maintenance Data to collect specific details on condition and performance of assets			Ongoing
	Improved the quality and consistency of condition grade recording and reporting systems	Operations & Management Engineer, Asset Management Engineer		Using IPWEA Practice Note 7: Condition Assessment & Asset Performance Guidelins where specific condition data is not available			
	Extend pipe condition sampling and surveys to improve life expectancy projections. A more methodical programme will be developed and prioritised based on asset criticality and risk	Operations & Management Engineer, Asset Management Engineer		Pipe condition sampling will only be carried out where it is deemed to be feasible. MRI testing has not proved to determine reliable patterns of deterioration in the past so updates to best practice around useful service lives will be used e.g USL envelopes in National Asbestos Cement Pressure Pipe Manual	Completed pipe condition sampling where deemed to be feasible, otherwise onsite criteria used to survey pipes	Asset Management Engineer, Operations and Maintenance Engineer	ongoing
	Develop business intelligence reports to assist with renewal decision making	Asset Management Engineer	2018		Improve methods are identifying maintenance requirements of assets	Asset Management Engineer, Operations and Maintenance Engineer	2023
ASSET PERFORMANCE	Improved business intelligence reporting on asset performance	Asset Management Engineer	2018	Continual data collection through work orders	Improve methods are identifying maintenance requirements of assets	Asset Management Engineer, Operations and Maintenance Engineer	2023
MAINTENANCE SCHEDULE	Improved data collection recording of schedule maintenance activities	Operations & Management Engineer, Asset Management Engineer	2019	Maintenance schedules established within AMIS where applicable			
RESILIENCE					Improve understanding of interdependencies across Lifelines Sector	Asset Management Engineer, Lifelines Utilities Co-ordinator, Operations and Maintenance Engieneer	2024
CLIMATE CHANGE					Consider impact of climate change in all forward works planning	Planning and Development Engineer, Operations and Maintenance Engineer, Climate Change Action Group	On going as knowledge increases

Table 6-2 Progress on the 2018-28 improvement plan and the 2021 improvement plan

6.3 Monitoring and Review Procedures

The asset management plan is a compilation of day to day planning and management by the engineering managers and other senior Assets & Services staff. Subsequently the asset management plan is 'live' and under constant review.

The asset management plan is formally reviewed and updated every three years and the update is timed to provide supporting information for the development of the Long Term Plan. The draft asset management plan is submitted to an external consultant for peer review.

The Council's asset management plans are made available to the auditors of the Office of the Auditor General (OAG) during the audit of the Long Term Plan and the intervening Annual Plans.

The introduction of increased business intelligence reporting from the asset management information system will help to ensure the currency and accuracy of asset data collection.

Asset valuation is undertaken annually. The valuations and all supporting calculations are submitted to an external valuer for independent verification. The valuation is scrutinised by Audit NZ to ensure asset management is adequately resourced in future plans and budgets.

Levels of service performance indicators are monitored at six monthly intervals and reported to the Council's Executive Management Team. Council results in relation to the performance indicators are published in the Annual Report, which is made publicly available. The Council intends to elevate the status of performance measures and supplement them with other internal benchmark measures in future. These will be under constant review and published on the internal intranet. Progress has already been made towards this goal.

6.4 Performance Measures

The Local Government Act 2002 Amendment Act 2014 enabled the introduction of national non-financial performance measures for water, wastewater, stormwater, roading and flood protection. The introduced measures for water supply are broadly similar to the previous levels of service measures of drinking water quality, response and resolution of service requests and the number of customer complaints. The addition of performance measures for water losses and household consumption may focus more attention on these areas.

Some performance measures adopted by the Council have been difficult to measure, and there was no defined interpretation of the method of measurement. Detailed methodologies have subsequently been documented for each measure to ensure repeatable consistency and accuracy. Recommendations by the OAG to improve the control environment, including the data collection and storage mechanisms, have been actioned.

The AMIS is partially integrated with the customer request management system. There is a capability to trace service requests to subsequent work orders. The system allows response time monitoring, symptom and fault analysis, interruption and restoration monitoring, and cost recording.

The Council also participates in the annual National Performance Review undertaken by Water NZ. Over fifty councils regularly submit data for the annual reviews covering over 90% of the population of New Zealand. The data is categorised into large, medium and small participants (some water service providers are not councils). The report covers the three water services and provides an opportunity for councils to compare their performance on a large number of financial and non-financial performance indicators. Inevitably there is some difficulty in 'normalising' data across numerous agencies but the report still provides a good comparative guide on the performance of the Council's water supply activity within a national context.

Appendix 1 — Water Assets - Background Information

Blenheim Water Supply

The public water supply in Blenheim began in 1921. Initially water was abstracted from the Taylor River upstream of the town centre and distributed through a 12-inch spiral-wound, riveted, steel main in Taylor Pass Road and Maxwell Road.

By the 1950s it was clear the Taylor River source would require considerable reinvestment to upgrade the quality and improve the reliability of the water supply. It was therefore decided to progressively abandon river abstraction in favour of the underground Wairau aquifer as the source of water for Blenheim. The sinking of wells in Andrew Street, Grove Road and Colemans Road in the early 1960s enabled the Taylor River supply to be discontinued.

The Wairau Aquifer is mainly recharged from percolation through the bed of the Wairau River. It is a reliable source of water and has proved to be more than adequate to meet both urban and rural demand in the area to date. The aquifer is relatively shallow and is unconfined to the west of Blenheim. Tests have shown that the water abstracted from the aquifer is generally less than two years old. The source of supply therefore fails to meet the criteria for 'secure groundwater' as defined by the Drinking Water Standards for New Zealand 2005 (and the revised 2008 DWSNZ) and does not comply with the protozoal requirements unless treated.

The Blenheim water supply was untreated until 1998. However, the chemistry of the raw water was aggressive to metal pipes, causing rapid corrosion of the reticulation system and private plumbing. Between 1998 and 2000 three treatment plants were built close to the borehole abstraction points at Bomford Street, Andrew Street and Middle Renwick Road. Lime water or caustic soda is injected into the supply to raise the pH and reduce the corrosivity.

In 2009 a major upgrade to the Middle Renwick Road Water Treatment Plant was completed. The plant is served by three boreholes. The water is treated by caustic soda to achieve pH correction followed by disinfection in ultraviolet light reactors. The treated water is then stored in a new reservoir before being pumped into the reticulation.

The Bomford Street Water Treatment facility received a major upgrade in 2011. Two new boreholes were sunk at the existing Grove Road site and one at the treatment plant site. An ultraviolet disinfection plant was constructed and a new storage reservoir and distribution pumps installed at the plant. The lime water pH correction plant remained. The Auckland Street bore and one of the original Grove Road bores were decommissioned. The Bomford Street site has been renamed the Central Water Treatment Plant.

The Andrew Street Water Treatment Plant (WTP) was decommissioned and the plant was removed in 2011.

Following the upgrades the Blenheim water supply meets the DWSNZ requirements for bacteria and protozoa.

Blenheim Reticulation

The Blenheim water reticulation system has evolved in order to meet demand for a public drinking water supply, and has increased in scale as the town has grown. Generally, cast iron and asbestos cement pipes were the preferred materials throughout the 1940s, 50s and 60s. These were gradually superseded by PVC and polyethylene materials. Originally copper was used extensively for service connections but these have largely been replaced by polyethylene.

Between 1954 and 1968 around 40 km of the original watermains (mainly spiral riveted steel) was replaced by cast iron and asbestos cement mains. During the 1960s the public water distribution system was extended to the area south of Alabama Road (Redwoodtown).

The reticulation continued to grow as the town expanded. A major extension was undertaken in 1998 when a new pipeline was laid to the Marlborough Ridge development. A small pump station and reservoir tank farm were built to boost supply to the higher elevations. Around the same time the supply to the town

was reinforced with a new trunk main along the bank of the Taylor River from the Middle Renwick Road WTP to the Wither Road Booster Pump Station. In 2004 the trunk main was linked to the Central WTP.

During the upgrade of the water treatment plants, distribution pump stations were incorporated into the design. Four 220kW pumps were installed at the Central WTP and three pumps at the Middle Renwick Road WTP.

Throughout the day the variable demand for water is met by automatic adjustment of pump output at the two water treatment plants. There are three main service reservoirs on the Wither Hills. The larger zone covering all of Blenheim north of Hospital Road is served by the 10,000 m^3 Taylor Pass Low reservoir. The area south of Hospital Road is served by the 5,500 m^3 Weld Street reservoir. A third major reservoir, Taylor Pass High Level, was commissioned in 2017. This reservoir provides support for the Weld Street reservoir and will be used extensively when the older reservoir is decommissioned for refurbishment and earthquake strengthening.

The area of Blenheim to the south of Hospital Road includes higher ground at the foot of the Wither Hills which requires a separate supply zone to maintain pressures. The Wither Road booster pumps transfer water to the higher zone as well as the Weld Street and Taylor Pass High Level reservoirs.

There are three smaller, high elevation zones at Marlborough Ridge, Forest Park and Redwood Street. Each zone is supplied through a booster pump station. A number of smaller reservoirs (arranged in tank farms) assist with pressure and balancing of demand in these zones.

There are a small number of private bores within the distribution area that continue to be used. They are separate from the public supply and are mainly used for irrigation.

Picton Supply

Picton's water supply was first developed in 1891 when a dam was installed in the Waitohi Stream catchment. Water was delivered into the town via a 225 mm trunk main installed in 1907, running from the dam to Oxford Street. In the 1920s Humphreys Dam was added to the system.

By the 1950s a new source of water was needed to meet the demand of a local freezing works and the growing demands of Picton town. A new impounding dam and reservoir were constructed in the Essons Valley. A 225 mm cast iron watermain providing a direct supply from the new Barnes Dam to the freezing works was completed in 1952. The freezing works had paid the cost of the development and was given priority use of the water. However, a 1958 agreement between the freezing works and Picton Borough Council allowed a public supply from Barnes Dam whilst there was sufficient water for both. When water levels dropped below a predetermined level the Borough supply was cut off and the public reverted to using water from the Humphrey's and Williams Dams.

In 1975 the Borough developed a new bore water source at Speeds Road, Koromiko, 8 km south of Picton. Three bores abstract water from a shallow aquifer. The water is treated with a lime solution to increase the pH and reduce the corrosivity. Chlorine gas is injected to disinfect the water.

In 1984 the freezing works closed and Barnes Dam became available exclusively for the municipal supply.

