MARLBOROUGH DISTRICT COUNCIL

2021

# Wastewater

## Asset Management Plan

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# Chapter 1: Introduction

The Assets and Services Department of Marlborough District Council (MDC) provides a wastewater collection and disposal service to residences and businesses of Marlborough through the management of four wastewater treatment plants in Blenheim, Picton, Havelock and Seddon, and the associated reticulation owned and operated by the Council. This is an essential service which benefits approximately 85% of the Marlborough population. It contributes to the health of communities, minimisation of adverse environmental effects and industrial and residential development.

This activity contributes to the Community Outcomes of:

- **Living** — providing a clean and sanitary living environment by effectively removing and treating liquid wastes.
- **Environment** — protecting aquatic environments through the treatment of domestic and industrial effluents prior to discharge.
- **Economy** — providing cost effective treatment of trade wastes which enables commercial activities to thrive.

The plan details the process of operating, maintaining and upgrading the wastewater infrastructure. It describes the current assets, the achievements in meeting the desired community outcomes and the costs of doing so. The plan looks forward to future service requirements: growth in demand; enhanced customer service in line with increased customer expectations; changing environmental constraints; and how to achieve greater efficiency.

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

### Components of the Introduction:

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

1.2 Strategic Goals — how wastewater asset management fits into the wider Council vision, goals and objectives.

1.3 Asset Management in Relation to the Planning Process — a summary of other planning processes within the Council.

1.4 Wastewater Assets Included in the Plan — a short summary of the wastewater assets managed by the Council.

1.5 AM Plan Stakeholders — the main stakeholders and interested parties in the wastewater activity.

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

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

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

1.9 Asset Management Planning Maturity — a discussion on the developmental status of wastewater asset management planning.

## 1.1 Purpose

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

- Demonstrate to the stakeholders the sustainable operation and responsible management of wastewater infrastructure.
- Describe service delivery achievements against the defined community outcomes.
- Define the strategy for asset development and maintenance into the future.
- Outline the medium-term (10+ years) financial planning profile by reference to the life cycle of the wastewater assets.
- Describe the strategies employed to manage the risks associated with the delivery of the service.
- Provide support for 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 Wastewater 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.

As a minimum the plan seeks to satisfy 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, financial).
4. Include financial information (10 years +).
5. Recognise decline in service potential.
6. State assumptions and 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 30 Year Infrastructure Strategy

A 2014 amendment to the Local Government Act requires local authorities to produce an infrastructure strategy to look at challenges over a 30 year planning horizon and to ensure the infrastructure strategy is 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 flood management. These activities are widely regarded as key services and 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 play 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.

**Resilience** — Building and maintaining assets that are both resistant to natural events such as earthquakes and storms and also adaptable to climate change, rising sea levels, changing patterns of use and future demand for the services.

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

**Affordability** — The costs of owning and operating the infrastructure assets need to be affordable in the future, bearing in mind changes in population demographics, economic prosperity and changing work patterns.

**Renewals** — 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 services and to 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 to the asset management plan and are apparent throughout the plan.

Specific wastewater asset management challenges identified in the Infrastructure Strategy are:

- Resource consent applications for discharge at Seddon, Havelock and Blenheim Wastewater Treatment Plants and the need to meet increasing national standards and respond to cultural sensitivities related to effluent discharges to the environment.
- Growth in wastewater flows, particularly industrial effluents from the wine industry.
- Impact of sea level rise on Blenheim and Havelock Wastewater Treatment Plants beyond the 30 year period.
- Impact of the ability of discharging treated wastewater to land due to rising water tables.
- The vulnerability of some older wastewater pipes to ground movement during an earthquake.
- The timing of expenditure with funding and the ability to be able to resource future work programmes, eg, development of a targeted and efficient renewals programme for up to $182.4M of wastewater assets over the next 30 years.
- The increasing likelihood of infiltration of stormwater into the wastewater network as a result of the ageing pipe network and climate change.

### 1.2.3 Functional Environments

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

**Legislative and Regulatory Environmen**t — Wastewater services exist in a highly regulated environment designed to ensure public health through provision of good sanitation and protection of the environment from the discharge of damaging effluents. Legislation passed by central government is enacted through agencies such as the Council's Regulatory Department, the Department of Conservation, and even the Police for Crown offences. Regulation also has a less direct influence through matters such as the health and safety of staff, building standards, financial control regulations, etc.

**Commercial Environment** — Local authorities' funding and spending mechanisms are important considerations for the delivery of community services. Councils have a moral responsibility to their ratepayers for financial prudence and are scrutinised and regulated by central government.
A number of funding sources are available to Council including general rates, targeted rates, development levies, volumetric charges, loans, enterprise income, grants and charges.
The allocation of costs must reflect due consideration of customer affordability and also be equitable and fairly distributed between businesses and domestic users.

**Economic Environment** — Council must consider its strategic approach to economic development — the amount and type of businesses it wants to encourage to the region and the subsequent development of service industries and related commerce. The prosperity of the area will encourage population growth and urban development. Land must be identified and zoned for development and the wastewater reticulation and treatment capacity must be planned and available. Policies and strategies must be adopted for the allocation of costs.

**Social Environment** — Social responsibility requires fair and beneficial business practices across the whole community; balancing the benefits and impacts of its service provision across socio-demographic groups.

**Natural Environment** — Environmental sustainability is becoming a pressing imperative. Councils are expected to set high standards of environmental stewardship. Policies and strategies must be adopted to protect the environment from the negative effects of wastewater, and wastewater services need to comply with those standards.

**Cultural Environment** — Council has to pay due consideration to the cultural sensitivity and heritage of the community. People from European, Maori, Pacifica and other cultures can have significantly different relationships to the environment. Wastewater discharges to natural receiving waters must be considered from a cultural as well as an environmental perspective.

### 1.2.4 Levels of Service

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

Provide an overall level of service that meets or exceeds residents' expectations.

- Provide a level of service quality that minimises environmental risk.
- Provide a reliable wastewater service with adequate capacity and performance.
- Provide a service that is timely and responsive to customer needs.
- Provide a sustainable wastewater service.

The method of developing and establishing the Levels of Service is described in Chapter 2.

## 1.3 Asset Management in Relation to the Planning Process

The role of the wastewater 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, long term planning, and the day to day functioning of the operational activities.

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.

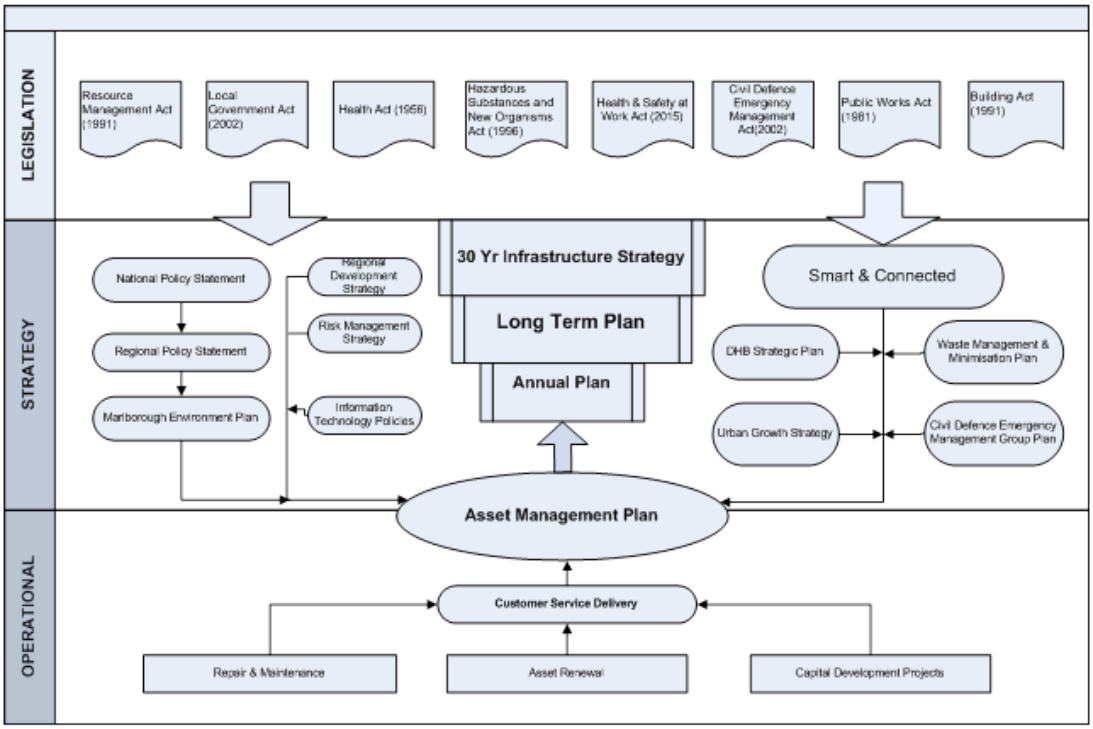



*Figure 1-1 The role of asset management plans in the planning process.*

### 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 Figure 1-2. 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).

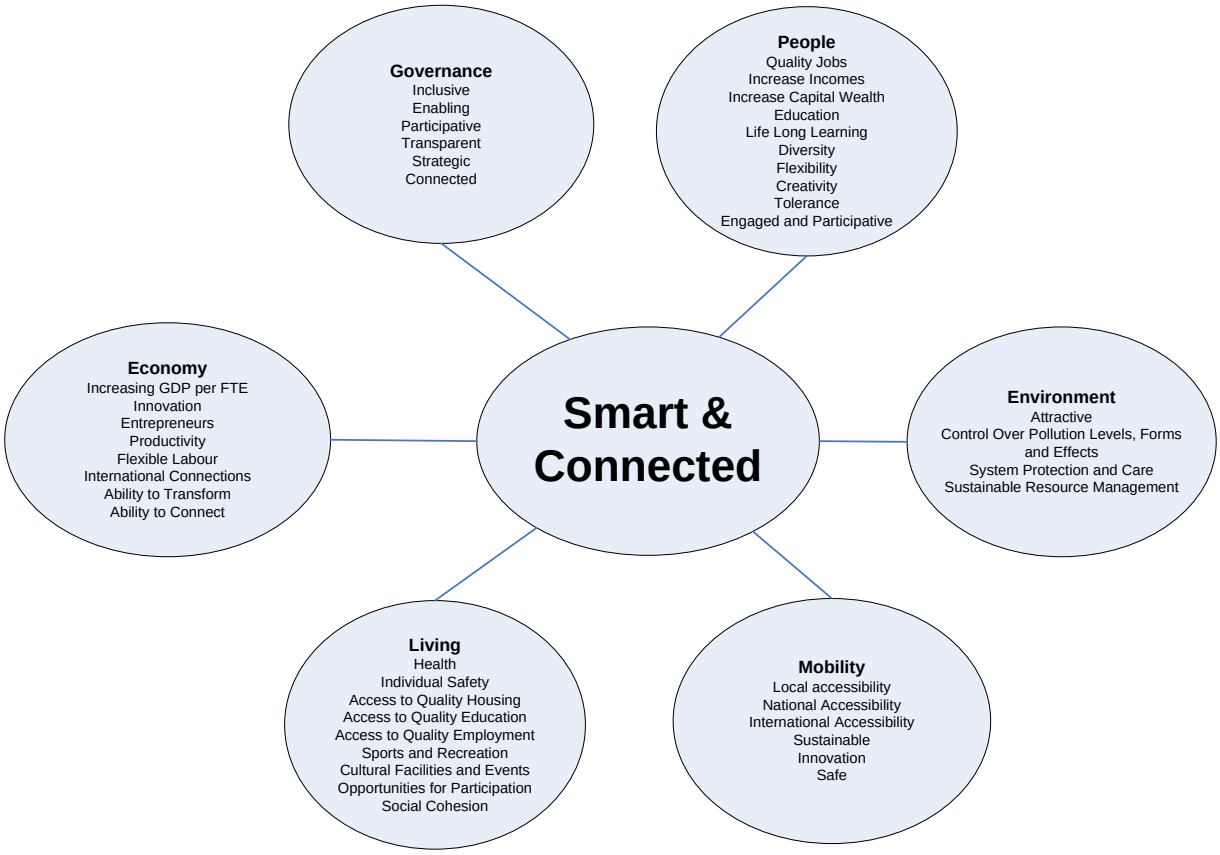



*Figure 1-2 Community Outcomes.*

**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 ten year period and is updated every three years. It contains detailed information for the first three years and outline information for a further seven years.
Asset management plans provide additional detailed information about the main Council activities that feature in the LTP.

**Annual Plan** — Each year the LTP is reviewed and updated. Updates are publicly consulted on through the Annual Plan. Progress on infrastructure projects, performance against levels of service and financial matters are reported through the **Annual Report**.

**Resource Management Plans** — The Proposed Marlborough Environment Plan includes the Council's environmental objectives, policies and rules, and these have a major influence on wastewater management. The provisions relate to overarching issues such as land use, and discharges to land, freshwater and the marine environment.

**Bylaws** — Council has powers to adopt local enforceable bylaws. The Tradewaste Bylaw is relevant to the Wastewater Asset Management Plan.

**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.

## 1.4 Wastewater Assets included in the Plan

Council operates four wastewater schemes in Blenheim, Picton, Havelock and Seddon.
The reticulation networks at Blenheim, Renwick, Grovetown, Spring Creek, Riverlands, Cloudy Bay, Marlborough Ridge and Woodbourne drain to the sewage treatment facility at Hardings Road, Blenheim – See 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.

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.

The outfall discharge from the treatment plant at Spring Creek has been decommissioned.
The Spring Creek ponds continue to provide treatment and butter storage. Spring Creek pond effluent and wastewater from Grovetown is pumped to the Blenheim Wastewater Treatment Plant.