Today, the older dams (Humphreys and Williams) are no longer used. Picton's water is supplied from the Speeds Road bores and the Essons Valley (Barnes Dam) sources. Speeds Road is the primary source.

The Speeds Road supply has proved a reliable source of water to meet demand. An exception occurred during the prolonged dry spell of 2000/01 when water abstraction was reduced due to falling groundwater levels. Water restrictions were imposed on the town to prevent further drawdown. Since then the bores have been re-drilled deeper into the aquifer and the pumps lowered to increase resilience to drought. The water from the Speeds Road bores is disinfected with chlorine and the pH is raised by lime dosing before being pumped to the main Elevation Reservoir on the southern edge of Picton.

In 2016 work commenced on the upgrade of the Speeds Road treatment plant. New ultraviolet disinfection units were installed and a reservoir constructed to improve the contact time of the chlorine dose. The plant was commissioned in the autumn of 2017.

The Essons Valley supply is mainly used to support the Speeds Road supply during the summer peak demand periods. Dual raw watermains feed water from the Barnes Dam by gravity to the Essons Valley treatment plant. A coagulant is added to the raw water which is then passed through four dual media filters at the treatment plant. In 2011 the Essons Valley WTP was upgraded with the addition of ultraviolet disinfection and improved monitoring of chlorine levels. The output of the plant now meets the requirements of the DWSNZ.

The impounded water in Essons Valley can suffer from water quality problems during the summer. The water stored behind the dam can become subject to thermal stratification (a layer of warm water above a layer of cold water with low oxygen levels). High temperatures in the upper layer provide ideal conditions for algal growths. Compressed air can be introduced at a low level to mix the two layers of water and therefore reduce the conditions for algal growth. In the most severe circumstances the Essons Valley supply is turned off.

Picton Reticulation

Many of the original watermains were constructed of cast iron, the oldest dating back 70–80 years. From the late 1940s asbestos cement pipes became a popular alternative material to cast iron and were increasingly installed. These in turn were succeeded by PVC and polyethylene pipes which were introduced in the 1970s and have been the main pipe materials from 1990 onwards.

Due to the terrain in Picton, high water pressure is required to feed the properties on the upper hillsides. Consequently properties on the lower slopes and valley floor receive high pressure. Modifications to the reticulation have been made in order to create pressure management zones. Pressure reducing valves

are installed to lower the pressure experienced by customers and reduce the wear and tear on plumbing and fittings in these areas.

The Elevation Reservoir was constructed in 1973 and stores around 2,200 m^3 of water. A second reservoir was constructed at the site in 2015 to provide additional security of supply. In 2010 a new 3,000 m^3 reservoir was constructed at Victoria Domain to provide increased storage capacity. The reservoir is fed through gravity from the Elevation Reservoir, although the supply can be boosted by the Lincoln Street Booster Station.

An additional three 30 m^3 water tanks were added in 2011 to the two tanks at the Boons Reservoir site. Waikawa Reservoir at the northern end of the reticulation receives water when demand is low and feeds water back into the system at peak periods. A number of other small 'energy harvesting' reservoirs provide a similar facility to localised subdivisions. The booster station at Lincoln Street pumps water to higher properties in north Picton and Waikawa and fills the 'energy harvesting' reservoirs.

Figure A1.1 — Picton reticulation network

Renwick Supply and Reticulation

The public water supply to Renwick was first established in 1975. Water was abstracted from a well in Terrace Road and pumped to a storage reservoir at an elevated site close to Boyce Street. After basic treatment the water was pumped into the water supply. Since then two further bores have been installed and a tank farm of 10 storage tanks added to the Boyce Street site. The water is aerated through a trickle aerator on the way to the tanks. The aeration is designed to raise the pH of the water to make it less corrosive to metal pipes. The water is disinfected with chlorine before being pumped to the town.

In recent years the supply has struggled to meet the demand for water. Water restrictions were imposed during the summer of 2014 and voluntary restraint was requested in 2015 and 2016. Three new bores have been drilled at Conders Bend Road and a pipeline constructed to allow the test pumping of the bores. The testing undertaken in 2017 will provide data for a resource consent application. Subject to approval, the water from these bores will be piped to a new water treatment plant to be constructed adjacent to the existing plant. The plant will disinfect the water to meet the protozoal requirements of the DWSNZ.

Flow and pressure are monitored at the treatment/pump station and the two distribution pumps are automatically started and stopped in response to fluctuations in demand. Around half of the reticulation is asbestos cement pipe. The remainder is split evenly between polyethylene and PVC. Pipe samples taken in 2015 showed the 150 mm diameter asbestos cement mains had deteriorated significantly. A budget has been secured for the replacement of the AC mains.

Havelock Supply and Reticulation

The Havelock water supply scheme has evolved over a number of years. A small impounding dam on a creek above Takorika Street to the west of the town was constructed pre-1950 and created a small reservoir of 300 m³. The reticulation consisted of 3 inch and 5 inch cast iron pipes that served the area of the settlement north of Lawrence Street. The system was expanded to include the southern part of the town in 1977, and 150 mm and 100 mm diameter AC pipes were installed.

In 1993 a bore was sunk to the south of the settlement adjacent to the Kaituna River and storage was improved by the addition of 5 x 45 m³ storage tanks sited close to the Takorika dam. In 1996 a new 150mm diameter PVC main was laid from Lawrence Street north to increase the firefighting capacity.

Today a second bore has been drilled adjacent to the first to provide additional security of supply. Chlorine is added to the delivery main at the wellhead by a dosing pump. Water is pumped to a steel service reservoir, built in 2010, and the old ferro-concrete tanks have been demolished except for one which has been retained as an emergency backup until the second steel reservoir that is currently under construction is commissioned in 2021. The Kaituna well pumps are activated automatically based on the level of water in the reservoir. The settings are remotely adjustable by Council's operators via the Datran Supervisory Control and Data Acquisition (SCADA) system. The bore pumps will also be started when a preset outflow rate from the reservoir is exceeded. This is a precaution in case of a fire.

The dam in the Takorika catchment has been isolated from the water supply and decommissioned because of the risk to health from protozoa contamination of the water.

The Havelock distribution system is relatively new. The original cast iron main in Main Street and Lawrence Street was identified as the source of discoloration problems (it was badly tuberculated) and a likely source of leakage and flow restriction. It was replaced in 2009.

Two thirds of the mains are constructed of modern plastic material — PVC or polyethylene.

Awatere Supply and Reticulation

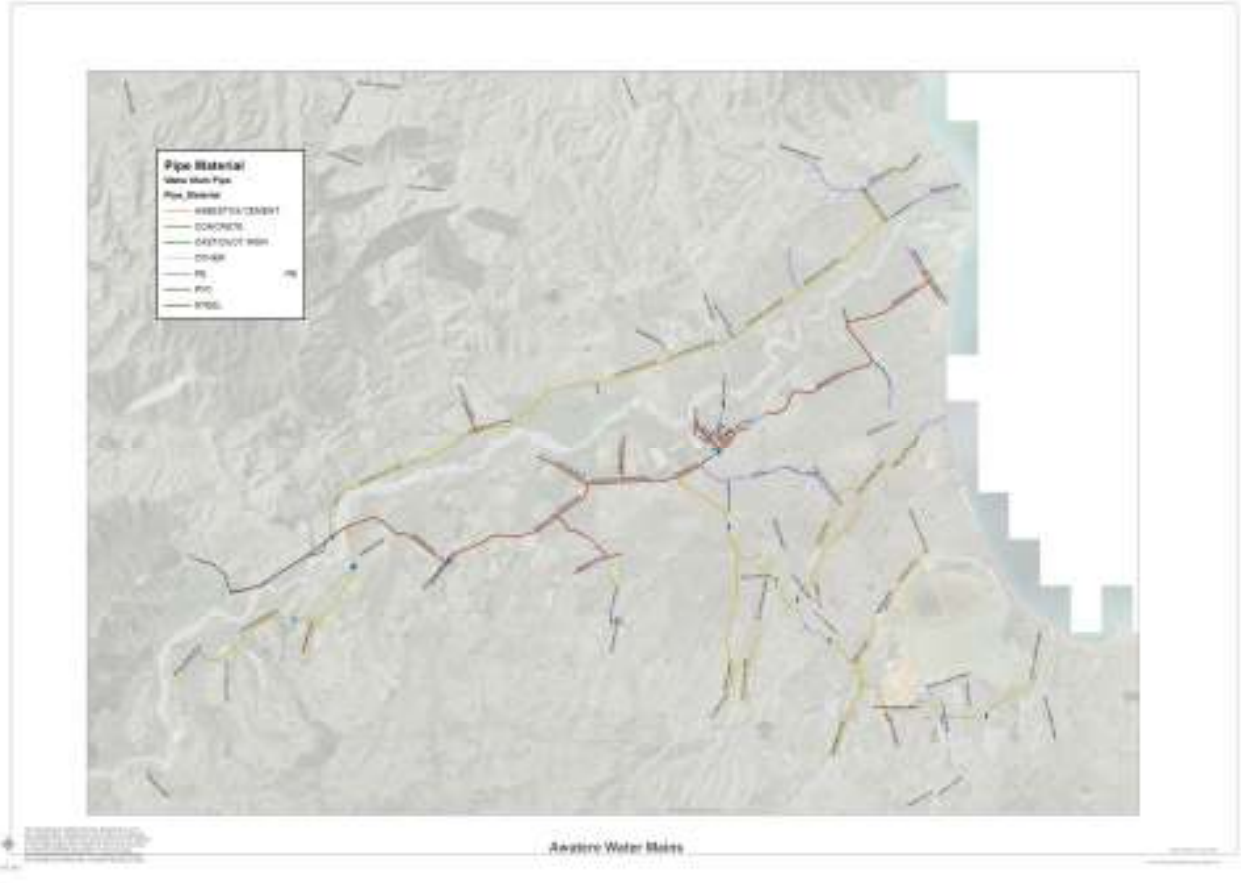
The original Awatere water supply scheme was designed around 1938 and was installed and operational by 1942. The Awatere water scheme was initiated as both a stock and domestic water supply.

The initial scheme involved installation of 32 km of pipeline to serve an area of 10,000 ha although it was envisaged that eventually the scheme could serve an area of up to 20,000 ha.

The scheme took water from the Black Birch Stream, piped it along the north bank of the Awatere River to just downstream of Blairich Station, where the pipeline crosses the Awatere River and continues down the south bank to service the Seddon township and beyond to Seaview and the coastal properties which are eight km from Seddon.

A number of extensions serving the Tetley Brook, Blind River, Grassmere and Upton Downs were installed in the late 1950s and early 1960s.

Later the Dashwood scheme was constructed in 1967/68 to service a further 30 properties with a total area of 5,300 ha.



In some areas privately installed pipelines have been vested with the Council, which now maintains them. These areas include Marfells Beach Road and Waterfalls Road.

The Seddon supply is primarily a household supply. It provides water to the township of Seddon which services the surrounding rural community.

The Seddon supply has 252 residential and 32 commercial connections with an average population of 535. The usually resident population from the 2013 census for Seddon was 489. However the population increases during the vineyard pruning season when RSE workers are resident. During this period (May to September) the peak population can be 900. The population used for Water On Line and this WSP has been agreed at an average of 535.

The community has the normal social infrastructure of a community of this size with a school, cafes, vineyard worker accommodation, campground and a service station.

Water for Seddon, the Awatere south and the Dashwood rural zones are sourced from the Black Birch Stream in the Awatere Valley. Water is extracted through two deeply buried intake galleries (perforated piping) in the bed of the stream. The gallery was modified and deepened in 2017. The modification was in response to algae getting into the network through the intake gallery. This occurred a few months after the 2016 earthquake. Prior to the earthquake algae had never been a problem for the supply. The algae growth did not reoccur in the summer of 2018/19. The modifications have reduced the maximum turbidity experienced in the supply during flooding events in the stream. However during these flood events turbidity exceeds the Drinking Water Standards for NZ.

Chlorine is added to the water at the Blairich Water Treatment Plant which is approx. 5.3 km downstream of the intake gallery. This plant produces chlorine from salt by a MIOX unit. The chlorine is added at the point where the bulk water pipelines “split” to distribute to the Awatere South and Dashwood Rural zones. The disinfection properties of the chlorine become ineffective at times when the water is turbid as described above. Chlorine does not inactivate protozoa.

Water is conveyed through piping in the Awatere South rural water distribution zone, along Higgins and Marama Roads to the Seddon Water Treatment Plant. Water is drawn from a take-off on the Awatere south rural pipeline, where it passes the edge of the Seddon Township along Wakefield Street. This take off is the “raw water” supply to the Seddon water treatment plant. The Seddon WTP provides further treatment for the water supplied to Seddon. It does not provide treated water to other zones within the Awatere water supply.

Properties within the Seddon Township receive water that has been treated via the Seddon WTP, a two train membrane filtration plant, followed by Advanced Oxidation (AOX) treatment, pH correction and further chlorination. Treated water is stored in a 300m^3 reservoir before being pumped into the Seddon network. If pumping is interrupted through power outage water can still be supplied via gravity but at reduced pressure.

The Seddon reticulation network has a total length of 9.6km and is made up of a variety of pipe materials, notably 0.4 kilometres of 50mm, 75mm and 80mm asbestos cement pipe most of which was installed in the 1960’s and 1970’s, 2.4 kilometres of PE pipe that has been installed from 1990 until the present, 2.3 kilometres of PVC pipe most of which has been installed in the 1980’s and 1990’s, 4.4 kilometres of steel pipe, most of which was installed in the 1940’s.

Riverlands Supply and Reticulation

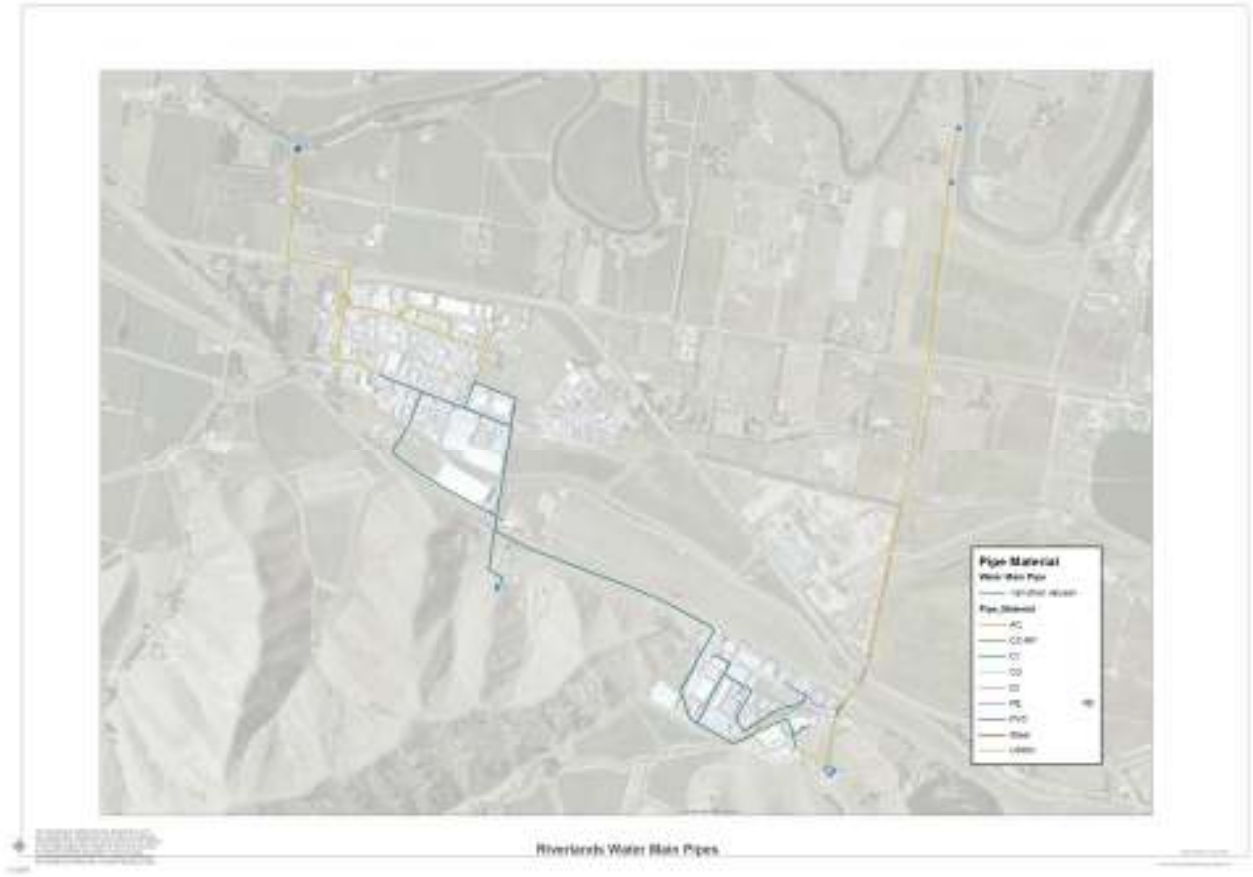
The Riverlands water supply was first developed in 1970 to service the Riverlands Industrial Estate east of Blenheim. A bore and pumping station were installed at the end of Malthouse Road. Water was taken from the well by surface pumps that operated continuously to meet demand. In the mid 1980s the original well began to fail and a new 200 mm bore was drilled. In 1997 the current system was developed — a 370 m^3 reservoir and 920 m of 200 mm diameter pipe were added to the system.

Today, water is drawn from the bore with a submersible pump that delivers water at low pressure directly into two surface mounted centrifugal pumps that alternate (duty and standby) to pump water into the reservoir via the reticulation system. The duty pumps are activated by Datran SCADA and start when the reservoir level falls to a predetermined minimum level and stop when the reservoir is full. The water is drawn from a confined aquifer and is not treated or disinfected.

The Te Koko-o-Kupe/Cloudy Bay Business Park (CBBP) is adjacent to the Riverlands Industrial Estate. The CBBP was developed from the former Primary Producers Cooperative Society (PPCS) meat processing plant and surrounding land. In 2002 the PPCS plant closed and the privately owned water and wastewater infrastructure was purchased by the Council. This included two bores at Hardings Road,

a 4,500 m³ concrete reservoir and associated reticulation. In 2003, 1500 m of 375 mm diameter pipe was laid to connect the CBBP site with the Riverlands Industrial Estate. The Riverlands supply remains primarily for industrial use and the estates are now dominated by wineries which have experienced very significant growth in recent years.

There is a small irrigation system associated with this supply that is not included in this asset management plan.



Wairau Valley Supply and Reticulation

The Wairau Valley scheme became operational in 1991. Water is sourced from a bore adjacent to the Wairau River, accessed via Keith Coleman Road. Two surface pumps alternate between duty and standby. The water is disinfected with chlorine as it is pumped into the town reticulation. An Akdolit Filtration plant has been installed at the wellhead to raise the pH of the water, although this has been bypassed for many years without significant consequences.

The supply services an area in the Wairau Valley Township on the northern side of SH 63 from Church Street to Northbank Street only. The scheme was funded from a capital contribution made by residents and a subsidy from the Ministry of Health.

Naturally occurring arsenic has been identified in the groundwater to the south of SH 63 and this is currently under investigation. The water in this area is very corrosive to metal plumbing. The existing scheme has no spare capacity in its present form to service any properties outside of the designated supply district.

The reticulation was installed with the development of the scheme and therefore no pipes are more than 25 years old and all of them are made of PVC.