Around 85% of Marlborough’s population is connected to the reticulated wastewater system.
The other 15% are in rural locations and rely on individual on-site treatment/disposal systems or small community based reticulation and treatment. The initial cost of on-site treatment is often more affordable for small and dispersed settlements but these systems require suitable ground conditions for soakage of the treated effluent and a commitment to ongoing monitoring and maintenance. Permeable soils, a low residual water table and a reasonably flat topography are good attributes for an efficient on-site treatment system.

| Area | Sub Area | Treatment Plants | Biofilters | Pump Stations | Grinder Pumps | Mains (km) | Connections | Replacement Value ($M) |
|---|---|---|---|---|---|---|---|---|
| Blenheim | Blenheim | 1 | 3 | 37 | 57 | 198.3 | 7953 | $134.34 |
| | Grovetown | | | | 1146 | 17.0 | 833 | $9.90 |
| | Spring Creek | | | 2 | | 3.6 | 142 | $3.03 |
| | Renwick | | | 1 | | 15.0 | 833 | $8.58 |
| | Riverlands | | 1 | 5 | | 11.5 | 121 | $38.97 |
| Havelock | | 1 | | 6 | | 9.7 | 293 | $5.41 |
| Picton | | 1 | | 9 | | 49.7 | 1644 | $44.94 |
| Seddon | | 1 | | 2 | | 7.3 | 189 | $4.44 |
| TOTAL | | 4 | 4 | 62 | 1203 | 312.1 | 12008 | $249.60 |

*Table 1-1 Summary of wastewater assets.*

There are many areas of Marlborough where on-site sewage disposal occurs in difficult conditions. Failing treatment systems can cause insanitary living conditions and pollution of local watercourses and groundwater, with subsequent health risks, loss of amenity and ecological deterioration.

## 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 wastewater 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 wastewater 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.

The interests of other stakeholders are discussed in section 2.3, and include iwi, the Nelson Marlborough District Health Board, the Marlborough CDEM group and operators of engineering lifeline utilities, as well as businesses (particularly the wine and seafood processing industries).

Environmental and recreational groups have a significant interest in the performance of the wastewater treatment operation.

## 1.6 Organisational Structure

The Assets & Services Department is responsible for the Council's wastewater 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 1-3. The department has its own Finance and Information Manager to supervise the budget and liaise with the Corporate Finance Department.

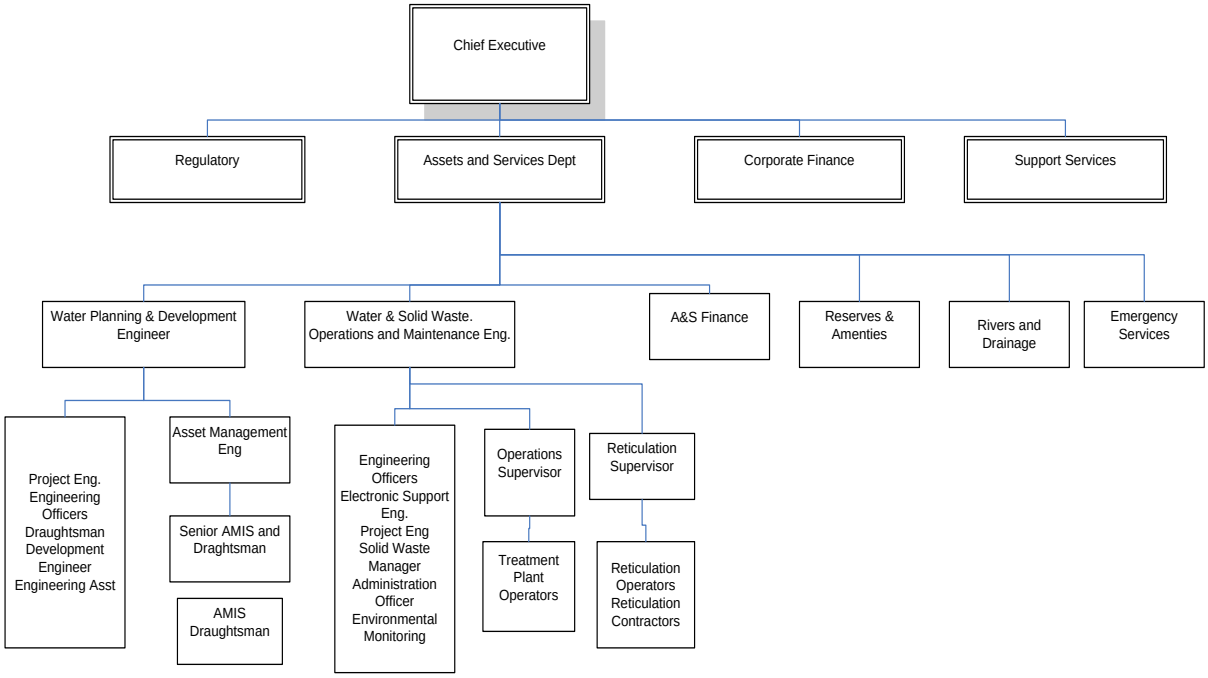



*Figure 1-3 Organisational structure of wastewater management at Marlborough District Council.*

## 1.7 Negative Effects

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

| **Area of Impact** | **Negative Effects** |
|---|---|
| The health of communities | Poor sanitary conditions and community health.<br>Increase in vermin and other disease vectors.<br>Odour nuisance.<br>Introduction of pathogens into the human food chain.<br>Dangerous infrastructure. |
| Minimising adverse environmental effects | Pollution of the aquatic environment.<br>Damage to natural ecology.<br>Damage to underground aquifers. |
| Minimising adverse environmental effects | Acute pollution events or long term degradation of natural receiving waters from wastewater overflows, or inadequately treated wastewater effluent. |
| Industrial and residential development | Inadequate waste treatment capacity resulting in constraints on economic and/or residential development. |

*Table 1-2 Negative effects of stormwater services.*

## 1.8 The 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 2021 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 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, complexity and value of the infrastructure, criticality of the community facilities the infrastructure serves, experience and culture of staff, and risk management.

The Council recognises there is an element of diminishing returns between the effort required to collect and analyse data and the subsequent improvement in decision making. The wastewater infrastructure networks are relatively small and comprehensible systems. They are managed by an experienced engineering management team and skilled operators. Advanced asset management techniques are employed only where they will add significant value to the current decision making process or significantly improve future forecasting.

Core asset management is 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 gradings are all regularly used within the current asset management implementation processes.

A team within the Assets and 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 become more sophisticated, network modelling and other techniques provide insights into the complex behaviour and performance of the infrastructure. Dynamic mathematical models continue to be developed and deployed to model and predict future scenarios.

There is a current reliance on the knowledge and experience of a stable and highly skilled workforce. The depth and breadth of the skills base across the workforce mitigates many of the risks associated with reliance on individual staff members. However, high quality data and empirical analysis is required to optimise effective decisions 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 will select and deploy advance techniques where they will assist in resolving conflicting demands whilst maximising the skills and practical experience of the workforce. Levels of Service.

# Chapter 2: Levels of Service

The purpose of the Levels of Service chapter is to describe the type and extent of wastewater services the Council provides, the context and manner in which they are delivered, the current achievements in delivering the agreed levels of service, and challenges in meeting future expectations.

**Components of the Levels of Service Chapter**

2.1 Strategic Overview — The context for the wastewater services.

2.2 Community Outcomes — The outcomes we are working towards for Marlborough.

2.3 Who Are Our Customers — A description of the stakeholders of wastewater services.

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

2.5 What We Have to Do — Our statutory obligation to provide a wastewater 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 related to changing expectations and growth.

## 2.1 Strategic Overview

The operating cost of the wastewater service accounts for around 10% of the Council's total activity expenditure. The infrastructure will increase over the next 10 years as standards improve and demand, particularly from the wine industry, increases. The wastewater removal service is probably one of the most recognised, and heavily relied upon, services provided by the Council. Figure 1-1 shows the relationship between the wastewater asset management plan and the Council's strategic objectives.

The Council has three strategic objectives related to wastewater:

- Wastewater treatment plants will fully comply with current and anticipated discharge standards.
- Wet weather sewer overflows will not occur from storm events with a frequency of less than a 10 year anticipated return interval (ARI).
- Future treatment plant upgrades designed to avoid cultural offence by removing or reducing effluent discharges to the aquatic environment, where possible.

There is a strong national direction to improve the quality of freshwater quality. Given this, there is some uncertainty about whether wastewater 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 Three Water Entities by December 2021. At this stage, Marlborough District Council has been in support of this process.

Separation of wastewater services 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 standards. Cost sharing across an increased user base and opportunities for alternative funding models.

## 2.2 Community Outcomes

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

The wastewater activity contributes to the Community Outcomes of:

- **Living** — providing a clean and sanitary living environment by effectively removing and treating liquid wastes.
- **Environment** — protecting aquatic environments through the treatment of domestic and industrial effluents prior to discharge.
- **Economy** — providing cost effective treatment of trade wastes which enables commercial activities to thrive.

The community outcomes have been established through consultation with the community and its elected representatives. The Council conducts an annual customer satisfaction survey of 600 residents. Plans and strategies are published and the public are invited to submit their comments.

Special consultative committees and working groups are established from time to time to gain an understanding of public opinions on specific projects.

The Council also draws intelligence from the experience and research of a number of national and local agencies such as the Nelson Marlborough District Health Board, Ministry for the Environment, Ministry of Social Development, Statistics New Zealand, Marlborough Research Centre and many others.

Performance measures for Council activities are reported each year in the Annual Report. In 2014 national non-financial performance measures for wastewater were introduced by the Secretary for Local Government. These have become the primary methods of monitoring and evaluating progress towards the community outcomes and comparing councils throughout New Zealand.

## 2.3 Who Are Our Customers and Stakeholders

The expression ‘customers’ is a useful concept in that it infers a contractual relationship between the ratepayer purchasing goods and services from the Council. However the Council has a more complex role to play than a simple purveyor of services. For example, many of the services provided by the Council are required by central government through statute and are outside the usual customer/vendor relationship. It is more accurate for this section to consider all of the stakeholders.

Commercial properties and domestic households connected to the reticulation are customers. Approximately 85% of properties in Marlborough receive wastewater services and rely on the Council to provide reticulation for sanitary living conditions.

Industries and businesses producing tradewaste have different quantitative and qualitative requirements of the service than the standard domestic property. Wineries, meat and seafood processing plants can also make significant demands of the service by discharging highly concentrated organic wastes. These stakeholders have an important vested interest in the provision of wastewater services.

In recent years the growth of the grape processing industry has placed major demands on the wastewater treatment facilities in Blenheim. New Zealand’s wine exports continue to grow strongly, and appear on track to exceed the $2 billion mark within the next couple of years. This

is significant for Marlborough as the region produces 80% of the New Zealand total output. Vineyards now occupy 24,020 hectares of land in the region and in 2016 produced 323,290 tonnes of grapes.

The viticulture industry is forecasting a 25% increase in production over the next five years. The viticulture industry employs a large and growing number of seasonal workers. Specialist residential accommodation is being provided and much of it is sited on the outskirts of Blenheim. This creates new demand at the edges of the water and wastewater distribution networks which was not anticipated at the time the services were designed and installed.

Aquaculture, seafood and fishing make a major contribution to the local economy. However, seafood processing typically uses large volumes of clean water and produces equivalent volumes of liquid waste. Meeting the additional demand for water supplies and wastewater treatment can be a challenge.

Central government is an important stakeholder. Legislation obligations to implement and maintain sanitary conditions are included in the Public Health Act, the Local Government Act and other legislation (see section 2.5). The quality of treated wastewater discharges into the environment are controlled through the Resource Management Act, which is reflected in the Proposed Marlborough Environment Plan and implemented by the Council's Regulatory Department.

Environmental standards are also important considerations for other national agencies such as the Department of Conservation and the Nelson Marlborough District Health Board.

Iwi have a strong cultural relationship with the environment, and the disposal of human waste into the aquatic environment is of particular concern. The Council is working with Iwi on an Iwi engagement plan, and will continue to work with Iwi on mutually acceptable solutions to wastewater management. For example, a pipeline has been installed alongside the upgraded Picton Trunk Main. It will facilitate the recycling of treated effluent for irrigation at a later date. Further improvements to practices can be expected over time.

Commercially, water quality (which has the potential to be affected by wastewater activities) is of great interest to fishermen, aquaculture and tourist industries.

Rivers and coastal areas are also important sites for leisure activities represented by anglers associations, Fish and Game, surfers, swimmers and other water sporting groups.

Environmental groups such as Forest and Bird, Guardians of the Sounds, Kaipupu Point Inland Island and the Grovetown Lagoon Working Group are important stakeholders.

## 2.4 What Our Customers Want

The levels of service and the subsequent performance measures are derived from the fundamental objectives of the wastewater service which are to:

- provide safe and sanitary living conditions.
- dispose of liquid waste without damage to the natural environment.
- provide a consistent, constant and unlimited service.
- provide the service at reasonable and equitable cost.

In practice there is a tension between the provision of the first three objectives and the perceived value and hence the willingness to pay for the service. Some of the standards included in the wastewater levels of service are prescribed by legislation and have little room for negotiation; others recognise the limitations of delivering the desired goals within financial constraints. The levels of service that are currently used have, therefore, been derived through consultation with the customer base to best reflect the realities of the situation.

The proposed levels of service (as listed in section 1.2.4 of this plan) are included 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 Australasia (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.

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.

In December 2014 a new asset management information system was introduced. The project ensured that customer service requests were linked to work orders so that there was 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 wastewater supply to be adopted by all local authorities throughout New Zealand.

Many of the new measures have the same intent as the previous performance indicators measuring the environmental quality of discharges; the system adequacy with regard to capacity, the response and resolution time to customer service requests and the number of customer complaints. The performance indicators adopted for 2021-31 are attached in Appendix 2 - Non-Financial Performance Indicators.

## 2.5 What We Have To Do — Legal Requirements

**Local Government Act 2002**

- **Section 10** states the purpose of local government is
  - to enable democratic local decision-making and action by, and on behalf of, communities; and
  - to meet the current and future needs of the communities for good-quality local infrastructure, local public services, and performance of regulatory functions in a way that is most cost-effective for households and businesses.

  'Good quality' in the legislation is defined as efficient, effective and appropriate for present and anticipated future circumstances.
- **Section 11A** states local authorities are required to provide 'core services'. Network services are listed as a core service.
- **Section 125** requires the local authority to undertake an assessment of the water and sanitary services within its area.
- **Section 126** states the purpose of an assessment is to assess the "adequacy of water and other sanitary services available to communities…" in terms of the quality of the service currently available; the potential health risks from the absence or deficiency of the service; the current and estimated future demand; and the potential consequences of discharges of sewage and stormwater.
- **Section 146 and 148** give powers to territorial authorities to make bylaws for the control of waste, on-site wastewater systems and tradewaste.

**Tradewaste Bylaw**

- Marlborough District Council's Tradewaste Bylaw 2011 sets standards for tradewaste and determines the circumstances in which tradewaste may be accepted into the public wastewater system and how charges will be calculated.

**Resource Management Act 1991 (RMA)**

The purpose of this Act is to promote the sustainable management of natural and physical resources. Many sections of the Act are relevant to the control of wastewater discharges and the process for seeking consent to undertake the activity.

- **Section 13** places restrictions on certain uses of the beds of lakes and rivers, which can affect maintenance of wastewater reticulation located near watercourses.
- **Section 15 does** not allow the discharge of any contaminant into water or allow a contaminant to enter water unless the discharge is expressly allowed for by a national environmental standard or other regulations, a rule in a regional plan or a resource consent.
- **Part 6 (sections 87A–165)** describes the requirements for applying for resource consents and implementing resource consent processes.

**National Policy Statements**

- National policy statements (NPSs) are issued by central government to provide direction to councils about how they carry out their responsibilities under the Resource Management Act when it comes to matters of national significance.
- The NPSs of particular relevance to wastewater are the National Policy Statement for Freshwater Management (regarding treated effluent discharges to freshwater, and to land where it may enter water), the New Zealand Coastal Policy Statement (regarding treated effluent discharges to coastal waters) and the National Policy Statement on Urban Development Capacity (regarding the need to meet future demand for urban development, including provision of wastewater services).

Local implementation of these national policy statements will be through the Proposed Marlborough Environment Plan and in resource consent conditions.

- Upgrades of wastewater treatment plants to process increasing volumes of wastewater will be required, particularly related to tradewaste discharges from the wine industry and increasingly stringent standards for effluent discharges. Recognising and resolving cultural issues related to waste discharges to aquatic environments is another important factor.

***New Zealand Coastal Policy Statement (NZCPS)***

- Policy 23 is particularly relevant to wastewater services. This policy does not allow the discharge of treated human sewage to water in the coastal environment unless there has been adequate consideration of alternative methods, sites and routes for undertaking the discharge; and the decision is informed by an understanding of tangata whenua values and the effects on them.
- In addition, objectives, policies and rules in plans (such as the Proposed Marlborough Environment Plan) which provide for the discharge of treated human sewage into waters of the coastal environment must have been subject to early and meaningful consultation with tangata whenua.
- The NZCPS is likely to influence the outcome of the 2017 consent applications for the Seddon and Havelock sewage treatment plants. The resource consent for the Blenheim sewage treatment plant is due for renewal in 2025. Capital upgrades to the plant are planned to comply with the expected consent conditions.

***National Policy Statements for Freshwater Management 2020 (NPSFM)***

- The NPSFM requires councils to set water quality limits for water bodies which (at least) meet the national objectives related to ecosystem health and human health for recreation. All regional (and unitary) councils need to fully implement the objectives and policies in the NPSFM as promptly as is reasonable, and no later than December 2025.
- That means water quality objectives will be set for freshwater management units within the region which must reflect tangata whenua roles and interests. Under Policy A2, every regional council is:
  - to specify targets and implement methods (either or both regulatory and non-regulatory) in a way that considers the sources of relevant contaminants recorded under Policy CC1 (accounting for freshwater takes and contaminants),
  - to assist the improvement of water quality in the freshwater management units, and
  - to meet those targets within a defined timeframe.

  This requirement is particularly relevant for the Council's discharges of treated effluent to freshwater in Havelock and Seddon.

***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:

| | |
|---|---|
| Short term (the next 3 years) | Development capacity must be feasible, zoned and serviced with development infrastructure. |
| Medium term | Development capacity must be feasible, zoned and either: |

| | |
|---|---|
| Short term (the next 3 years) | Development capacity must be feasible, zoned and serviced with development infrastructure. |
| (3 to 10 years) | • serviced with development infrastructure, or<br>• 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<br>(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. |

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

**Regional Resource Management Plans**

- The Marlborough Sound Resource Management Plan and the Wairau Awatere Resource Management Plan have been superseded by the Marlborough Environment Plan (MEP). The MEP states that discharge of treated or untreated human sewage into the coastal marine area is a prohibited activity, except for the discharge of treated human sewage from regionally significant infrastructure (in this case it is a discretionary activity.)

**Health Act 1956**

- The Health Act includes some specific and some implied references to wastewater services.
- **Section 23** grants powers to local authorities to protect public health.
- **Section 25** gives powers to the Ministry of Health to order local authorities to provide sanitary works for the benefit of the district.
- **Section 39** requires all dwelling houses and commercial businesses to provide sanitation facilities.
- **Section 60** makes it an offence to cause the pollution of a water supply. This may be invoked if wastewater is allowed to get into a source of water used as a water supply.

**Civil Defence Emergency Management Act 2002 & Amendment 2016**

- **Section 60** requires lifeline utilities (which includes wastewater networks) to prepare to function to the greatest possible capability during an emergency.

**Other Acts**

**The Health and Safety at Work Act 2015** provides the legislation for the occupational health and safety of staff employed in wastewater management.

**The Building Act 2004** and the **Hazardous Substances and New Organisms Act 1996** both have a peripheral influence on the planning and operation of the wastewater system.

## 2.6 What We Currently Provide

Currently the Council has five levels of services for wastewater. Achievement of these levels of service is measured through eight 'performance indicators' which are reported in the LTP and in Annual Reports.

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

**Performance Indicator** — Residents' satisfaction survey

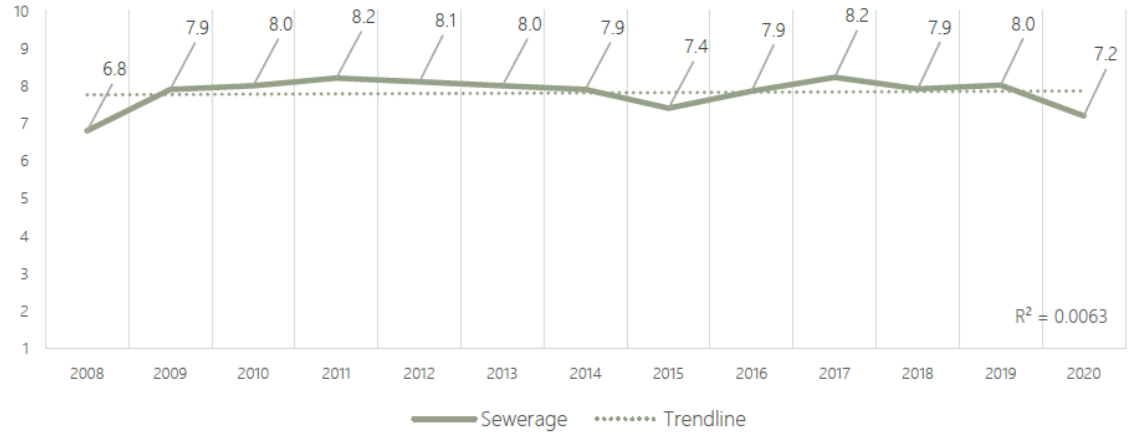
| Indicator | Baseline | 2018-19 | 2019-20 |
|---|---|---|---|
| Resident satisfaction with this service as measured by survey, where 10 = "service delivered extremely well". | 7.8 | 7.8 | 7.7 |

The residents' satisfaction survey is conducted each year. A telephone poll of approximately 600 residents is undertaken around June/July. Participants are asked to rate the Council's performance in providing the service. The measure is subjective and can be heavily affected by recent one-off events or press coverage of a particular topic. However as a general indicator of public opinion it is an important reference.

The survey was introduced with the following: *"The Council operates sewerage schemes in Blenheim, Renwick, Picton, Seddon, Havelock, Spring Creek, Grovetown, Riverlands and Cloudy Bay Business Park. These cater for both domestic and industrial waste"*. Residents were then asked: *"If you receive a Council supplied sewerage scheme, 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 these services?"*

The results of the customer service survey show a generally high level of satisfaction with this service.




*Satisfaction with sewerage has, on average, been stable over time.*

*Figure 2-1 Residents satisfaction scores for wastewater service 2008-2020.*

*There was little variation across the region. Improvements have been made in the satisfaction of Picton residents since the 2017 survey. This is believed to be due to the completion of a number of upgrade projects and resulting decline in wastewater overflows.*

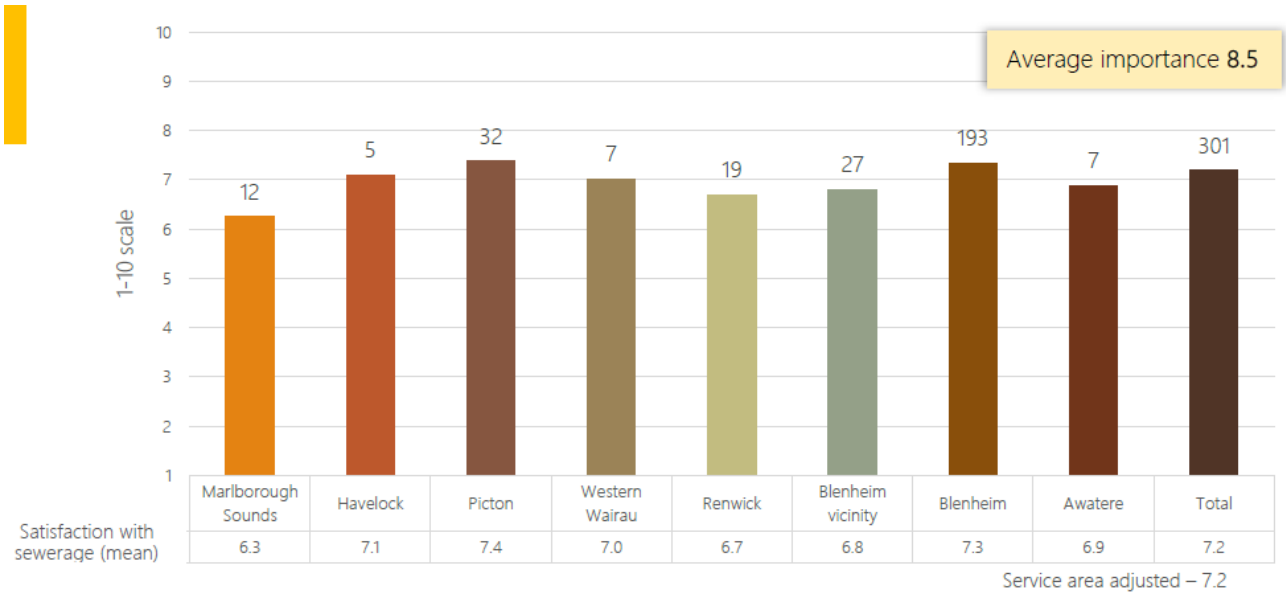



*Figure 2-2 Regional breakdown of wastewater satisfaction scores 2020.*

Sewerage satisfaction percentages by area

| | Marlborough Sounds | Havelock | Picton | Western Wairau | Renwick | Blenheim vicinity | Blenheim | Awatere | Total |
|---|---|---|---|---|---|---|---|---|---|
| Sewerage | 56% | 100% | 76% | 72% | 72% | 77% | 81% | 83% | 79% |

*Table 2-2 Summary of satisfaction percentages by area.*

No persistent problems or trends were identified. There are no Council wastewater services in the Marlborough Sounds. It is difficult to understand on what basis these opinions were formed.

Sewerage unprompted comments (coded categories)

| | Positive | Count | Negative | Count |
|---|---|---|---|---|
| Sewerage | No problems / functions well | 51 | Need maintenance | 5 |
| | Effective upgrades | 10 | Discharge management needed | 3 |
| | Other positive | 3 | | |

*Figure 2-3 Summary of verbatim comments for the residents satisfaction survey.*

The verbatim comments are an interesting insight into customer perception and although very subjective can provide a valuable source of information, and for this reason they are carefully scrutinised.

**Performance Indicator:**

In 2015 the national performance indicators were adopted which was a minor modification to the previous service standard.

| Indicator | Baseline | 2018-19 | 2019-20 |
|---|---|---|---|
| The total number of complaints received by the territorial authority about any of the following:<br>(a) sewage odour<br>(b) sewerage system faults<br>(c) sewerage system blockages, and<br>(d) the territorial authority's response to issues with its sewerage system, expressed per 1000 connections to the territorial authority's sewerage system. | 8.0 | 7.9 | 0.2 |

There are around 13,200 wastewater connections to the Council networks. The statistics show customer complaints are generally at a low level, which is supported by feedback from the customer satisfaction survey. 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 condition. A long term increase in blockages and breakdowns may indicate an overall deterioration in the asset base and suggest a need to accelerate the renewals programme.

The details of the blockages are studied by the Operations team to assist with maintenance and renewal planning. It should also be realised that a lot of the time, Council requires the public to advise them of issues across the network, complaints and requests for service are both recorded, but reported separately.

Staff look for trends such as:

- multiple blockages on the same asset.
- repeat blockages on similar pipe diameters or materials.
- repeat blockages or overflows under similar operating conditions.

Currently the asset management information system (AMIS) cannot automatically generate these reports or search for trends. However, there are other means for using this data in a reporting capacity —see Chapter 6 for details. Further improvements will also be made to the business processes to accurately collect and record the field data.