Pipe Material
Water Main Pipe
Pipe_Material
PVC
STEEL
Wairau Valley Water Mains

Appendix 2: Levels of Service 2021-2031

Levels of Service : Water Supply

Performance Targets (for the financial year)

Level of Service	Indicator	Baseline	2021-22	2022-23	2023-24	2024-31
Customer satisfaction Provide an overall level of service that meets or exceeds residents' expectations.	Resident satisfaction with this service as measured by survey (10 = service delivered extremely well).	8	8	8	8	8
Expressed per 1000 connections to the local authority's networked reticulation system.	The total number of complaints received by the local authority about any of the following:					
	(a) drinking water clarity	1.10	1.10	1.10	1.10	1.10
	(b) drinking water taste	1.90	1.90	1.90	1.90	1.90
	(c) drinking water odour	0.65	0.65	0.65	0.65	0.65
	(d) drinking water pressure or flow	1.50	1.50	1.50	1.50	1.50
	(e) continuity of supply	1.30	1.30	1.30	1.30	1.30
	(f) the local authority's response to any of these issues	0.65	0.65	0.65	0.65	0.65
Safety of drinking water Provide a level of water quality that meets community needs and is appropriate to the degree of public health risk.	The extent to which the local authority's drinking water supply complies with: (a) Part 4 of the drinking-water standards (bacteria compliance criteria), and (b) Part 5 of the drinking-water standards (protozoal compliance criteria).					
	Blenheim	a)Y b)Y	a)Y b)Y	a)Y b)Y	a)Y b)Y	a)Y b)Y
	Picton	a)Y b)Y	a)Y b)Y	a)Y b)Y	a)Y b)Y	a)Y b)Y
	Havelock	a)Y b)N	a)Y b)N	a)Y b)N	a)Y b)N	a)Y b)Y
	Renwick	a)Y b)N	a)Y b)N	a)Y b)N	a)Y b)Y	a)Y b)Y
	Riverlands	a)Y b)N	a)Y b)N	a)Y b)N	a)Y b)Y	a)Y b)Y
	Awatere	a)N b)N	a)N b)N	a)N b)N	a)N b)N	a)Y b)Y
	Wairau Valley	a)N b)N	a)N b)N	a)N b)N	a)Y b)Y	a)N b)N
Maintenance of the reticulation network	The percentage of real water loss from the local authority's networked reticulation system.					
	Blenheim	37%	37%	37%	37%	37%
	Picton	28%	28%	28%	28%	28%
	Havelock	28%	28%	28%	28%	28%

Levels of Service : Water Supply

Performance Targets (for the financial year)

Level of Service	Indicator	Baseline	2021-22	2022-23	2023-24	2024-31
	Renwick	28%	28%	28%	28%	28%
	Awatere	15%	15%	15%	15%	15%
	Wairau Valley	15%	15%	15%	15%	15%
Fault response times Provide a service that is timely and responsive to customers' needs (The target figures are the 'median' time ie half of all call-outs will be responded to/resolved in less time, half will be greater)	Where the local authority attends a call-out in response to a fault or unplanned interruption to its networked reticulation system, the following median response times measured: (a) attendance for urgent call-outs (in hours): from the time that the local authority receives notification to the time that service personnel reach the site, and					
	Blenheim	1 hour	1 hour	1 hour	1 hour	1 hour
	Picton	1 hour	1 hour	1 hour	1 hour	1 hour
	Riverlands	1 hour	1 hour	1 hour	1 hour	1 hour
	Renwick	1 hour	1 hour	1 hour	1 hour	1 hour
	Awatere	2 hours	2 hours	2 hours	2 hours	2 hours
	Havelock	2 hours	2 hours	2 hours	2 hours	2 hours
	Wairau Valley	2 hours	2 hours	2 hours	2 hours	2 hours
	(b) resolution of urgent call-outs (in hours): from the time that the local authority receives notification to the time that service personnel confirm resolution of the fault or interruption.	4 hours	4 hours	4 hours	4 hours	4 hours
	(c) attendance for non-urgent call-outs (in working days): from the time that the local authority receives notification to the time that service personnel reach the site, and	3 working days	3 working days	3 working days	3 working days	3 working days
	(d) resolution of non-urgent call-outs (in working days): from the time that the local authority receives notification to the	10 working days	10 working days	10 working days	10 working days	10 working days

Levels of Service : Water Supply

Performance Targets (for the financial year)

Level of Service	Indicator	Baseline	2021-22	2022-23	2023-24	2024-31
	time that service personnel confirm resolution of the fault or interruption.					
Demand management Provide a reliable water supply service	The average consumption (in litres) of drinking water per day per resident within the territorial authority district.	750 litres	750 litres	730 litres	710 litres	700 litres

Assumes 15,591 connections. Estimated in accordance with DIA recommended option 2. Minimum Night Flow Analysis. Riverlands not included as industrial night consumption volumes not available.

The water loss figures shown are based on the best available information and do not include legitimate commercial/industrial night usage, day/night adjustment factor or system specific issues that are not currently monitored. Water loss has been calculated in accordance with Method Option 2 (minimum night flow analysis) recommended by the Department of Internal Affairs guidance for non-financial performance measures for water supply.

Appendix 3: Ministry for the Environment guidance on climate change

The advice on the Ministry for the Environment website (updated December 2017) on the likely impacts of climate change in Marlborough is as follows:

“Projections of climate change depend on future greenhouse gas emissions, which are uncertain. There are four main global emissions scenarios ranging from low to high greenhouse gas concentrations. This page presents regional projections as a range of values from a low emissions to a high emissions future.

The projected changes are calculated for 2031–2050 (referred to as 2040) and 2081–2100 (2090) compared to the climate of 1986–2005 (1995).

Temperature — Compared to 1995, temperatures are likely to be 0.7˚C to 1.0˚C warmer by 2040 and 0.7˚C to 3.0˚C warmer by 2090.

By the end of the century, Marlborough is projected to have from 6 to 38 extra days per year where maximum temperatures exceed 25˚C. The number of frosts could decrease by around 7 to 19 per year.

Rainfall —Rainfall will vary locally within the region. The largest changes will be for particular seasons rather than annually.

Summer rainfall in Blenheim is projected to increase by up to 9 per cent by 2090.

According to the most recent projections, extreme rainy days are likely to become more frequent in Marlborough by 2090 under the highest emissions scenario.

Snowfall — The Marlborough region is likely to experience significant decreases in seasonal snow. By the end of the century, the number of snow days experienced annually could decrease by as much as 30 to 40 days in some parts of the region. The duration of snow cover is also likely to decrease, particularly at lower elevations.

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

Wind — The frequency of extremely windy days in Marlborough by 2090 is likely to increase by between 2 and 10 per cent. There may be an increase in westerly wind flow during winter, and north-easterly wind flow during summer.

Storms — Future changes in the frequency of storms are likely to be small compared to natural inter-annual variability. Some increase in storm intensity, local wind extremes and thunderstorms is likely to occur.

Sea-level rise — New Zealand tide records show an average rise in relative mean sea level of 1.7 mm per year over the 20th century. Globally, the rate of rise has increased, and further rise is expected in the future.”

Appendix 4: Marlborough District Council Climate Change Action Plan 2020

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
1. Council contributes to NZ's efforts to reduce greenhouse gas emissions (including net carbon emissions).	(a) Contribute to the reduction of emissions as directed by the Climate Change (Carbon Zero) Amendment Act 2019, emissons budgets and other applicable regulation.	(i) Undertake a baseline inventory of Council emissions by end of 2020; and the regular monitoring of Council's greenhouse gas emissions.	$	Regular monitoring of emissions and review targets.	Regular monitoring of emissions and review targets.
		(ii) Identify and prioritise activtiies to reduce emissions from Council offices (e.g. refrigeration emissions from air-conditioning, reduce travel by holding virtual meetings, working from home etc), Council operations (e.g. methane from landfill) and Council vehicle fleets.	Staff time	Implement emissions reduction programme.	Implement and review emissions reduction programme.
		(iii) Facilitate a higher number of strategically located electric vehicle charging stations and electric bike docks/charging stations across the district. Continue to increase the number of plug-in hybrid vehicles in Council's fleet and investigate use of electric vehicles.	Staff time $	Investigate opportunities to transition the majority of Council's fleet away from fossil fuels (i.e. replace with plug-in hybrid and electric vehicles).	Transition the majority of Council's fleet away from fossil fuels (i.e. replace with plug-in hybrid and electric vehicles).
		(iv) Review Council's Procurement Policy to include consideration of emissions as a factor.	Staff time	Implement reviewed Procurement Policy.	Further review Procurement Policy.
		(v) Continue to invest in forest plantations and participate in the Emissions Trading Scheme programme. Explore opportunities to undertake carbon	BAU	Continue to invest in forest plantations and participate in the ETS programme. Explore opportunities to plant carbon forests on	Continue to invest in forest plantations and participate in the ETS programme. Explore opportunities to plant carbon forests on

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
		sequestration planting on Council land.		Council land (e.g. river berm land).	Council land (e.g. river berm land).
		(vi) Continue to work with communities to develop catchment care programmes (e.g. riparian margin restoration, habitat enhancement, land stability, planting in Council parks & reserves and within roading corridors), to sequester carbon in conjunction with the Indigenous Biodiversity National Policy Statement (once in force).	BAU	Continue to work with communities on catchment care and biodiverstiy programmes.	Continue to work with communities on catchment care and biodiverstiy programmes.
		(vii) Continue to support landowner applications to the government's Billion Trees fund (and other relevant funds).	BAU	Continue to support landowner applications to the government's Billion Trees fund (and other relevant funds).	Continue to support landowner applications to the government's Billion Trees fund (and other relevant funds).
		(viii) Investigate energy efficient design and renewable energy options for Council buildings.	$	Implement energy efficiency and renewable energy generation actions (e.g. solar panels on Council's buildings).	Monitor technology developments for improvements to energy efficiency and implement these where feasible.
		(ix) Continue to develop Council's Waste Management & Minimisation Plan to reduce total waste to landfill (including promotion of the circular economy, education, service changes, etc).	$	Develop further programmes to support waste reduction.	Develop further programmes to support waste reduction.
		(x) Investigate options for reducing green waste to landfills.	Staff time	Review programmes for reducing green waste to landfills and composting.	Implement programmes for reducing green waste to landfills and composting.

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
	(b) Council decisions for planning and infrastructure design supports private individuals and businesses to reduce their emissions by 80% by 2050. *Targets are based on Zero Carbon Act and will be adjusted if necessary to meet the legislation.*	(i) Collaborate with central government initiatives for incentivising: (a) low carbon footprint buildings; (b) highly energy efficient buildings; (c) renewable energy use in buildings; (d) reductions in refrigeration emissions from air conditioning and disposal of refrigerants; (e) enhanced urban/subdivision design.	Staff time	Implement preferred options.	Implement preferred options.
		(ii) Through the Marlborough Environment Plan (MEP) and other means, continue to explore housing intensification to reduce the need for car travel.	$	Implement the MEP.	Review and implement the MEP.
		(iii) Investigate options for further promoting the Warmer Homes programme.	Staff time	Support & promote the Warmer Homes programme.	Support & promote the Warmer Homes programme.
		(iv) Review renewable energy generation provisions in the MEP.	BAU	Planning documents enable renewable energy generation.	Planning documents enable renewable energy generation.
	(c) Year on year, use of alternative modes of transport increases, whereas use of single-occupancy internal combustion engine vehicles on Marlborough roads declines.	(i) Through the Regional Land Transport Plan, and in conjunction with NZTA, investigate options for increasing use of public transport (where this will provide the best outcome) and prepare action plan to increase public transport use.	BAU	Implement action plan to increase public transport use.	Implement action plan to increase public transport use.
		(ii) Investigate ways to incentivise use of	Staff time	Investigate ways to	Investigate ways to

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
		alternative transport modes, such as ride sharing and EVs.		incentivise use of alternative transport modes, such as ride sharing and EVs.	incentivise use of alternative transport modes, such as ride sharing and EVs.
	(d) Use of active transport (e.g. walking, cycling etc) as a form of transportation increases year on year.	(iii) Through the Regional Land Transport Plan, continue investment in new and (maintenance of) existing active transport networks.	BAU	Increased investment in new and maintenance of active transport networks. Impediments to use of network are steadily removed.	Increased investment in new and maintenance of active transport networks.
		(iv) Through the MEP and implementation of the Bike/Walk strategy, implement requirements on new developments to provide for active transport.	BAU	Effectiveness of provisions are monitored and reviewed as necessary.	Effectiveness of provisions are monitored and reviewed as necessary.
		(v) In conjunction with central government and local agencies, fund infrastructure programmes and activities that support increased use of active transport network.	$	Fund active transport infrastructure programmes and activities.	Fund active transport infrastructure programmes and activities.
		Continue to seek and obtain co-funding for active transport network development and maintenance.	BAU	Continue to seek and obtain co-funding for active transport network development and maintenance.	Continue to seek and obtain co-funding for active transport network development and maintenance
2. Marlborough District becomes more resilient to the impacts of climate change.	(a) Progressively improve network infrastructure resilience to climate change risks across all Council networks.	(i) Prepare infrastructure risk and resilience assessment Asset Management Plans (AMPs) identifying critical infrastructure (i.e. water supply sources, stormwater, wastewater, transportation, and solid waste) and their	BAU	AMPs account for climate change risks, uncertainty, and resilience for the entire life of current and future infrastructure (ie future proof design). All assets should	Implementation of AMPs through network development projects. Funding obtained through future plans.

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
		vulnerability to natural hazards and climate change. The plans will also identify what infrastructure will become redundant.		be assessed for climate change risks at their proposed location, before decisions on siting of a new asset/replacement of existing assets are made. Funding for repair or replacement of network infrastructure incorporates accounting for climate change risks and resilience.	
		(ii) Review Council's policy on emergency funds, to ensure it anticipates repair/replacement and relocation costs that factor in climate change risks ("build back better"). Investigate the potential funding requirements of implementing this policy.	Staff time	The Long Term Plan 2021-2031 incorporates emergency funds that anticipate repair/replacement/ relocation costs that factor in climate change risks.	Funding maintained or increased as risks increase.
	(b) New coastal development and infrastructure accounts for climate change risks, including sea level rise.	(i) Develop a coastal hazard plan including consideration of the extent of the risks, options, and regulatory responses for adaptation, relocation, coastal structures etc.	BAU	Develop a coastal hazard plan.	Implement the coastal hazard plan.
		(ii) Regulatory activities (resource and building consenting) continue to account for sea level rise based on the MEP provisions and the latest MfE Guidance.	BAU	Regulatory activities (resource and building consenting) continue to account for sea level rise based on latest MfE Guidance.	Regulatory activities (resource and building consenting) continue to account for sea level rise based on latest MfE Guidance.
		(iii) Undertake and support national initiatives to undertake	$	Undertake mapping	Update mapping

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
		mapping of the coastal margins.			
		(iv) Use the Dynamic Adaptive Pathways Planning (DAPP) and other appropriate tools in decision-making where appropriate.	BAU	Use DAPP and other tools	Use DAPP and other tools
	(c) Ecological adaptation to climate change is taken into account when making decisions.	(i) Review options for how Council can be more agile and responsive to increased biosecurity risks (including marine pathway biosecurity risks) and pest management requirements, in response to the changing climate; including through the Regional Pest Management Strategy.	Staff time	Implement new options for biosecurity and pest management.	Implement new options for biosecurity and pest management.
		(ii) Continue to support the Marlborough Environment Awards and seek opportunities to recognise climate change initiatives through the Awards.	BAU	Seek opportunities to recognise climate change initiatives through the Marlborough Environment Awards.	Seek opportunities to recognise climate change initiatives through the Marlborough Environment Awards.
3. The Marlborough community is informed of climate change actions and options for response.	(a) Council leads the establishment of a climate change forum.	(i) Encourage community collaboration and active involvement with the Forum	Staff time	Establish and lead Forum.	Establish and lead Forum.
	(b) Encourage private adaptation and business adaptation to climate change by providing clear and applicable information.	(i) Obtain updated information on local climate impacts and collate and publicise relevant information.	BAU	Ongoing information gathering and publication.	Ongoing information gathering and publication.
		(ii) Maintain Council's website climate change pages with relevant and up-to-date information on local impacts, options for Council and private mitigation, and Council's adaptation	Staff time	Website maintenance and updates.	Website maintenance and updates.

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
		options and responses.			
		(iii) Incentivise and support ideas for innovation from the community	$	Incentivise and support ideas for innovation from the community.	Incentivise and support ideas for innovation from the community.
		(iv) Continue to implement the Climate Change Integrated Work Programme.	BAU	Continue to implement the Climate Change Integrated Work Programme.	Continue to implement the Climate Change Integrated Work Programme.
4. Council shows clear leadership on climate change issues.	(a) Council's elected representatives demonstrate regional leadership.	(i) Promotion of innovations, changes and initiatives that individuals and businesses can take to reduce emissions, benefit from climate changes and improve resilience.	$	Promotion of innovations, changes and initiatives that individuals and businesses can take to reduce emissions, benefit from climate changes and improve resilience.	Promotion of innovations, changes and initiatives that individuals and businesses can take to reduce emissions, benefit from climate changes and improve resilience.
		(ii) Liaison and collaboration with local government agencies, iwi, central government and others to provide clear and consistent messaging and and directions for change.	Staff time	Liaison and collaboration with local government agencies, iwi, central government and others to provide clear and consistent messaging and directions for change.	Liaison and collaboration with local government agencies, iwi, central government and others to provide clear and consistent messaging and directions for change.
	(b) Council's staff work collaboratively to implement the Climate Change Action Plan.	(i) Formation of a Climate Change Working Group comprising staff across Council to champion implementation of this plan which is supported by Council management and Councillors	Staff time	Climate Change Working Group continues to champion implementation of this Action Plan	Climate Change Working Group continues to champion implementation of this Action Plan.

Goals	Targets	Actions (2019-2021)	Resources	Actions 2021-2024	Actions 2024+
	(c) Decisions of Council consider the implications of climate change for current and future generations.	(i) Include assumptions for climate change in the Long Term Plan, including provision for uncertainty, based on latest scientific evidence from the Intergovernmental Panel on Climate Change (IPCC).	Staff time	Include assumptions for climate change in the Long Term Plan, including provision for uncertainty, based on the latest scientific evidence.	Include assumptions for climate change in the Long Term Plan, including provision for uncertainty, based on latest scientific evidence.
		(ii) Incorporate funding provision in the Long Term Plan to implement this Action Plan.	BAU	Incorporate funding provision in the Long Term Plan to implement this Action Plan.	Incorporate funding provision in the Long Term Plan to implement this Action Plan.
		(iii) Develop an internal staff policy for guiding and informing agenda items, reports and projects.	BAU	Review and monitor implementation of the policy.	Review and monitor implementation of the policy.
	(d) Council reports on its progressive implementation of this Action Plan.	(i) Reporting on progress towards targets of this Action Plan is included in Council's Annual Report.	BAU	Annual reporting.	Annual reporting.

Appendix 5: LTP Assumptions

Assumptions, Disclosure and Compliance

Assumptions

With any financial forecasting, a number of assumptions must be made. The following assumptions have been made in the preparation of this document. Also presented for each assumption is the "Level of uncertainty", "Risk" and "Financial Impact" for each.

Legislative

Assumption

Local Government may be significantly affected by changes in legislation as a result of the Government being re-elected in October 2020. As a result, it is likely that government will continue its reform programme, especially in the areas of, COVID-19 recovery, Community, Housing, Environment and the delivery of the Three Waters. However, there are high levels of uncertainty on the exact path government will take and the implementation requirements and impacts on Council. As a result of this uncertainty, the consequential financial impacts on Council can't be quantified with certainty yet. Therefore it is assumed that legislative and Government Policy changes will not significantly impact upon Council's current responsibilities and activities.

Level of Uncertainty

High.

Risk

It is highly likely that the new Government will want to advance its agenda. As a result of local government having a very broad range of activities it is also very probable the cumulative effect on Council will be significant.

Financial Impact

To date Government's reforms have not reduced legislative obligations, costs or the impact on the ratepayer. It is too early to assess the financial impact of the Government's signalled policy announcements. However, it is expected that there will be specific requirements resulting from National Policy Statements and legislative change, to establish a possible new means of delivering the "three waters" in response to the Havelock North Water Quality Inquiry.. However, it should be noted that Council has already moved to address many of the recommendations of the Havelock North Inquiry in its infrastructure planning.

Infrastructure Impact

Upon recommendation from Central Government, whilst changes will occur with the impending Three Waters Reform, we are continuing to do all Long Term Planning as per the status quo.
Civil engineering labour, plant and materials have already been in high demand in New Zealand. Current procurement costs are already high and timing on projects is somewhat dictated by the availability of contractors.
Significant changes in national standards or deadlines for compliance with statutory requirements may accelerate the delivery of specific capital projects accordingly.

COVID-19

Assumption

That the continuing impacts of COVID-19 on Marlborough will be no worse than currently forecast by the economic commentators. Associated with this is that New Zealand will not return to either Lockdown Levels 3 or 4 and that the effects of COVID-19internationally do not require Council to

1. Make significant reductions to its planned levels of service in response to the effects on the local economy; and
2. Increase its community support.

Level of Uncertainty

High.

Risk

The significant risks are threefold:

1. The Government's border control measures and vaccines prove ineffective and COVID-19 enters the community, resulting in the reinstatement of either Level 3 or 4. Reinstatement of level 3 or 4 could have significant impact on Marlborough's retail, tourism and hospitality sectors. Also it could delay the completion of Capital Projects and Council's ability to deliver services.
2. Government closes the borders with the result that Marlborough's industries are unable to recruit the labour they need at critical times during the year. The consequence is that these industries are unable to produce their normal quantities of product.
3. The economies of Marlborough's trading partners suffer a significant down turn, resulting in a diminished market for Marlborough's product.

Financial Impact

Should the above risks manifest, this will have a significant impact on Marlborough's economy, resulting in reduced revenue to Council and the probability that Council will be called upon to provide support to the Community. The likelihood is that this will result in increased Council debt.