**LEVEL OF SERVICE: System Adequacy – provide a level of service quality that minimises environmental risks.**

**Performance Indicator:**

| Indicator | Baseline | 2018-19 | 2019-20 |
|---|---|---|---|
| The number of dry weather sewerage overflows from the territorial authority's sewerage system, expressed per 1000 sewerage connections to that sewerage system. | 0.4 | 0.12 | 1 |

In 2013 a new performance indicator was introduced to measure the number of dry weather overflows from the system. Dry weather overflows result from blockages, pump failures or breakdowns in the system and are an indication of the system performance in terms of the level of maintenance, surveillance, and speed of response.

The target has been set at a high level as overflow from the system should be avoidable. Approximately 16,00 properties receive wastewater services. Eight dry weather overflows were recorded In the 2016/17 reporting year. A number of power failures to Havelock pump stations contributed to the increase in incidences in that year.

If the overflow cannot be avoided a clean-up and disinfection is instigated. A repair crew is immediately dispatched as a matter of urgency. A notification protocol ensures the public health officers are alerted and local stakeholders are immediately advised to avoid contact and activities such as shellfish collection in the vicinity.

**LEVEL OF SERVICE: Discharge Compliance - provide a reliable wastewater service with adequate system capacity and performance.**

**Performance Indicator:**

| Indicator | Baseline | 2018-19 | 2019-20 |
|---|---|---|---|
| The number of wet weather sewerage overflows from the territorial authority's sewerage system, expressed per 1000 sewerage connections to that sewerage system. | 1.1 | 0.42 | 0.6 |

The avoidance of environmental damage from wastewater discharges is an essential service provided by the Council and a high priority for legal, environmental and social reasons. The discharges from each of the four wastewater treatment plants are required to comply with the conditions imposed by their respective resource consents.

In order to avoid the health hazards and environmental damage that result from the escape of wastewater into the environment the reticulation must be designed and operated to avoid unacceptable sewer overflows. Sewers must be designed, constructed and upgraded to have sufficient capacity under normal operational circumstances and be maintained and operated to prevent overflow due to breakdowns or blockages.

The management of increasing flows in the sewer system is the combination of a number of influencing factors which are discussed in detail in Chapter 3 (Future Demand). Briefly, the factors include: prediction of population growth and the evaluation of existing sewer capacity,

the timely planning of sewer upgrades, overseeing the design and installation standards of new subdivisions, managing the inflow of stormwater and infiltration of groundwater into the reticulation, and ensuring effective operation and maintenance of the wastewater system.

Many of the sewer overflows in recent years have been on the Waikawa–Picton trunk main, either at the pump stations at Waikawa, Beach Road and Dublin Street or at intervening manholes. The surcharging in the system during storm conditions has been intensively investigated both on the ground and through computer modelling. The trunk main was identified as being under capacity for wet weather flows. Construction has now been completed on the upgrade of the trunk main and pump stations between Waikawa and Dublin Street. Stage 4 of the project is now underway and will upgrade the Beach Road Pump Station and rising main. Additional works within the sewer catchments continues to be undertaken to identify and remedy sources of inflow and infiltration.

Similar upgrade works in the north of Blenheim to upgrade the Nelson Street Pump Station and sewers in McLaughlin Street, Parker Street and other mains feeding the station began in 2019. The upgrade works will prevent uncontrolled overflows and ensure sewage overflows will be restricted to the most severe flood events, and will be treated prior to discharge.

**Performance Indicator:**

| Indicator | Baseline | 2018-19 | 2019-20 |
|---|---|---|---|
| Compliance with the territorial authority's resource consents for discharge from its sewerage system measured by the number of:<br>(a) abatement notices<br>(b) infringement notices<br>(c) enforcement orders, and<br>(d) convictions,<br>received by the territorial authority in relation those resource consents. | Nil | Nil | Nil |

Performance on this measure is good. The Council has not received any formal notices, orders or convictions for the treatment plants or reticulation systems it operates.

The resource consent conditions for discharges to water can be quite complex and stipulate a rigorous regime for monitoring the performance of the treatment plants, including spot check sampling of effluent quality, interval composite sampling, visual checks of the receiving waters and analysis of accumulated ecological effects on the shellfish in the environment around the outfall.

The performance of the treatment plants is summarised in an Annual Monitoring Report (AMR) prepared for the Assets and Services Department by external consultants. The report examines the performance of the plants against each of the conditions of the resource consents and is presented to the manager of the Regulatory Department. It is also published on the Council website for the benefit of community stakeholders.

The AMR provides an overview of both short and medium-term issues related to the performance of the plants. This is useful for both operational management and planning future capital upgrade projects.

| Sewage Treatment Plant | DischargeConsent | Date Granted | Expiry Date |
|---|---|---|---|
| Blenheim | U071181 | 04/10/2010 | 03/10/2025 |
| Picton | U100802 | 01/06/2011 | 01/06/2046 |
| Havelock | U170942 | 30/01/2019 | 1/02/2024 |
| Seddon | U170260 | 24/5/2018 | 24/5/2023 |

*Table 2-4 Wastewater treatment plant resource consents.*

The quality of the wastewater as it enters and travels through the larger treatment plants is frequently monitored to check the operational performance of the plants and adjust the treatment process as necessary. The smaller plants at Seddon, Havelock and the ponds at Spring Creek are not permanently manned but are regularly visited and monitored. Any operational problems encountered throughout the year that affect the final effluent quality are immediately reported to the Council's Regulatory Department.

There has been extensive investment in the Blenheim Sewage Treatment Plant (STP) over the last few years. The industrial aeration ponds in particular have needed to be able to cope with a huge increase in waste from the wineries. The loads to the industrial treatment ponds peak during the vintage in March, April and early May at around 10 times the loads during the rest of the year. Upgrades to ensure there is sufficient capacity to deal with this surge in demand are planned over the upcoming 10 years. An upgrade was fast-tracked in 2009 and was commissioned in time for the 2010 vintage. Additional aeration units have been installed, a dissolved air flotation (DAF) unit has been constructed and an activated sludge recirculation system developed to increase the bacteriological activity. The upgrade was agreed to and funded by industry through tradewaste charges.

In early 2014 a major upgrade was commissioned, and a series of eight new wetland ponds were constructed. The final effluent of the industrial and domestic ponds was combined and directed through the wetlands. A new outfall pipeline was constructed into the Wairau Estuary along with an outfall pump station. A secondary pump station was constructed to return part of the final effluent to a substantial irrigation network. Sprinklers and drippers have been installed to enable treatment of the effluent on around 200 hectares of adjacent farmland.

The Picton sewage treatment plant performs to a consistently high standard. The UV disinfection system was upgraded and a standby emergency generator installed in 2014. The outfall pipeline was in very poor condition and was replaced in 2012–13 along with a new submerged diffuser at a cost of around $5.2M. The old asbestos cement pipe suspended above the tide line along Kaipupu Point was decommissioned and removed for safe disposal. A project to all for the reuse of treated effluent is planned for 2024. Following this will be extension of the wastewater treatment plant to allow for additional capacity in 2026-27.

The Havelock sewage treatment ponds were extended and improved in 2010. The plant generally performs satisfactorily although occasional spikes have been detected in the quality of the influent stream. Heavy loads of organic material are detected from time to time at the inlet of the works. The very high concentrations of biological oxygen demand (BOD) are causing ongoing disruption to the treatment process and causing a deterioration of the final discharge quality. An investigation into the possible source of the high organic loads was traced to tradewaste discharges at the port.

Initial investigations have shown the existing site of the Havelock treatment plant is unsuitable for long term development due to geotechnical issues and increased risk of flooding, particularly in view of climate change uncertainty. A new resource consent for the existing site was

awarded in 2019, this consent was issued for a five year period. A new treatment plant on a new site is planned to be commissioned by 2024 at a cost of $9M. The new site will provide resilience from sea level rise and storm events as it is moved away from the Kaituna River. Acquisition of land and obtaining resource consent is in progress. The new treatment plant will be better equipped to deal with the spikes in loads but control of tradwastes will be needed including application of Councils Tradewaste Bylaw. Some tradewaste discharges will likely need onsite treatment to better manage these spikes in load.

The resource consent for the discharge from the Seddon treatment plant was approved in May 2018 for a term of five years. The plant discharges to Starborough Creek which can have very low seasonal flows. The application was for a lower daily discharge volume. The new consent conditions require careful monitoring of the dissolved oxygen in the Starborough Creek to ensure the effluent does not have a significant negative impact on the receiving water. Investigations into alternatives to the Starborough Creek effluent outfall are being considered, with the preference to be discharge to land. This work is expected to be completed by 2024 at a cost of $14M.

In early 2011 the Spring Creek sewage treatment plant was expanded with an additional pond. The pond was primarily constructed to provide a buffer capacity for high flows. The Wairau River outfall was decommissioned and a new pump station transfers the effluent to the inlet of the Blenheim (Hardings Road) domestic ponds for treatment. The Spring Creek discharge consent was surrendered in 2011. In 2020 an inlet screen was installed to provide additional treatment prior to wastewater being sent to the Blenheim Sewage Treatment Plant (BSTP). New aerators are planned to be installed in 2023, this is a small cost but will further assist to provide additional treatment before being received at BSTP.

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

**Performance Indicator:**

| Indicator | Baseline | 2018-19 | 2019-20 |
|---|---|---|---|
| Where the territorial authority attends to sewerage overflows resulting from a blockage or other fault in the territorial authority's sewerage system, the following median response times measured: | | | |
| (a) attendance time: from the time that the territorial authority receives notification to the time that service personnel reach the site, and | 0.6 | 0.5 | 0.6 |
| (b) resolution time: from the time that the territorial authority receives notification to the time that service personnel confirm resolution of the blockage or other fault. | 1.7 | 8.5 | 2.4 |

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 targets for the performance indicators have been derived through consultation with customers on what is considered to be a reasonable and acceptable service.

The table above shows the Council's performance against this indicator has been satisfactory for responding to tasks but failing in the resolution of issues. The response to an emergency event is interpreted as the arrival on site of a water officer or repair crew. In 2021-22 the target response time will be extended to align with contractual requirements and the response time for urgent water tasks. A target median response time of one hour will be adopted for tasks within Blenheim, Picton, Riverlands and Renwick. A target median response time of two hours will be adopted for tasks within Seddon and Havelock. The Council provides a 24/7 emergency

call-out service and the number of urgent events each year is not always issued correctly. Consistency across staff issuing tasks is poor and further training is required on a case by case basis.

An interruption to wastewater service is normally due to a blockage or breakdown. The measures require a prompt response from a service team and, after arrival on site, sustained attention to restore the service in an acceptable time. There may be exceptional circumstances that prevent the repair within the target despite best efforts — sewers may be very deep or difficult to access, spare parts may not be readily available and so on. In these circumstances customers will be offered alternative arrangements through temporary sanitary services or access to off-site facilities.

The time taken to resolve tasks is not recorded well and often the time the task is actually completed is the only record we can accurately measure. No complaints have been received about the time it has taken to resolve tasks to date. From 2021-22 the target resolution time will be extended to align with the contractual requirements and resolution time for urgent water tasks. A target median resolution time of four hours will be adopted for all urgent wastewater tasks.

### 2.6.1 How Levels of Service are Set

The levels of service for the wastewater service have been determined by the features of the Activity most valued by our customers. These are considered by the Councillors from time to time, most recently in a workshop in September 2020. Any adjustments to the levels of service are considered and new targets are set for inclusion in the LTP consultation process — see Appendix 2. Public submissions to the LTP may influence the final outcome.

**Environmental Risks** — Effluent quality from the treatment plants is strictly controlled by resource consent. Sampling routines have been imposed to check the quality of the outfall discharge of each of the plants and on the shellfish ecology in the vicinity of two of the plants.

Treatment plants can become overloaded by highly concentrated wastewater from intensive trade effluent. Vigilance is required to monitor tradewaste discharging into the networks, particularly to the smaller treatment plants which have less capacity to treat concentrated contaminant loads.

Excessive wastewater volumes can lead to inadequate treatment at the plants, and overflows from the reticulation. Most surcharging in the system occurs when rainwater enters the reticulation through inflow and infiltration during storms. An ongoing programme is in place to identify and remedy sources of leakage into the system. In the event of a sewer overflow the Assets and Services Department advises Council's Regulatory Department, the Medical Officer of Health and major stakeholders. A response plan is immediately implemented and environmental monitoring is undertaken to identify the extent of the contamination and to progress the clean-up.

**Reliability and capacity** — Blockages and pump breakdowns can cause occasional problems. They need rapid detection and response to prevent wastewater build up and overflow into the environment. Repeated breakdowns in the system may be of considerable inconvenience to customers who are unable to drain wastewater from their property and may also be an indication to Council of a deteriorating asset or inadequate operational maintenance.

**Timely and responsive service** — A constant and reliable wastewater service is often taken for granted, however all systems are likely to break down or fail from time to time. The Council operates a 24/7 emergency breakdown response service to remedy blockages and breakdowns as a matter of urgency.

Wastewater mains may become partially blocked causing considerable inconvenience and restricting the service as the wastewater slowly drains away. More severely blocked sewers will quickly back up with a risk of sewage overflowing. Many blockages occur on the laterals (the smaller pipes connecting the property to the mains in the road). Customer Services staff are

trained to question customers reporting blockages, to try to establish whether the problem is on the customer's pipe within the property or is the Council's responsibility. Service requests are prioritised based on the severity and the number of customers affected so that repair crews can be effectively dispatched to the most urgent work.

**Sustainable Service** — Routine maintenance is important for wastewater systems to ensure assets are clean and functioning correctly, and plant is serviced to prevent premature failure. Responsible stewardship of major infrastructure requires the Council to repair, renew and upgrade the assets in a timely fashion and avoid accumulating a legacy of decrepit assets. Decisions have to be made as to when it is cost-effective to replace failing assets rather than continue to repair them.

## 2.7 What Our Customers Would Like — Future Challenges

The Council is committed to meeting its environmental obligations and to avoid damage to the natural environment from wastewater effluents. 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 2021 LTP has set new targets for the performance measures – see Appendix 2 Levels of Service.