Infrastructure Impact

Delays in capital works projects due to future lockdowns are unknown but provided they are short in duration, cause little upset to the final delivery schedule. The delays in receiving parts and equipment from overseas however does have a significant impact on delivery. Large lead times on specific infrastructure can be overcome with suitable planning, however this also changes the procurement process on specific projects therefore reducing opportunities for innovation and removing a degree of competition in the tendering the process.

Aside from these delays affecting the capital programme, should unforeseen asset failure occur prior to the planning for replacement, there is also the risk of reduction to the level of service should asset failure occur before parts and equipment can be received.

Inflation

Assumption

The costs, revenues and asset values reflected in this plan reflect the following "Forecasts of Price Level Change Adjustors to 2028" produced by Business Economic Research Limited (BERL) in September 2020 for the Society of Local Government Managers. BERL provided three scenarios for their forecast, Council has adopted the middle scenario.

Label Year Ending	Planning and Regulation	Roading	Transport	Community Activities	Water and Environmental
			% change on year earlier		
June 2020	2.1	2.2	2.0	2.0	2.5
June 2021	2.1	2.2	2.1	2.1	2.3
June 2022	2.1	2.3	2.2	2.1	2.4
June 2023	2.2	2.4	2.2	2.2	2.4
June 2024	2.3	2.4	2.3	2.3	2.5
June 2025	2.3	2.5	2.4	2.3	2.6
June 2026	2.4	2.6	2.5	2.4	2.6
June 2027	2.4	2.7	2.5	2.4	2.7
June 2028	2.5	2.8	2.7	2.6	2.8
June 2029					
June 2030					
June 2031					
20 year average % pa	2.3	2.5	2.4	2.3	2.6

BERL also consolidates the above adjustors into a consolidated Local Government Cost Index (LGCI) which is further split between operating and capital expenditure.

Year ending	OPEX	CAPEX	TOTAL
	annual average % change		
June 2020	2.2	2.2	2.12
June 2021	2.2	2.2	2.17
June 2022	2.2	2.2	2.21
June 2023	2.3	2.3	2.35
June 2024	2.3	2.4	2.29
June 2025	2.4	2.4	2.41
June 2026	2.5	2.5	2.53
June 2027	2.5	2.6	2.55
June 2028	2.6	2.7	2.64
June 2029			
June 2030			
June 2031			

Level of Uncertainty

Medium to high.

NB: The forecast increases for Capital Expenditure are generally higher than operating cost increases and it is the Capital Expenditure that has historically driven rates increases.

Risk

There is a risk that the local inflation rates may be higher or lower than the national averages forecast by BERL.

Financial Impact

Should local inflation exceed the national average, this could result in either an increase in rates and debt servicing or deferral of capital projects which may impact upon the level of service that can be provided.

Infrastructure Impact

Deferral of capital projects which may impact upon the level of service that can be provided.

Interest Rate on Council Borrowings

Assumption

Council has assumed a long term interest rate on internal loans of 4.0% for the entire 10 years covered by the Long Term Plan. External interest rates may vary depending on the term of the debt and prevailing market conditions.

Level of Uncertainty

Medium.

Risk

As a result of the continuing impact of the Global Financial Crisis, COVID-19 and the expectation of increased interest rates in the future, Council has adopted a conservative position compared to current market rates to mitigate the risk associated with interest rate movements. Council has adopted this approach as interest rates can increase significantly within short timeframes, as has happened in the past. Council will attempt to mitigate the impact of interest rate rises with a prudent hedging programme that operates in accordance with its Treasury Policy. However, because of Council's current low debt level, its ability to hedge significant amounts of its forecast debt is limited.

Financial Impact

Increases in interest rates above 4.0% will result in higher debt servicing costs and rates funding requirements. Council only debt (internal and external) is currently forecast to peak at approximately $225 million. As a result a 1% increase in interest rates above the 4.0% forecast would result in increased interest costs of $2.3 million.

Infrastructure Impact

Deferral of capital projects which may impact upon the level of service that can be provided.

Population Growth

Assumption

Use of the medium to high projection as a basis for planning future service provision in Marlborough. An increasingly elderly population, growing urban centres and more ethnically diverse.

Level of Uncertainty

Low.

Risks

Population growth occurs at rates either above or below the level forecast with corresponding impacts on the revenue received from rates and development contributions.

Financial Impact

If population growth occurs at a slower rate than forecast, then the level of development contributions received will be lower than expected. However, there is the opportunity to mitigate the financial impact by slowing the Capital Expenditure programme. It is not expected that levels of service will be impacted upon significantly.

Infrastructure Impact

If the population declines, meeting the fixed costs (including operation and maintenance, depreciation, financing and insurance) of the infrastructure could place a significant burden on the remaining residents and businesses.

Economic Life

Assumption

Council has made a number of assumptions about the useful lives of its assets. The detail for each asset category is shown in the Statement of Accounting Policies. The useful lives are consistent with Council's experience with respect to its ongoing replacement programme.

Level of Uncertainty

Low.- above ground

Medium – below ground

Risk

Assets either wear out or become technically obsolescent and need to be replaced earlier than anticipated.

Financial Impact

Depreciation and borrowing costs would increase if replacement Capital Expenditure was required earlier than anticipated. However, these impacts could be mitigated in part by reprioritising the Capital Expenditure programme. There may also be an increase in maintenance costs to keep the asset operational until it is decided to proceed with replacement.

Infrastructure Impact

If useful lives of assets are shorter than what is assumed, forward works programmes need to be reprioritised and non-critical assets will be 'sweat' for a longer period to allow for the required change in programme. Should useful lives of assets be found to be longer than assumed, forward works programmes can be adjusted and renewal programmes can be deferred as appropriate.

Subsidy Rates

Assumption

The New Zealand Transport Agency (NZTA) has recently reviewed its financial assistance policy and it is assumed that Council will retain, for the period of the Plan, its current subsidy rate of 51% for road maintenance and construction works.

Level of Uncertainty

Low.

Risk

NZTA will either reduce the subsidy rate and/or toughen the criteria for the inclusion of works in the qualifying programme.

Financial Impact

If the subsidy rate is reduced, either a reduction in the level of service or an increase in rates would be required. Council is already receiving very good pricing for road maintenance compared to other Local Authorities, through its collaboration with NZTA in the form of Marlborough Roads.

Infrastructure Impact

If the subsidy rate is reduced, either a reduction in the level of service or an increase in rates would be required. Council is already receiving very good pricing for road maintenance compared to other Local Authorities, through its collaboration with NZTA in the form of Marlborough Roads.

Natural Disasters

Assumption

Should a major natural disaster occur the District could be faced with significant repair and reconstruction costs. In 2017 Council estimated the maximum probable loss (MPL) cost as a result of a major earthquake, flood or tsunami at approximately $485 million, following a joint Treasury supported exercise with AON and Tonkin and Taylor. Inflation adjusted this figure would now be approximately $520M. It is assumed that this forecast is accurate. It is also assumed that:

- The forecast contributions from the Local Authority Protection Programme (LAPP), insurance, Government and the NZTA will be received.
- Through a combination of Council's reserves, investment realisation, credit facilities and rescheduling capital and other works, Council can meet the remaining costs associated with a major disaster over a seven year period.
- As a result of a second earthquake occurring in Christchurch, Council has also modelled the financial impact of second significant event. Through the use of the same mechanisms identified in the two bullet points above, Council could meet the remaining costs associated with a second major disaster over a seven year period post the second event.

The LAPP fund is a mutual pool set up to assist Councils cover their share of damage to "below ground" and river protection assets resulting from a significant natural event. At the time the fund was formed commercial insurance alternatives for these assets was not available. There was also a clear requirement from Central Government, and still is, that any assistance given to rebuild infrastructure following a disaster will only be made available if Council has made adequate financial provisions to cover its own repair obligations.

Above ground assets are insured through commercial insurance. These costs are in addition to LAPP contributions. Insurance costs have increased over recent years as a direct result of national and international disasters. Council has mitigated the effect by joining with Nelson City and Tasman District Councils.

Level of Uncertainty

Low.

Risks

The actual costs of recovery from a major natural disaster are higher than the forecast MPL of approximately $520 million.

Financial Impact

Should Council's current estimate of MPL and existing arrangements prove inadequate, either an increase in debt and corresponding increase in rates or a slowing in the rebuild would need to occur.

Infrastructure Impact

Significant disruption of service immediately and reduction in the level of service able to provided for a reasonable length of time following an event dependant on the damage and extent of the event. High costs of emergency response, combined with the lead times and costs for parts and equipment from overseas during COVID-19.

Taxation Framework

Assumption

Council has assumed that existing taxation framework for the Marlborough District Council group will continue for the period of the Long Term Plan.

Level of Uncertainty

Low.

Risk

That the Inland Revenue Department takes the view that Council has used an incorrect tax treatment for any of its activities. Council while being generally exempt from Income Tax, is taxable on income received from subsidiaries. Council also has to account for GST, FBT, Withholding Tax and PAYE.

To mitigate this risk, Council seeks advice from Price Waterhouse Coopers (PWC) and obtains legal opinions and IRD Binding Rulings where appropriate. Every three years Council also requests PWC to undertake a review of its taxation activities. The last review was in 2020 with the resulting recommendations implemented.

Financial Impact

The likely financial impact is low, because of the steps Council takes to mitigate its risks.

Asset Ownership and Valuation

In the preparation of the Long Term Plan it has been assumed that Council will retain:

- Ownership of MDC Holdings Limited and its subsidiaries:
- Its ownership share (88.5%) in Marlborough Regional Forestry, with Kaikoura District Council owning the remaining 11.5%.
- Ownership of all substantial assets currently owned.

It has also been assumed that Council will revalue its major assets annually.

Level of Uncertainty

Low.

Risk

The asset values shown in the Long Term Plan have been adjusted based on the BERL indices. The risk is that the results of actual revaluations may be higher or lower than those disclosed in the Long Term Plan.

Financial Impact

If asset revaluations are higher than forecast, this will increase the resulting depreciation cost and rates as Council moves to provide for asset replacement.

Infrastructure Impact

Upon recommendation from Central Government, whilst changes will occur with the impending Three Waters Reform, we are continuing to do all Long Term Planning as per the status quo. With this in mind, should the valuation increase occur due to higher than anticipated replacement rates, the increased cost in delivery of the capital budget may require projects to be deferred and non-critical assets to be ‘sweat’ from longer than intended.

Sources of Funds for Capital Expenditure

Page164 of the Financial Strategy identifies the expected sources of funds for Council’s Capital Expenditure programme. It has been assumed that the funds identified for each of these sources will be received.

Level of Uncertainty

Low.