### 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 Resource Management Act as expressed through the Marlborough Environment Plan requires significant capital investment. Ensuring the infrastructure is resilient to natural hazards and is renewed before it becomes inefficient to maintain incurs additional pressure on the budget. However, the Council is committed to prioritising investment in core infrastructure.

### 2.7.2 Water Quality

The National Policy Statement for Freshwater Management 2020 (NPSFM) came in to effect 3 September 2020 and has replaced the National Policy Statement for Freshwater Management 2014 (amended 2017).

There is evidence of a deterioration of water quality in the Taylor River as it passes through Blenheim. CCTV surveys of the sewer and stormwater network following the 2016 earthquakes has shown considerable pipe damage to both networks. Rehabilitation work on the earthenware wastewater mains is underway with the third package of work being released in 2021. Relining of these damaged pipes will extend the life of the existing mains with little disruption to service and the community.

As resource consents for Stormwater Discharge are implemented, freshwater monitoring and reporting will become more consistent and regular. This work can be used to help in the identification of exfiltration of wastewater mains in to the stormwater network. The first stormwater discharge consent was issued in 2020 for the Springlands Catchment. Consents will be applied for on a catchment basis starting with Blenheim and then working out to other stormwater management areas.

**Gap analysis** — complete major pipeline upgrades planned for Picton and north Blenheim and increase operational budget for I & I investigation. Continue CCTV survey and use freshwater monitoring data to plan a targeted renewal programme.

### 2.7.3 Compliance with Discharge Quality Standards

Marlborough has experienced rapid growth over the last few years. The peak flows of industrial effluent from the grape processing at the wineries during a six week period around March, April and early May have been a challenge for the Blenheim Sewage Treatment Plant (BSTP). Failure to provide sufficient capacity could effectively inhibit economic development in this area.

Additional industrial treatment capacity has been added to keep up with increasing loads from industry. The latest upgrade is underway to establish additional aeration capacity.

Viticulture continues to thrive and expand. Existing users have increased tradewaste discharge volumes to the sewers as more and more land is being converted to vineyards. Whilst it takes a minimum of three years for vines to become productive, some of the processing plants could expand production relatively quickly. From 2021-30, $15.8M has been planned to be spent on upgrading treatment of industrial waste at the BSTP to meet existing demand and in anticipation of the continuing increase in demand.

A large fish processing plant in Picton was closed down in the 2012–13 year. The capacity of the treatment plants to handle the tradewaste would need to be considered prior to the development of new wet industries in Picton, Havelock or the other smaller settlements before upgrades are completed.

**Gap analysis** — Continue to monitor the growth of industrial effluents and prepare upgrade solutions to ensure sufficient capacity is available to meet demand.

The discharge of sewage effluent to the aquatic environment remains an environmental and cultural issue. The Council continues to investigate methods of avoiding or minimising coastal and river outfalls. The 2015 upgrade to the Blenheim STP has allowed the return of a portion of the final effluent for irrigation of land. Whilst this makes a useful contribution to the objective of reducing the volumes of effluent discharged to sea, great care has to be taken with the land irrigation to ensure further nuisance is not caused to neighbouring properties by increased odours, spray drift, health risks or environmental damage to the underlying aquifer. Strict conditions have been imposed on the circumstances in which the irrigation can occur. These conditions are currently being well managed.

Reuse of treated wastewater is planned for the Picton Sewage Treatment Plant (PSTP) in 2024 with a budgeted project cost of $3.6M. The ability to reuse treated water could provide another solution to reducing water demand and potentially removing the necessity for providing another water source for Picton residents in the future.

**Gap Analysis** – Incorporate effluent disposal to land in future capital upgrade designs.

### 2.7.4 Service Response Times

The current performance related to restoration and response times appears to be in line with customer expectations, and there are few complaints regarding these, however as the records show, the targets for resolution has not been meet. Significant improvements to reporting can be made by accurately prioritising urgent tasks and recording of actual resolution times.

Sewer pipes are normally of smaller diameter closer to the source of the waste input and increase in diameter downstream as more connections join the network and flows increase. Smaller pipes block more readily and, consequently, blockages that cause loss of service to individual properties occur more frequently on the privately owned portion of the pipe within the property boundary. Providing clear information to the public will help to direct customers to the most appropriate remedy.

**Gap Analysis** — Align response and resolution times with contractual requirements and improve how tasks are issued and recorded.

### 2.7.5 Customer Complaints

There are a number of challenges involved in managing service delivery. The asset base is ageing. Many underground assets are beginning to approach their design life expectancy. They being monitored through CCTV survey and maintenance activity data. A well targeted and timed replacement programme is required to sustain the current levels of service (see Chapter 4) regarding service interruptions.

There is evidence that more greases and oils are being deposited into the sewer system from both domestic and commercial discharges. The fat becomes deposited on the internal walls of the reticulation and wet-wells. 'Fatting-up' is an increasing cause of blockages and reduced capacity. Routine sewer cleaning and monitoring is being stepped up to cope with this issue. Careless disposal of 'wet-wipes' is becoming an increasing problem nationwide and whilst they do occasional cause issues in our network by binding the impellor of sewage pumps, causing blockages and breakdowns, it has not caused a huge issue across the network recently.

In 2010 four bio-filters were installed on the Blenheim wastewater reticulation in response to customer complaints of foul odours from the sewers. Further investigation discovered that in certain low-flow conditions wastewater was becoming septic within the mains and releasing unpleasant odours. Customer complaints continue to be monitored to ensure similar issues are not developing elsewhere. Attention is currently focused on a leachate drainage sewer from the Blue Gums landfill site to the south of Blenheim that passes through a recently constructed sub-division.

**Gap Analysis** – Ensure asset condition and performance data of is consistently and reliably collected and can be effectively analysed through the AMIS. Particularly investigating the root-cause of customer complaints.

### 2.7.6 Wet Weather Overflows

Sewer capacity is likely to become an increasing challenge to the operation of the wastewater reticulation. Urban growth pockets have been identified on the edge of existing settlements and inflow and infiltration (I & I) will increase as the asset base ages.

The completion of Stages 1-4A of the Picton Trunk Main project and the current project to complete Stage 4B/upgrade of the Beach Road Wastewater pump station and new rising main will help to reduce the incidence of wet-weather overflows in the Picton area. This project will be complemented by the relining of earthenware wastewater mains and pipeline replacements over the next ten years.

Similar improvements are expected in the north of Blenheim by the Blenheim Sewer Upgrade Project to upgrade mains in McLauchlan Street, Parker Street, Hutcheson Street, Budge Street and to replace pump stations at Nelson Street, McLauchlan Street and Budge Street West.

**Gap Analysis** - These improvements are reflected in the levels of service targets set for future years (see Appendix 2). The Blenheim Sewer Upgrade Project allows for a managed but treated overflow during the more severe storms as was undertaken in Dublin Street in Picton. An acceptance that inflow and infiltration cannot be eliminated, so consequently continued vigilance and a flexible ability to undertake sewer rehabilitation works will be a continuing feature of future management strategy.

### 2.7.7 Dry Weather Overflows

Dry weather overflows caused by a mal-function of the system or under-sized infrastructure are relatively infrequent. Capacity issues in wastewater mains are predicted through hydraulic models of our networks. These models are regularly update, calibrated and verified.

Additional resilience is built into the design of many major projects and smaller upgrades such as the retro-fitting of stand-by generators are occasionally identified and implemented.

The telemetry surveillance and management system and the stand-by emergency response works well. Operational emergency plans and standard operating plans are regularly reviewed and updated as systems and staff capabilities evolve.

**Gap Analysis** – No significant changes to this level of service have been identified.

# Chapter 3: Future Demand

**Components of the Future Demand Section**

3.1 Demand Drivers — Factors influencing the demand for wastewater 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 wastewater services is influenced by a number of factors that work together 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)[1].

**Domestic wastewater growth** — The production of household wastewater has increased over time as dwellings are fitted with more sanitary facilities, automatic washing machines, dishwashers, etc.

**Increased tradewaste** — This area of growth has been a major factor in Marlborough over recent years with the growth in the viticulture industry. Meat and seafood processing can also generate high loads for wastewater systems.

**Inflow and infiltration** — The ingress of stormwater and groundwater into the wastewater system has the potential to be a very significant problem for the design and operation of the system. The extent of inflow and infiltration in certain sub-catchments is a very significant component of total flow during storm events.

**Deterioration of on-site schemes** — On-site treatment of wastewater for some individual properties and small communities is proving to be inadequate either due to increasing standards, deteriorating systems or urban infill onto existing dispersal fields. Residents living in these areas may ask to join Council reticulation schemes.

**Improved environmental standards** — New Zealand is very aware of its 'clean/green' reputation and much of the economic strategy is based on this brand. There is increasing concern over the impact of human activities on the quality of waterways and the coastal environment. Central government provides direction through national policy statements which are implemented at a regional level through the Proposed Marlborough Environment Plan and consent conditions. Tighter regulation and more rigorous enforcement of existing controls can be expected in future. This is discussed in more detail in Chapter 2 (particularly section 2.7.1).

**Legislation** — The main legislative powers influencing wastewater services are outlined in Chapter 2. Changes in legislation may require additional drainage capacity or environmental protection upgrades.

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

**Climate Change** —Research and understanding around the implications of medium and long term climate change are improving. There has been a significant increase in extreme weather events and researchers predict this trend will continue. As severe storms become more frequent there will be more inflow/infiltration, and implications for the low lying treatment plants in Havelock and Blenheim from sea level rise.

**Resilience** — Having a robust and durable wastewater system in place is important, and this is recognised as an essential lifeline service in the National Emergency Management Agency (NEMA) Act. Meeting the demand for additional security against natural hazards would require further upgrades or extensions of the existing system. Some earthquake damage occurred following the November 2016 earthquakes. The best option for managing earthquake and liquefaction risk related to the low lying location of the Blenheim and Havelock treatment plants is to strengthen the structures as much as possible, and have financial contingency in place to repair any damage as quickly as possible.

**Technological developments** have the potential to change many elements of infrastructure over the next 30 years, including the availability of micro-treatment and water recycling options. Intelligent robotics will be increasingly used in underground inspections and works.

## 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.

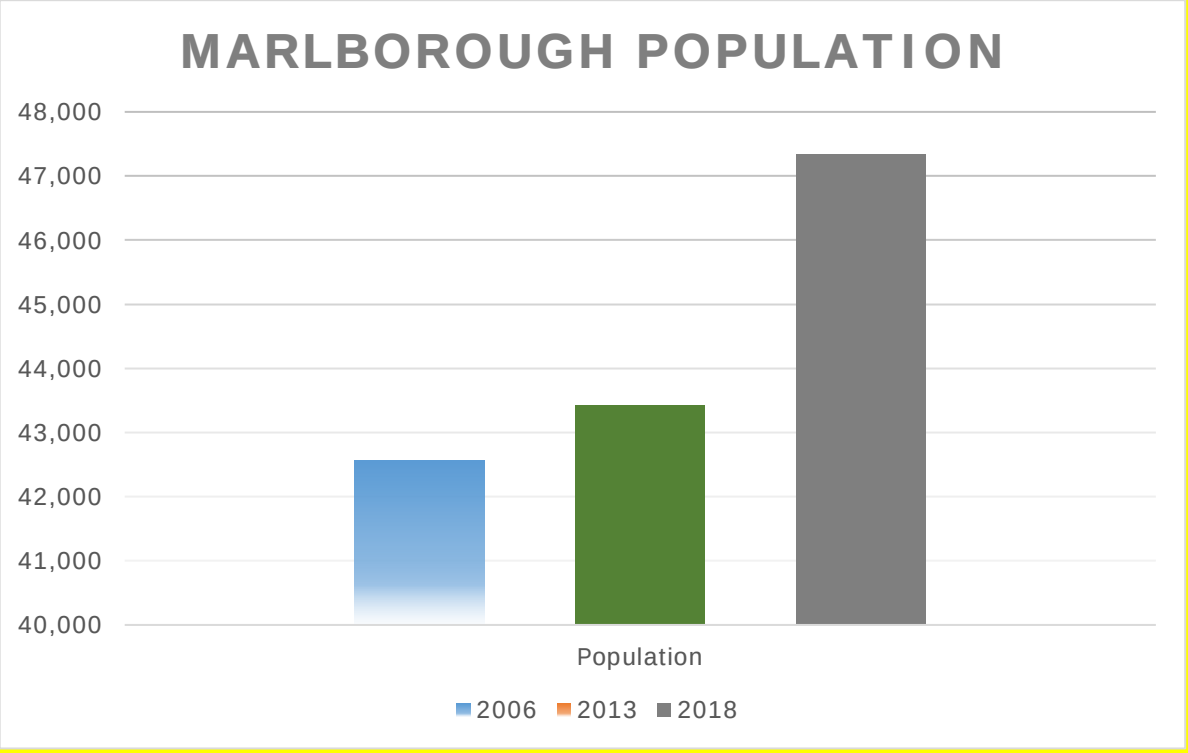



*Figure 3-1 Marlborough Population 2006 – 2013 – 2018.*

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)[2]. 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).