Risk

That the forecast funding will not be received as forecast.

Financial Impact

As it is proposed to fund Capital Expenditure from a range of sources it should be possible to compensate a funding shortfall from one source with funding from another i.e. borrowing. If it is decided to increase borrowing a debt servicing cost and a corresponding increase in rates will arise. The alternative is to slow Capital Expenditure especially if the project is growth related and the funding shortfall relates to Development Contributions.

Infrastructure Impact

With a reduced level of funding, the capital projects may be required to be deferred and non-critical assets would be made to 'sweat' for longer than intended.

Climate Change

Council has assumed that the climate changes in relation to rainfall, temperature and sea level will occur as predicted. It has been further assumed that climate change will have minimal impact over the period of the 2021-2031 Long Term Plan. This topic is considered in greater depth in Council's Infrastructure Strategy. This is appropriate given this Strategy covers a longer 30 year period.

Level of Uncertainty

Low.

Risk

That asset and hazard planning has not adequately assessed climate change.

Financial Impact

For the period of the Long Term Plan, the financial impact is assessed as low as climate change on the whole is occurring very slowly, providing extended lead times for mitigation measures if required.

Infrastructure Impact

Remedial programmes may need to be accelerated and lower levels of service tolerated until works can be completed. As understanding of the effects of climate change on infrastructure in Marlborough improves, all capital projects will give consideration of the effects of climate change in their regards to their priority and their design. The effects of climate change on demand, sustainability, future level of service and resiliency of infrastructure assets will be considered in operational and capital planning and expenditure.
High impact on flood risk if the rate of change is much faster than what is currently predicted, 0.3m by 2050 and a 1% AEP flood will increase in size by 10-15%.

Emissions Trading Scheme (ETS)

Any direct impacts of the ETS through potential price increases are assumed to be covered by Council's inflation assumptions and thus factored into the forecasts.

Specific ETS costs relating to waste and landfill have been incorporated into those estimates, together with the increased revenue that will be received.

Pre 1990 forestry has been registered. Any costs associated with ETS will be minimal given Council's rotation and replanting policy.

Level of Uncertainty

Low.

Risk

The impact and scope of the ETS may be more than assumed.

Financial Impact

The Council will face increased compliance and operating costs, which if significant enough, may require higher fees and charges or increased rating requirements to fund them. However, Council had already taken steps to reduce the landfill liability and fix the price of the Emission Trading Units that will be required to be surrendered during the Scheme's operation.

Infrastructure Impact

Consideration is given to sustainability and emissions in the planning of maintaining, replacing, upgrading and extending all infrastructure. A cost benefit analysis will be applied where proven products, practices and principles exist.

Resource Consents

Council has assumed that it will continue to hold and comply with appropriate resource consents to enable it to continue its activities, especially in relation to sewerage and stormwater.

Level of Uncertainty

Low.

Risk

Appropriate consents are either not renewed or require improvements in level of service before being granted. The trends in Resource Consent requirements are covered more fully in the Infrastructure Strategy.

Financial Impact

The main financial impact could occur if levels of service require improvement before a resource consent renewal is granted. The resulting increase in costs will likely require an increase in borrowing which in turn will impact on rates.

Infrastructure Impact

Delays in approval of future resource consents due to factors beyond our reasonable control e.g. time extension for consultation, puts as at risk of not meeting our legislative requirements and incurring unnecessary costs and damage to our reputation. Any failure to meet the requirements of existing resource consents is also potentially damaging to the environment and our reputation. Working with the Regulatory Department to ensure compliance is met and improving the software in which we record and report on compliance will minimize the risk of failures.

Data Confidence

The Council generally has good records of the attributes of the infrastructure assets it owns. The condition of underground assets is always less unknown and experience and fact based assumptions need to be made. Effort is continuing to be put in to improving the quality of data collection to support a targeted renewals programme.

Level of Uncertainty

Underground - medium

Above ground - low

Risk

The condition of underground assets is significantly difference than current evidence suggests.

Infrastructure Impact

Increased asset failure will increase reactive maintenance costs and reduce the level of service provided. The asset renewal programme will need to be accelerated.

THREE WATERS – Chlorination of Water Supplies

New Drinking Water Standards will require the chlorination of all Council managed drinking water supplies which have a rate of leakage exceeding 3%.

Level of Uncertainty

Medium.

Risk

All water supplies will require treatment with chlorine. This will affect the Blenheim, Riverlands and Picton water supplies.

Infrastructure Impact

Anticipated complaints around odour and taste of water in these areas.

THREE WATERS – Urban Growth

Urban growth will develop sequentially in the zoned areas.

Level of Uncertainty

Medium.

Risk

Land is developed out of sequence where existing infrastructure does not allow for this growth. This leads to infrastructure being installed in a less efficient manner to accommodate developments and can cause other planned work to be deferred due to this demand.

Infrastructure Impact

Costs will be recovered from developers but the return profile may need to be adjusted to meet the inefficiencies of construction.

THREE WATERS – Inflow and Infiltration

Inflow and infiltration will continue at current rates.

Level of Uncertainty

Medium.

Risk

Increased rates of stormwater entering the wastewater system through direct connections of damaged piped networks pushes the network to capacity and can cause surcharging or overflowing of sewerage to properties and waterways.

Infrastructure Impact

Inflow and infiltration beyond existing levels will increase the likelihood of overflows from the wastewater network, pumping and treatment costs.

THREE WATERS – Winery Discharge

Discharge from wineries will continue at the anticipated rates.

Level of Uncertainty

Low.

Risk

Changes in global markets, COVID-19, health concerns, climate change or horticultural disease may cause significant change in demand and supply of Marlborough wines

Infrastructure Impact

A significant increase in demand by restrict economic development. A down-turn in demand may result in a reduced funding stream.

THREE WATERS – Inflow and Infiltration

Inflow and infiltration will continue at current rates.

Level of Uncertainty

Medium.

Risk

Increased rates of stormwater entering the wastewater system through direct connections of damaged piped networks pushes the network to capacity and can cause surcharging or overflowing of sewerage to properties and waterways.

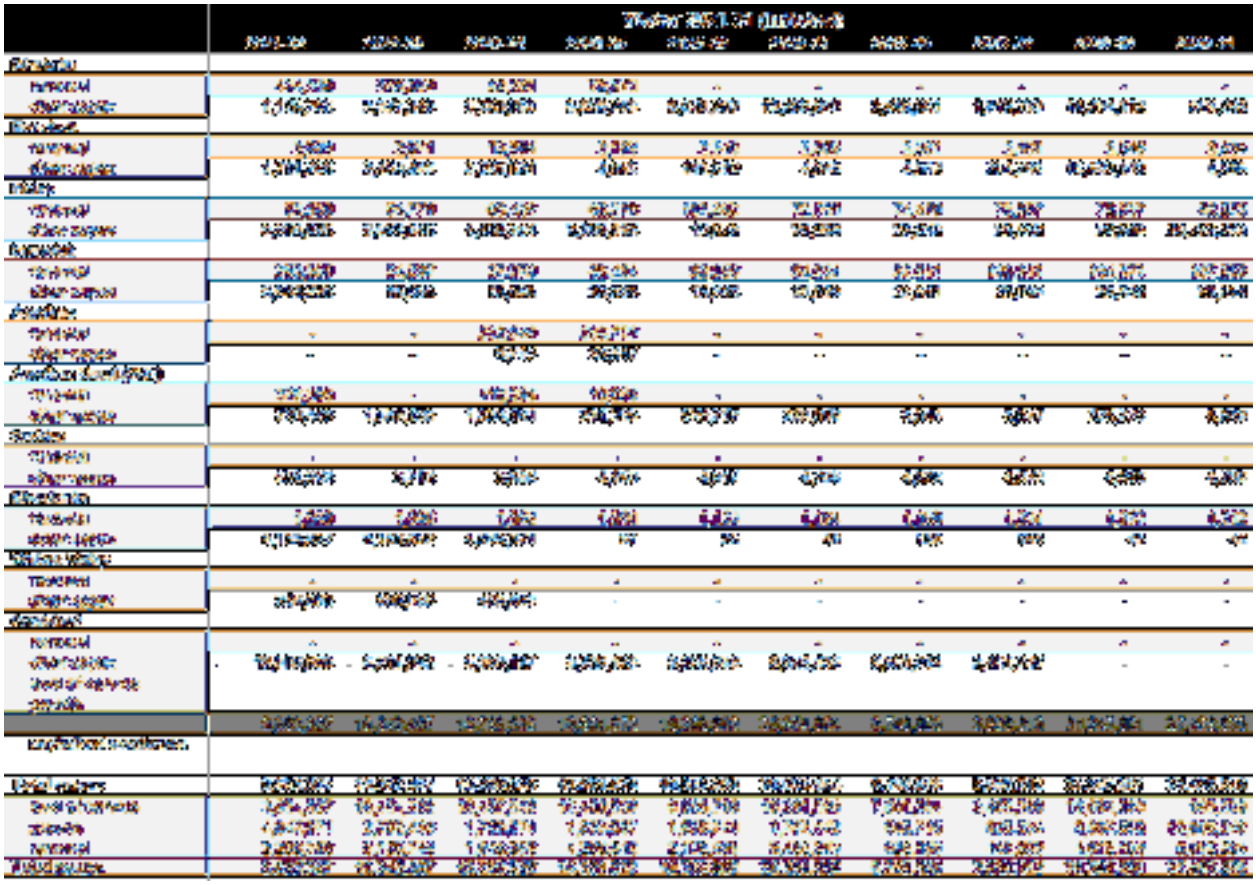
Infrastructure Impact

Inflow and infiltration beyond existing levels will increase the likelihood of overflows from the wastewater network, pumping and treatment costs.