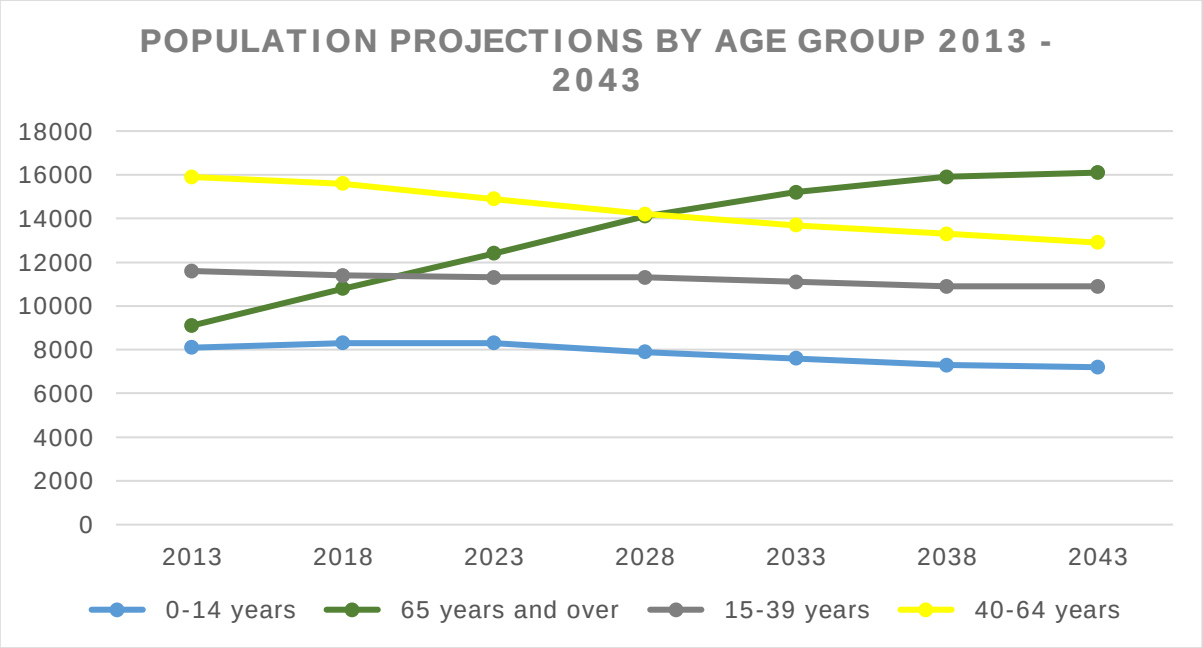



*Figure 3-2* highlights *the population projections by age groups.*

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 wastewater 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.

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

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

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.

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** — Reduced flows in receiving waters effects the dilution rate of treated wastewater discharges. Increased storm events put pressure on capacity of wastewater networks influenced by inflow and infiltration.

**Household Factors** — The Census information is also analysed for other data that may influence wastewater discharge 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.

### 3.2.4 Domestic Wastewater Growth

Councils around New Zealand are beginning to introduce customer demand management through initiatives such as sustainable water use and grey water recycling strategies. These have primarily been initiated by a limit in the capacity of either the water or wastewater system requiring a substantial infrastructure upgrade. Demand management helps to defer the costs of capital expenditure.

Sustainable management of resources (including water) is central to the purpose of the Resource Management Act.

Demand management is becoming important to the water supply activity due to the limitations of source water for some settlements, particularly Renwick and Havelock. Figure 3-3 (components of urban wastewater flow) shows that in some reticulation systems the contribution of 'legitimate' wastewater to the total sewer flow is relatively small. The inflow and infiltration component is a significant contribution to the total flow of wastewater. Currently the sewer flow management strategy may be more effectively targeted towards inflow and infiltration management rather than domestic wastewater demand management. The relative costs and benefits of each is reviewed to ensure efficiency.

### 3.2.5 Increased Tradewaste

#### Blenheim Treatment Plant

Certain industries create large volumes of liquid waste with high organic content. These require far more treatment than normal domestic sewage and can quickly overwhelm the treatment capacity of a plant designed for an urban population.

The huge success of the Marlborough wine industry has created challenges for the Council. During vintage there is a ten-fold increase in the discharge of trade effluent from the wineries. The total load on the Blenheim wastewater treatment plant is five times as much as normal. For a few weeks between March and May each year the wastewater treatment plant is required to process a load equivalent to the wastewater produced by 120,000 people. In terms of wastewater Blenheim becomes the fifth largest city in New Zealand.

To meet this demand the treatment plant has undergone a number of upgrades. Capacity was significantly increased in 2009 with the addition of an advanced dissolved air flotation (DAF) treatment plant. Tertiary treatment wetland ponds (established in 2013/14) improve the quality of the final discharge and allows a portion of the final effluent to be returned to irrigate the land.

The Council is committed to ongoing communications with industry to ensure infrastructure is provided to meet future demand. The timing of upgrades can be difficult to ascertain due to some commercial sensitivity within the industry and external factors affecting worldwide demand for Marlborough wine. Circumstantial evidence such as the development of new vineyards and resource consent applications for additional winery capacity also assist forward planning. The funding methodology is agreed with the industry in advance of the works.

Treatment solutions are designed to meet the growth forecasts whilst maintaining maximum flexibility and efficiency during the yearly cycle.

**Picton and Havelock Treatment Plants**

The smaller treatment plants at Havelock and Picton have limited capacity to deal with additional trade waste growth. This can be an issue for industries such as seafood and meat processing. Processing can add value to exports and create jobs, but early consideration needs to be given to the treatment of the associated liquid wastes.

A seafood processing plant closed down in Picton in 2011. The processing capacity released at the Picton wastewater plant has been partially used by increased growth from other sources. Careful consideration would be required if a similar facility was proposed in future.

Similarly tradewaste from seafood processing has become a more significant factor at Havelock. Sampling of the influent at the treatment plant and the performance of the plant has indicated occasional but very high peak loads. Investigations were undertaken and a new seafood processing plant was identified within the Havelock Port industrial area. Assets and Services staff have worked with the factory to control their discharges to a manageable level. The new treatment plant will be better equipped to deal with the spikes in loads but is likely to need assistance from discharges with on-site treatment to better manage these spikes.

### 3.2.6 Inflow and Infiltration

The sewerage system has been designed and built to collect the wastewater from domestic and commercial properties and exclude stormwater. However, the ingress of stormwater and groundwater into the sewer network is an increasing issue facing the wastewater activity over the next few years. Inflow and infiltration is derived from a number of sources and can prove difficult to manage:

- Inflow from illegal rainwater connections on private property are difficult to trace.
- Infiltration from groundwater will vary depending on the level of the groundwater table and the prevailing weather conditions.
- An ageing sewer network can present a number of opportunities for stormwater infiltration - pipe joints, cracks or holes in the barrel of the mains, service connections, manhole structures submerged manhole covers, etc.
- Identifying whether the sewer mains or laterals are the prime source of the infiltration.

In recent years reliable flow measurement and mathematical modelling of the sewer network has enabled evaluation of the components of wastewater flow.

A detailed analysis of the Ida Street catchment in central Blenheim shows the flows in sewers during peak flow are greatly influenced by inflow and infiltration of stormwater and groundwater (see Figure 3-1). In storm conditions around 70% of the flow in the wastewater sewers is from rain derived inflow and infiltration (RDII).

Investigation of I & I is incorporated into the operational budget and is projected to become an increasing element as the asset base ages.

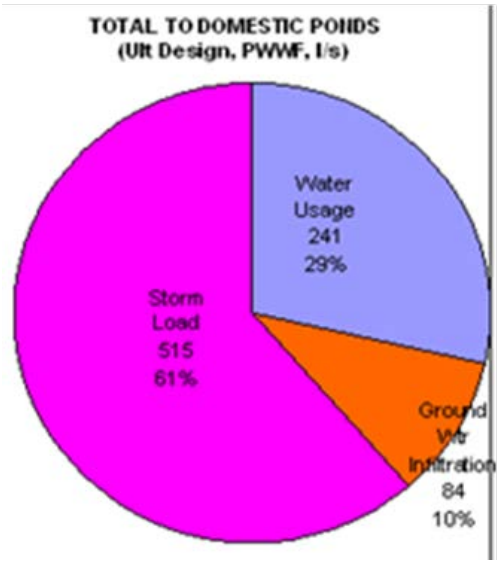



*Figure 3-3 Components of urban wastewater flow.*

Further detailed models continue to be developed for sub-catchments in both Blenheim and Picton. The individual characteristics such as age and condition of the pipe network and the level of the water table within the ground influences proportions of inflow/infiltration and wastewater. There is significant variation between areas and it can be difficult to recognise repeatable patterns or trends. Each catchment is separately evaluated and the conclusion discussed with the Operations & Maintenance Engineer to identify the sources and programme remedial works.

The impact of inflow and infiltration is further evidenced by the information in Figure 3-2 which has been derived from actual flow data from the Ida Street catchment in Blenheim. The blue area of the graph shows the diurnal pattern of urban wastewater flow as households undertake their routine washing and sanitary activities. The green peak is the instantaneous inflow of rainwater during or immediately after the storm — probably originating from illegal downpipe connections or leaking surface features. The amount of infiltration increases following a period of rain as groundwater levels rise. The sewer flows decrease over a number of days as the groundwater drains away. The red area is the constant infiltration of groundwater seeping in through leaky infrastructure.

As the wastewater reticulation ages, stormwater is able to seep into leaky joints. The levels of service are challenged when the ingress of stormwater into the sewerage system causes sewage overflows during severe storms, with subsequent insanitary conditions and pollution of waterways. Reduction of stormwater infiltration and improved resilience of the pipe network to earthquake damage are two major benefits from a well targeted renewals programme.

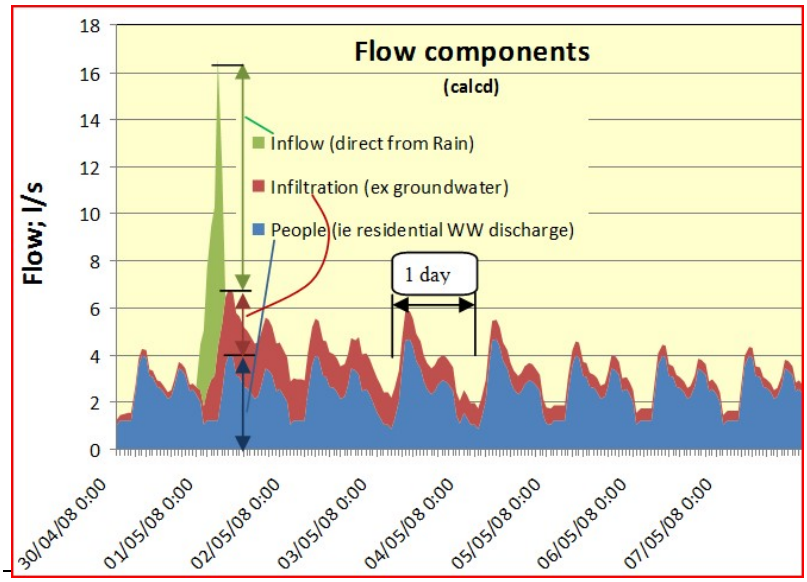



*Figure 3-4 Sewer flows showing the impact of inflow and infiltration.*

The management of inflow and infiltration offers the most opportunity for resolving current and future capacity issues. However, identification and remedy of rain derived inflow and infiltration presents a number of engineering challenges, as outlined below.

***Identification*** — Identification of the source of the inflow/infiltration is time consuming and expensive, and the efficacy can be difficult to evaluate as the flow will vary depending on the weather and prevailing groundwater conditions. Inflow and infiltration have very different characteristics and causes, so a range of solutions is required.

***Persistence*** — Inflow and infiltration (I & I) management requires a sustained, continuous effort that will increase as the average age of the reticulation increases, and the structural condition deteriorates over time.

***Benefit/Costs*** — I & I rehabilitation techniques are relatively costly and need to be weighed up against the residual value and remaining life expectancy of the asset. Installing patches on leaking infrastructure does not increase its overall life expectancy.

***Ownership*** — Generally the Council owns all the sewer pipes in the public highway as well as a limited number of pipes in private land and private rights of way which the Council accesses and maintains through legal easements.

Wastewater pipes within a property's boundary which connect houses to the mains are owned by the householder. Maintaining the privately-owned pipes is therefore the responsibility of the property owner. However, the owner rarely experiences any problems associated with the I & I on their pipes and therefore has little incentive to undertake repairs. Currently Council relies on powers under the Building Act and the standards in the Building Code to instigate repairs although this has seldom been invoked to date. A number of New Zealand councils recently discussed how to resolve I & I on private sewers connected to Housing Corporation houses. Some Councils have opted to fund the renewal/rehabilitation of these pipes as the most practical way to achieve the required outcomes.

***Uncertainty*** — There is high level of risk with I & I management. Finding and fixing points of infiltration may simply cause accelerated infiltration at the next weakest point in the pipeline with little or no reduction in overall flows.

The provision of good quality flow data has improved for some, but not all, sewer catchment areas and the extent of inflow and infiltration will continue to be a work in progress.

### 3.2.7 Deterioration of On-site Schemes

On-site sewage treatment through septic tanks and soakage fields has been a traditional method of disposal in rural areas. This technique can be compromised by the spread of urban development and infill onto soakage fields, poor soil percolation, poor maintenance, and outdated systems.

People living on lifestyle blocks and in settlements on the urban fringes often seek to connect to the reticulated network.

The introduction of reticulation to an area can be a catalyst for further development. Growth occurred in Renwick following the installation of wastewater reticulation in 2006 and this trend is now occurring in the Grovetown area following the construction of its sewerage scheme.

Burleigh and other parts of St Andrews are planned to be added to the Blenheim network.

### 3.2.8 Climate Change

The three most significant impacts for wastewater services are outlined below.

- Marlborough's wastewater treatment plants can continue to operate with a 300mm increase in sea level rise, as is predicted to occur over the next 30 years. However, the existing wastewater treatment plants will be seriously impacted by 700mm of sea level rise, which is predicted to occur by 2100.
- Rising water tables will affect the Council's ability to continue irrigating land with treated wastewater from the Blenheim wastewater plant (when the land is too wet and/or the water table is high.)
- More frequent and intense storms will increase the risk of sewer overflows in urban areas via stormwater leaks into the sewer reticulation.

### 3.2.9 Resilience to Earthquakes

A significant earthquake in the next 50 years (on the Alpine Fault) has a 50% likelihood of occurring, and an 85% likelihood of occurring over the next 100 years. This event could be ten times more powerful than the November 2016 event, with shaking lasting up to six minutes (compared to up to two minutes during the Kaikōura earthquake).

To prepare for such a large earthquake, new infrastructure is being built to high standards, and emergency power generation is provided.

Fault lines will need to be avoided when developing land and installing infrastructure. Slumping and liquefaction are also becoming more significant considerations when planning future urban development.

The most significant implications of earthquakes for wastewater asset management are outlined below.

- The wastewater treatment plants at Blenheim and Havelock are located on the coastal plain. Tsunami inundation is a risk, as is ground movement and liquefaction on river/coastal soils.
- Many pump stations have been upgraded to resist the effects of ground shaking but significant damage could be expected from a very large event.
- Modern plastic pipe materials are more resistant to damage from ground shaking. However, around 77 km of pipe, 25% of the reticulation network (valued at approximately $45.6M) are over 50 years old.
- Ground movement may affect gravity pipelines laid to shallow gradients on the Wairau Plain.

The Council is prioritising the replacement of pipework and other assets made of older materials that are susceptible to natural hazards or have deteriorated more quickly than anticipated.

Our financial planning is another way we can recover as quickly as possible from emergency events, by ensuring we have financial reserves, flexible capital programmes and insurance to meet the expected losses.

### 3.2.10 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[3]. 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. Capacity of existing wastewater networks is an issue in some Blenheim growth pockets. However, pipeline upgrades will be required to convey wastewater from the new growth areas. Upgrade 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 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.

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

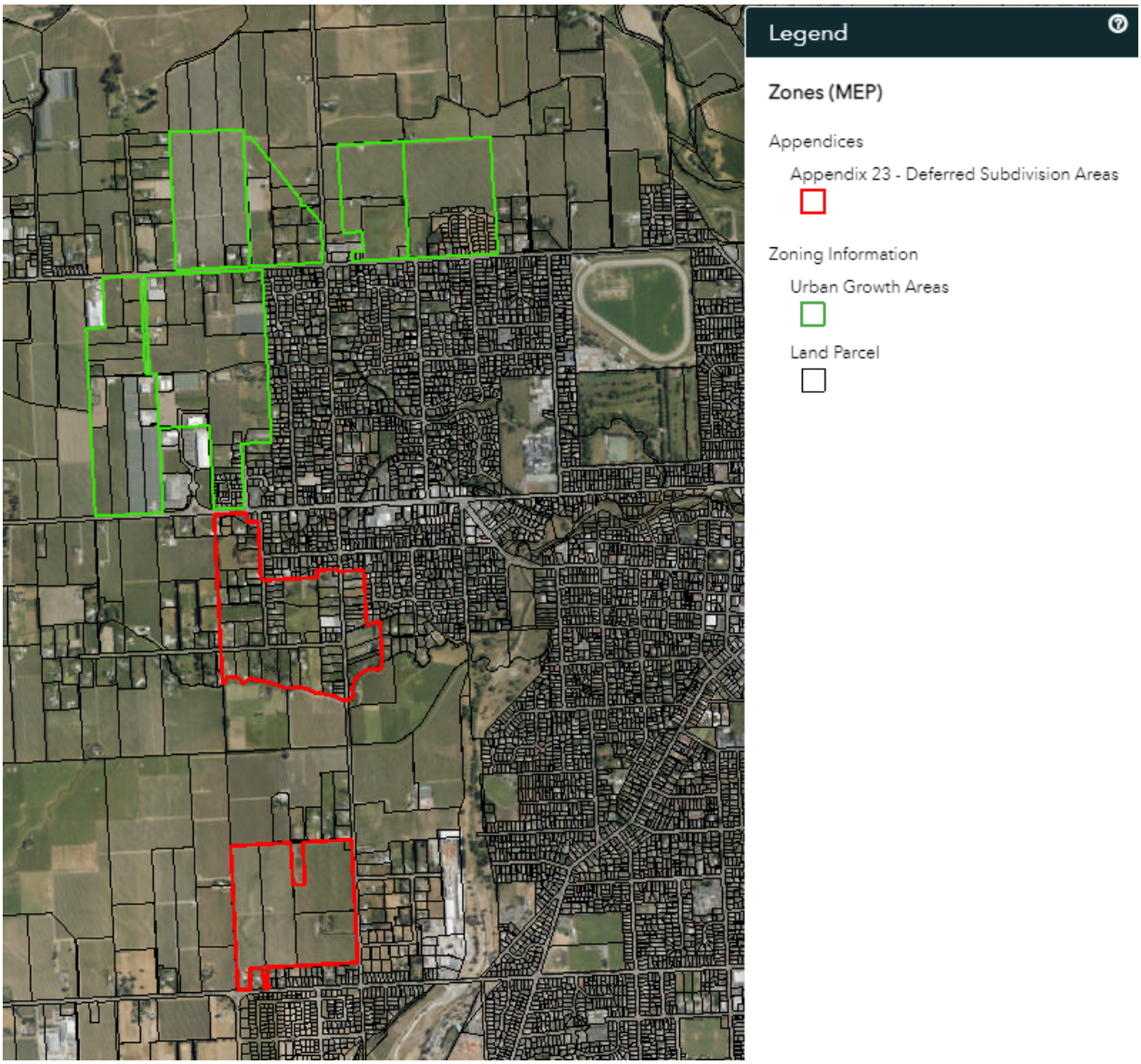



*Figure 3-5 Urban growth pockets in Blenheim – improve map quality.*

Growth pockets have also been identified around Renwick. Some small local wastewater upgrades may be required to accommodate the extra flow. The main pump station and trunk main connection to the Blenheim reticulation will be adequate for the anticipated growth but will require additional storage capacity to balance peak flows during storm events. Budget has been included for this work in 2021-2024.

The effects of demand on the wastewater assets are considered in terms of treatment and reticulation for the network areas.

## 3.3 Demand Impact on Assets

### 3.3.1 Blenheim Treatment

The Hardings Road sewage treatment plant receives the domestic influent stream from the Main Outfall Pump Station (MOPS) and the Grovetown/Spring Creek townships. The industrial influent from IMOPS, the Riverlands Industrial Estate and Cloudy Bay Business Park arrives at the Industrial Inlet Screens.

In the early treatment stages the influent streams are generally kept separate and they progress through different treatment streams. The plant is configured with a number of bypasses and cross-connections to permit interconnectivity and flexibility of the operational processes. The treatment streams combine in Pond 6 and pass through the wetland ponds.

The treatment plant has gone through a number of major upgrades to meet demand. Most recently eight new ponds were constructed as a tertiary wetland treatment process, and a new outfall and pump station was installed to discharge final effluent to the Wairau Estuary. An irrigation pump station was incorporated into the design to facilitate the recycling of final effluent to over 200 hectares of adjacent farmland when conditions permit. The upgrade was commissioned in 2014.

In 2017 a major technical review of the treatment plant was undertaken by specialist consultants. The review examined the current performance of the plant against design and actual flow loads and estimated future performance against the most likely growth scenarios. The report recommended a number of improvement options to ensure the plant continues deliver a high quality final effluent. A high level benefit/cost analysis was calculated on engineering criteria and the estimated net present value of the costs of each option. Upgrade projects are planned over the 2021-30 period at an estimated cost of $41.6M. Desludging works are also underway and are anticipated to be completed by 2025 at a cost of $7.8M.

### 3.3.2 Blenheim Reticulation

Mathematical hydraulic modelling of the Blenheim reticulation identified a number of inadequacies based on current growth projections. The growth pockets to the north and west have combined with existing inflow and infiltration problems caused by the high groundwater table and leaky reticulation in Springlands.

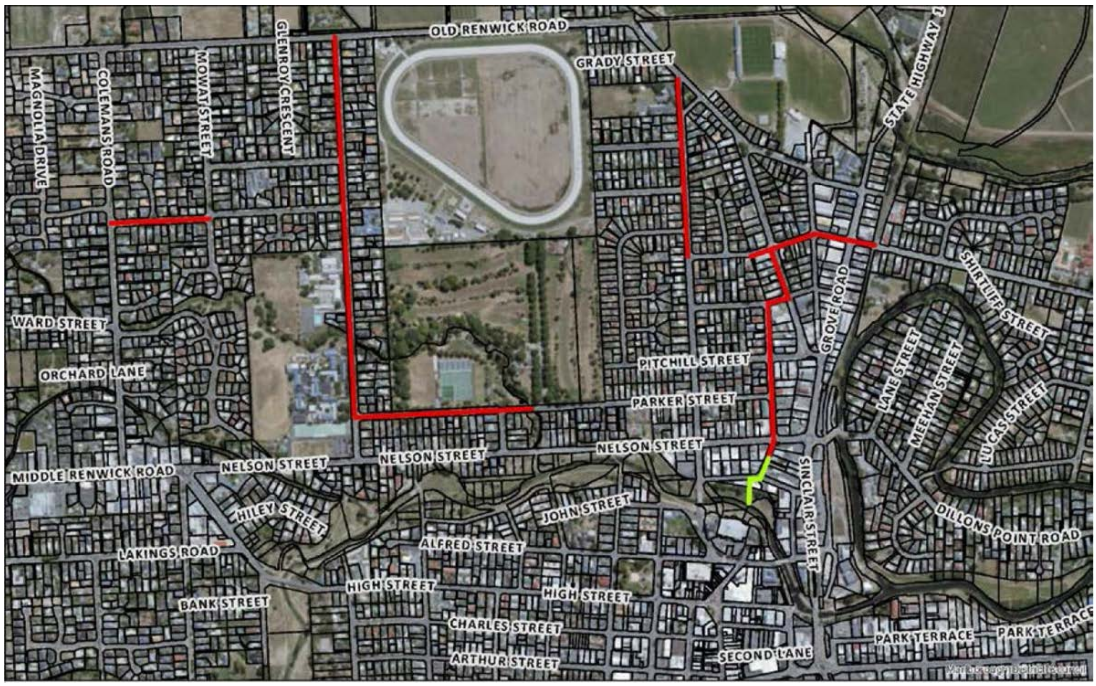



*Figure 3-6 Solution to renew sewer mains in Blenheim.*

Construction on the Blenheim Sewer Upgrade began in 2020 and is expected to be completed in 2022 at a cost of $11.5M.

### 3.3.3 Picton Treatment

Picton is not anticipating growth at the same rate as Blenheim. Considering this, additional flows from inflow and infiltration and potential for new industrial development, a project to duplicate the existing aeration basin at Picton sewage treatment plant has been budgeted for 2026-27.

### 3.3.4 Picton Reticulation

The current design philosophy accepts that in severe storm conditions some overflows will be inevitable and controlled overflow points should therefore be designed into the reticulation. The new main Dublin Street pump station flows which are in excess of a one in two year storm will overflow through a fine screen and UV disinfection process before being pumped to the main outfall. Flows in excess of a five year ARI will overflow through the screens only and discharge to the storm-swollen Waitohi Stream. This is a marked difference to traditional design that assumed stormwater could largely be excluded from the wastewater network. Resource consents have been obtained.

In 2017 work commenced on the upgrade of the gravity trunk sewer from Waikawa to the main terminal pump station at Dublin Street. New pump stations were built at Surrey Street, Fishermans Reserve and Dublin Street along with the treatment facility and outfall.

Minor sewer renewals have been identified in Waikawa and the Dublin Street catchments. These projects are underway at a budgeted cost of $2 million.

### 3.3.5 Havelock Treatment

The application for a five year extension to the existing Havelock STP resource consent that expired in May 2018 was dealt with through the issuing of a new consent, expiring in February 2024. The additional time is being used to acquire the land, design and build an upgraded plant.

The location of the existing treatment plant is not suitable for redevelopment due to the potential for liquefaction in the event of an earthquake and its exposure to flood risk. The new site is elevated and could allow the possibility for future discharge to land.

Recent problems caused by excessive BOD loading from a seafood processing plant at the port have demonstrated the current limitations of the current plant to accommodate significant tradewaste. While a new treatment plant will not deal with all of the spikes, on site treatment at significant contributors will improve the cost and level of treatment required at the new treatment plant.

#### Havelock Reticulation

A hydraulic model for the Havelock Wastewater Network has been built and is being calibrated and verified by Council staff. This will assist in identifying the most efficient renewals programme.

#### Seddon Treatment

Anticipated demand growth in Seddon is very low and there are no asset upgrades planned for growth. A time extension of the resource consent has been applied for, and early planning has commenced for the upgrade of the treatment plant to meet new consent conditions and to enable disposal of effluent to land. Gully erosion close to the eastern edge of Pond 1 will need to be remedied to ensure the long term resilience of the plant.

#### Seddon Reticulation

A hydraulic model for the Seddon Wastewater Network is being built, calibrated and verified by Council Staff. This will assist in identifying the most efficient renewals programme.

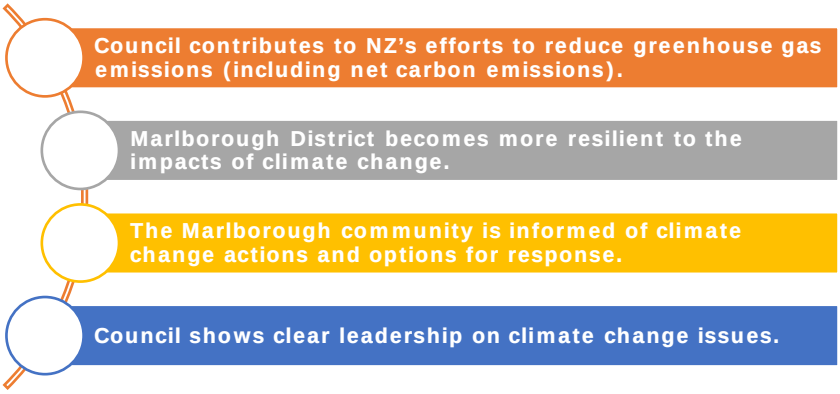
### 3.3.6 Climate Change

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.

Stormwater infiltration into the wastewater network becomes a more significant problem during storms and when groundwater levels are high. Climate change is likely to make this problem worse as storms are predicted to become more intense and more frequent.

Hotter drier summers will have an impact on the bacteria and algae used in the wastewater treatment process, because they both require dissolved oxygen in the wastewater to effectively process the waste into treated effluent. Dissolved oxygen decreases as the temperature of the ponds increases. Additional aeration plant may be required to increase the oxygen in the treatment ponds.