Appendix 6: Valuation Details

LOCALITY	SITE	ORC	ODRC	ADSP	
AWATERE	Pump Station	$ 450,750.09	$ 101,188.08	$ 13,865.61	
	Reticulation	$ 100,006.77	$ 16,484.07	$ 9,745.02	
	Source	$ 109,456.28	$ 94,406.04	$ 1,368.20	
	Storage	$ 755,216.04	$ 680,789.54	$ 10,830.65	
	Treatment Plant	$ 310,511.62	$ 187,484.19	$ 15,378.43	
AWATERE TOTAL		**$ 1,725,940.80**	**$ 1,080,351.92**	**$ 51,187.91**	
BLENHEIM	Pump Station	$ 2,093,314.04	$ 436,483.50	$ 87,005.76	
	Reticulation	$ 674,908.59	$ 350,990.41	$ 49,050.45	
	Source	$ 1,782,777.74	$ 735,340.18	$ 41,035.34	
	Storage	$ 15,571,352.65	$ 11,295,694.67	$ 223,164.81	
	Treatment Plant	$ 18,950,871.14	$ 12,750,145.85	$ 529,560.04	
	Unknown	$ 175.91	$ 17.59	$ 17.59	
BLENHEIM TOTAL		**$ 39,073,400.07**	**$ 25,568,672.20**	**$ 929,833.99**	
HAVELOCK	Reticulation	$ 29,969.97	$ 15,942.95	$ 2,483.05	
	Source	$ 61,506.98	$ 24,853.49	$ 2,320.96	
	Storage	$ 529,635.08	$ 437,802.04	$ 8,751.61	
	Treatment Plant	$ 1,015,641.96	$ 480,830.12	$ 31,459.52	
	Unknown	$ 175.91	$ 158.31	$ 17.59	
HAVELOCK TOTAL		**$ 1,636,929.90**	**$ 959,586.91**	**$ 45,032.73**	
PICTON	Pump Station	$ 844,591.46	$ 659,505.78	$ 23,282.18	
	Reticulation	$ 124,933.25	$ 50,598.54	$ 9,401.73	
	Source	$ 7,808,096.37	$ 2,497,024.97	$ 86,370.38	
	Storage	$ 7,838,041.92	$ 5,887,180.86	$ 116,200.40	
	Treatment Plant	$ 9,650,273.63	$ 7,245,824.66	$ 248,360.50	
	Unknown	$ 9,014.11	$ 6,827.75	$ 606.80	
PICTON TOTAL		**$ 26,274,950.74**	**$ 16,346,962.56**	**$ 484,221.99**	
RENWICK	Reticulation	$ 308,253.40	$ 292,139.54	$ 29,784.11	
	Source	$ 235,263.91	$ 153,737.68	$ 5,526.83	
	Storage	$ 35,769.78	$ 16,977.45	$ 907.44	
	Treatment Plant	$ 2,929,014.70	$ 471,785.53	$ 90,040.05	
RENWICK TOTAL		**$ 3,508,301.79**	**$ 934,640.20**	**$ 126,258.43**	
RIVERLANDS	Pump Station	$ 703.64	$ 140.72	$ 70.36	
	Reticulation	$ 187,971.98	$ 104,275.68	$ 13,293.66	
	Source	$ 533,857.40	$ 112,695.47	$ 16,798.75	
	Storage	$ 3,900,883.54	$ 2,083,351.04	$ 50,539.07	
	Treatment Plant	$ 13,969.38	$ 1,007.74	$ 931.28	
RIVERLANDS TOTAL		**$ 4,637,385.94**	**$ 2,301,470.65**	**$ 81,633.12**	
SEDDON	Reticulation	$ 54,359.07	$ 9,511.16	$ 5,288.75	
	Treatment Plant	$ 4,390,261.35	$ 4,161,621.09	$ 114,114.25	
SEDDON TOTAL		**$ 4,444,620.42**	**$ 4,171,132.25**	**$ 119,403.00**	
SPRING CREEK	Reticulation	$ 879.55	$ 193.49	$ 87.95	
SPRING CREEK TOTAL		**$ 879.55**	**$ 193.49**	**$ 87.95**	
WAIRAU VALLEY	Reticulation	$ 13,984.34	$ 4,767.62	$ 1,289.73	
	Source	$ 12,075.31	$ 5,246.30	$ 235.48	
	Treatment Plant	$ 56,143.48	$ 14,740.27	$ 1,631.09	
WAIRAU VALLEY TOTAL		**$ 82,203.13**	**$ 24,754.19**	**$ 3,156.30**	
WATER OTHER TOTAL		**$ 81,384,612.34**	**$ 51,387,764.37**	**$ 1,840,815.42**	
SVIS	Irrigation Other	$ 5,372,289.41	$ 3,023,442.70	$ 143,973.94	
RIVERLANDS	Irrigation Other	$ 19,807.66	$ 15,157.98	$ 256.11	
IRRIGATION OTHER TOTAL		**$ 5,392,097.07**	**$ 3,038,600.67**	**$ 144,230.05**	**Length (m)**
AWATERE	Reticulation	$ 24,401,534.67	$ 7,046,150.14	$ 355,819.31	154572.8
BLENHEIM	Reticulation	$ 82,319,725.78	$ 52,405,212.82	$ 902,741.60	275162.1
HAVELOCK	Reticulation	$ 3,194,430.06	$ 2,223,887.55	$ 36,197.69	12041.0
PICTON	Reticulation	$ 23,991,855.63	$ 13,335,947.24	$ 278,530.81	78198.4
RENWICK	Reticulation	$ 6,533,179.39	$ 2,809,163.61	$ 99,973.65	23706.2
RIVERLANDS	Reticulation	$ 4,692,687.40	$ 3,322,984.18	$ 49,609.88	12002.9
SEDDON	Reticulation	$ 2,883,942.60	$ 1,633,330.39	$ 38,447.94	12149.7
WAIRAU VALLEY	Reticulation	$ 1,041,575.35	$ 730,633.96	$ 10,415.81	3860.2
WATER RETICULATION TOTAL		**$ 149,058,930.88**	**$ 83,507,309.89**	**$ 1,771,736.69**	**571693.4**
SVIS	Irrigation Reticulation	$ 20,674,126.34	$ 17,367,787.14	$ 206,741.26	57469.5
RIVERLANDS	Irrigation Reticulation	$ 295,540.87	$ 274,853.01	$ 2,955.41	2064.5
IRRIGATION RETICULATION TOTAL		**$ 20,969,667.21**	**$ 17,642,640.15**	**$ 209,696.67**	**59534.0**
WATER TOTAL		**$ 256,805,307.51**	**$ 155,576,315.08**	**$ 3,966,478.84**	**631227.4**

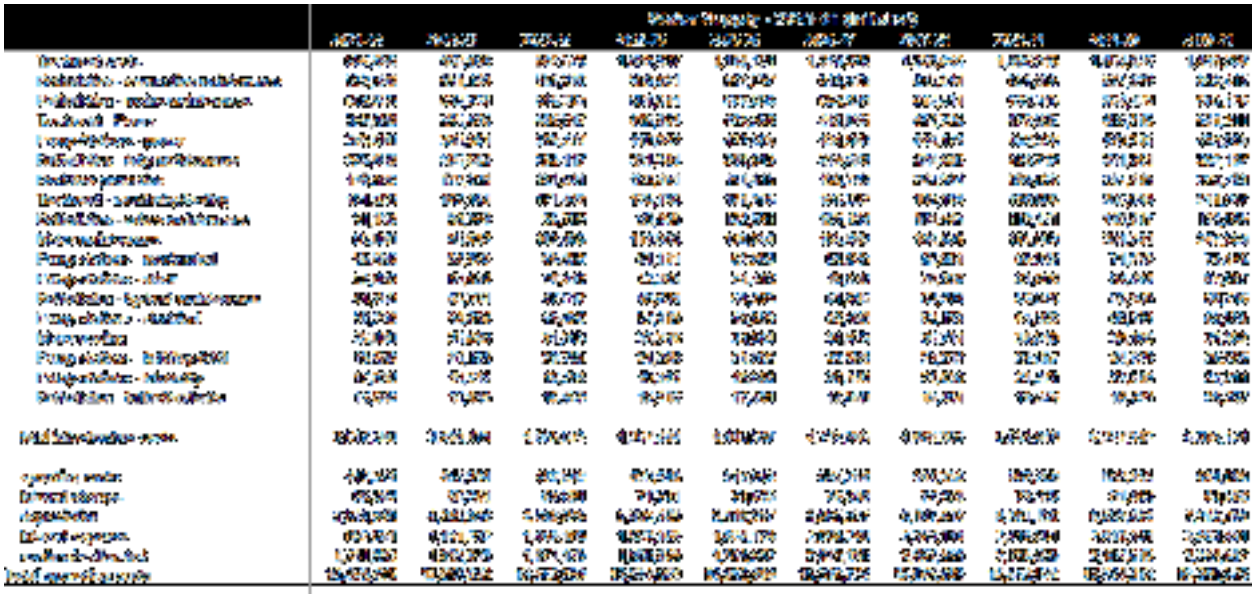
Appendix 7: Water Capital Budget 2021-31



Appendix 8: Water Capital Budget 2021-51

	Water 2021-51 (Inflated)					
	21-26	26-31	31-36	36-41	41-46	46-51
Blenheim						
renewal	1,140,313	-	-	-	-	-
other capex	22,146,529	32,018,612	-	-	-	-
Havelock						
renewal	22,302	12,320	-	-	-	-
other capex	8,695,960	16,757,008	-	-	-	-
Picton						
renewal	369,310	385,367	-	-	-	-
other capex	16,943,422	26,370,334	-	-	-	-
Renwick						
renewal	603,509	505,117	-	-	-	-
other capex	6,707,007	115,727	-	-	-	-
Awatere						
renewal	501,319	-	-	-	-	-
other capex	30,061	-	-	-	-	-
Awatere Rural (POE)						
renewal	805,291	-	-	-	-	-
other capex	4,900,694	515,473	-	-	-	-
Seddon						
renewal	-	-	-	-	-	-
other capex	547,255	22,873	-	-	-	-
Riverlands						
renewal	5,311	6,160	-	-	-	-
other capex	17,665,872	375	-	-	-	-
Wairau Valley						
renewal	-	-	-	-	-	-
other capex	1,245,610	-	-	-	-	-
Combined						
renewal	-	-	17,720,902	15,253,420	20,555,482	36,226,560
other capex	9,422,964	15,337,586	-	-	-	-
level of service						
growth						
	72,906,803	92,046,953	17,720,902	15,253,420	20,555,482	36,226,560
capitalised overheads			639,713.72	550,639	742,040	1,307,757
Total capex	**72,906,803**	**92,046,953**	**18,360,615**	**15,804,059**	**21,297,523**	**37,534,317**
level of service	45,521,598	44,556,853	21,010,941	18,085,351	24,371,786	42,952,336
growth	11,943,618	29,651,189	13,131,838	11,303,344	15,232,367	26,845,211
renewal	15,441,587	17,838,911	18,384,573	15,824,682	21,325,313	37,583,294
Total capex	**72,906,803**	**92,046,953**	**52,527,352**	**45,213,376**	**60,929,467**	**107,380,841**

Appendix 9: Water Operational Budget 2021-31



Appendix 10: Water Operational Budget 2021-51