The Blenheim Sewage Treatment Plant includes a facility to recycle a portion of the treated effluent to irrigate land. This is only permitted when the soil requires additional moisture and when the groundwater levels are low enough to prevent surface ponding. Longer, drier summers may prolong the irrigation season, but rising sea levels may raise the groundwater levels, preventing irrigation.

The Seddon Sewage Treatment Plant discharges to the Starborough Creek which can have very low natural flows. The impact of the discharge on the Creek's water quality may be affected by changes in the volume and temperature of the receiving water. Limitations on the impact on dissolved oxygen in the receiving water are expected to be conditions of the new resource consent at Seddon. Options to discharge treated wastewater to land are being investigated and are intended to be a part of the SSTP Upgrade between 2021-25, budgeted at $14M.

## 3.4 Demand Management Plan

Whole of network monitoring and options for how residents view their water consumption will give them more choices about how they use water. This is likely to smooth the peaks and troughs of wastewater flows, allowing for more economic designs. Greywater recycling and water-efficient appliances will counterbalance the increase in demand from growth.

New treatment processes are being developed and high quality treated effluent discharges are becoming consistently achievable. Many new treatment technologies are becoming 'scalable'.

It may become efficient for small businesses, and even domestic properties, to treat their wastewater. This will reduce both the strength and the volume discharged to sewer and enable recycling of a portion of the greywater for use as irrigation or other uses which do not require potable water.

Evidence from flow measurement studies and the hydraulic modelling of wastewater flows (see Figure 3-3 Components of urban wastewater flow) is highlighting the significant impact of rain derived inflow and infiltration (RDII) on the capacity of wastewater networks. The difficulties and uncertainties of managing RDII have been discussed. The debate will continue in order to strike a balance between the provision of additional capacity through upgraded reticulation or reducing the RDII. Benefit/Cost Analysis or Multi-Criteria Analysis can be usefully employed to evaluate the various techniques and assist with decision making.

Management of tradewastes will continue through discussion with the main industries and close cooperation of the staff involved in urban planning, economic development and the Assets and Services functions within the Council.

The extension of reticulated services to peripheral urban areas such as Burleigh and St Andrews are included in the 10 year budget in years 2024-27 for $8.86M and 2023-26 for $1.05M respectively.

The Water and Sanitary Services Assessment 2018/2019 looked predominantly at water supplies but did identify that over 2000 people are reliant on a septic tank or other wastewater system across the region.

The constituent elements of growth in demand for wastewater services are understood and included in feasibility and design planning. However, because of the complexity of the inter-relationships between the component parts, demand assessments are often simulated through hydraulic models. Changes to parameters can be readily modelled and the sensitivity of the proposed solutions can be tested. The results of the sensitivity analysis are assessed with respect to the criticality of the asset and the lead time from conception to commissioning of each project. Decisions can then be modified and updated based on the most recent predictions or changes in the political/economic environment.

## 3.5 Programmes to Meet Demand

The main capital investments related to growth are summarised in Table 4-10 Major budgeted Capital Projects.

| Description | Budget cost | Growth % | Programmed start |
|---|---|---|---|
| Battys Road Pump Station Upgrade | $4.42M | 80% | 2027 |
| Renwick Pump Station Upgrade | $1.195M | 100% | 2026 |
| North West Pipeline Uprgrade | $0.59M | 59% | 2023 |
| Burleigh Pump Station Upgrade | $6.92M | 75% | 2023 |
| MOPS to BSTP Pipeline Upgrade | $3.53M | 80% | 2027 |

*Table 3-1 Capital projects with a growth element > 50% budget.*

### Direction from the Infrastructure Strategy

(i) **Residential demand** — The preferred option to respond to increased demand related to urban growth is to install a conventional sewerage system within new subdivisions, and upgrade downstream infrastructure as necessary. Conventional gravity sewerage with pump stations is preferred. Modern materials and installation quality will minimise inflow and infiltration problems.

The benefits of this approach are that wastewater disposal was considered at the outset of the Urban Growth Strategy and selection of growth pockets, and relatively minor downstream upgrades are required. Downstream upgrades will also help to resolve some levels of service issues with inflow and infiltration.

A cost of this approach is that some upgrades will lead to premature replacement of functioning assets. On-site sewerage will be installed by the developer to an agreed services plan. Council will collect and distribute development levies to fairly allocate the costs of over-sized infrastructure that a developer may incur for the benefit of subsequent development.

The costs of downstream upgrades have been estimated and included in a revised development contributions model.

(ii) **Tradewaste demand** — Continue monitoring of grape effluent volumes and strengths is undertaken each year during the vintage. Upgrades of Industrial Treatment processes are planned for the Blenheim Sewage Treatment Plant between 2021-30.

Continue communication and consultation with industry representatives and individual businesses to ensure infrastructure is provided to meet demand and an equitable funding mechanism to cover these costs.

The benefits of this approach are that the local economy will be able to grow, supporting local jobs and prosperity.

The costs of upgrading the Blenheim STP by 2030, between upgrade to residential and industrial treatment upgrades and desludging will be approximately $49M. The Council will begin the consultation around the design options for the upgrades and desludging starting with iwi initially.

# Chapter 4: Life Cycle Management Plan

The life cycle management plan is a coherent plan to deliver the best value for money for the assets' owners whilst providing satisfactory service to the customers. The plan seeks to anticipate future requirements, manage risks and optimise decision making throughout the assets' lives.

## Components of the Life Cycle Management Plan

4.1 Background Data — physical assets, asset capacity/performance, asset condition and asset valuation

4.2 Infrastructure Risk Management

4.3 Routine Operations & Maintenance

4.4 Renewal/Replacement

4.5 Creation/Acquisition/Augmentation

4.6 Disposal

The life cycle of an asset follows the progression shown below.

| | |
|---|---|
| **Planning** | The process of preparing for a new asset, or non-asset solution, to a service delivery issue. Service delivery issues may derive from growth, a current or anticipated failure to meet levels of service or to replace a failing or obsolete asset. The planning process involves engineering expertise, legal compliance and community engagement to size, locate, programme and operate with consideration to design options, whole life costs, risks and non-asset alternatives. |
| **Creation** | The purchase, construction or vesting of an asset to the Council.<br>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 a continual, effective and efficient service to the customer. Maintenance is the proactive and reactive repair and servicing of assets. It is undertaken with respect to the 'criticality' of the assets and the overall quality of the service delivered. |
| **Rehabilitation** | Proactive restoration of assets to extend the serviceability and ultimate life expectancy in a cost-effective manner. |
| **Renewal** | The controlled replacement of assets that have reached the end of their useful lives. |
| **Disposal** | The removal of redundant assets by decommissioning, physical removal, sale or reutilisation for an entirely different purpose (eg, using decommissioned sewer pipes as cable ducts). |

*Table 4-1 Typical Life-cycle of Assets.*

### 4.1.1 Background Data

## Physical Assets

Marlborough District Council owns and operates four wastewater treatment plants — Blenheim, Picton, Havelock and Seddon (the plant at Spring Creek was decommissioned in 2009 but remains in the network and provides basic treatment and storage for the sewage pump station which discharges to the Blenheim Sewage Treatment Plant). The Blenheim sewage treatment plant at Hardings Road is served by reticulation networks from Blenheim, Renwick, Grovetown, Spring Creek, Riverlands and Cloudy Bay Business Park. The infrastructure is summarised in Table 4-2 and includes 62 sewer pump stations and 1203 sewer grinder pumps. The asset base has grown considerably over the last 10 years to meet the growth in wastewater (domestic and industrial) and the higher standards expected by an increasingly environmentally conscious population.

In some areas the grinder/pump system has become favoured over traditional gravity sewer mains. This relatively new technology requires every property to have an individual mini-pump station installed on their lateral connection. It has been adopted at Grovetown and around the David Street/Severne Street area of Blenheim as the high groundwater table and flat gradient has made the installation the most viable option.

The following table provides a summary of the Council's wastewater systems.

| Area | Sub Area | Treatment Plants | Biofilters | Pump Stations | Grinder Pumps | Mains (km) | Connections |
|---|---|---|---|---|---|---|---|
| Blenheim | Blenheim | 1 | 3 | 37 | 57 | 198.3 | 7953 |
| | Grovetown | | | | 1146 | 17.0 | 833 |
| | Spring Creek | | | 2 | | 3.6 | 142 |
| | Renwick | | | 1 | | 15.0 | 833 |
| | Riverlands | | 1 | 5 | | 11.5 | 121 |
| Havelock | | 1 | | 6 | | 9.7 | 293 |
| Picton | | 1 | | 9 | | 49.7 | 1644 |
| Seddon | | 1 | | 2 | | 7.3 | 189 |
| TOTAL | | 4 | 4 | 62 | 1203 | 312.1 | 12008 |

*Table 4-2 Summary of wastewater infrastructure.*

## Reticulation

Some of the broad attributes of the pipelines in the reticulation network are outlined below.

**Materials** — The material type of the sewer network tends to reflect the era in which the pipes were laid. The common material available for sewer pipes during the early years of urban development in Marlborough was generally the earthenware and glazed vitreous china. This was particularly favoured for the smaller diameter mains. The 1950s to early 1970s saw the ascendency of asbestos cement (AC) as the preferred material. During the late 60s AC began to be replaced by plastic materials led by PVC and later the polyethylenes. Concrete has been a popular material throughout the whole period but has more commonly been used for larger diameter mains (see Figure 4-1.)

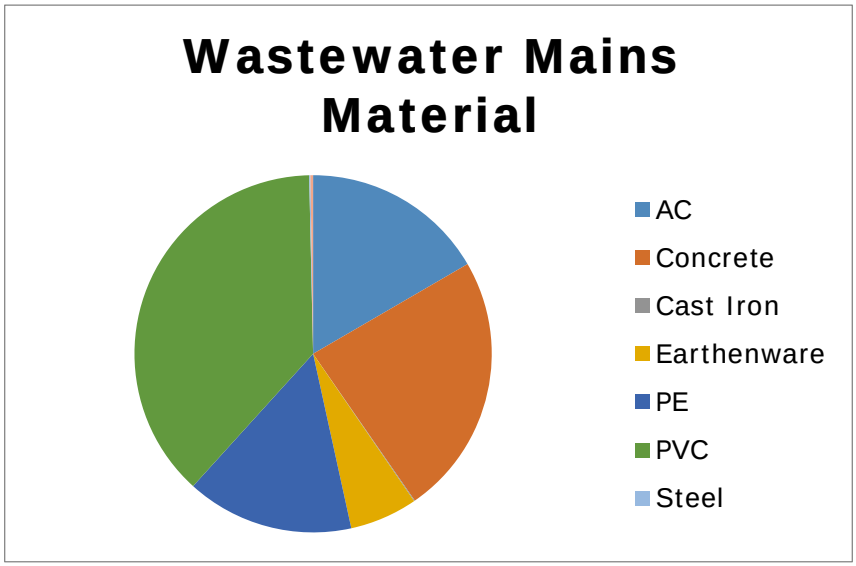



*Figure 4-1 Pipe materials in the wastewater reticulation.*

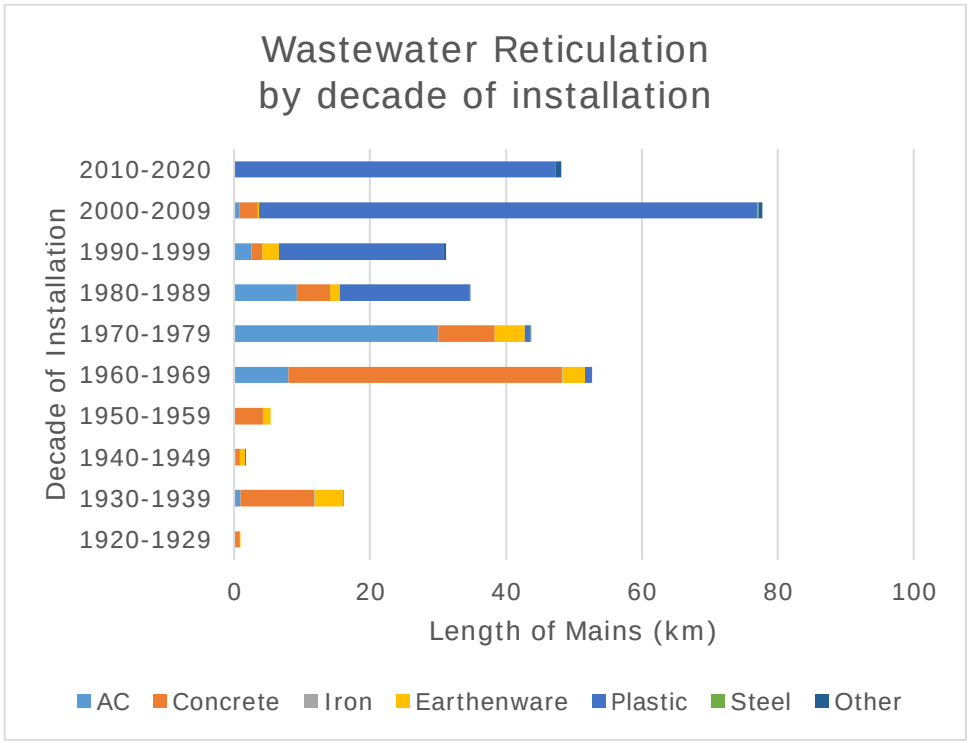



*Figure 4-2 Age profile of the wastewater reticulation.*

**Age** — most of the sewer reticulation in Blenheim and Picton is first generation pipework and was installed to serve the adjacent properties as the settlement grew. Some of the assets in the older central urban areas have required upgrade or renewal and the linkage between property age and pipe infrastructure has been broken. As the treatment plants have been developed, newer trunk mains have been installed to connect them to the settlements. The smaller settlements such as Havelock, Renwick and Grovetown developed without a reticulated wastewater service and pipework was fitted retrospectively when on-site treatment became untenable. The large spike in pipe installed between 2000 and 2010 was partially due to the reticulation of Renwick and Grovetown (Figure 4-2).

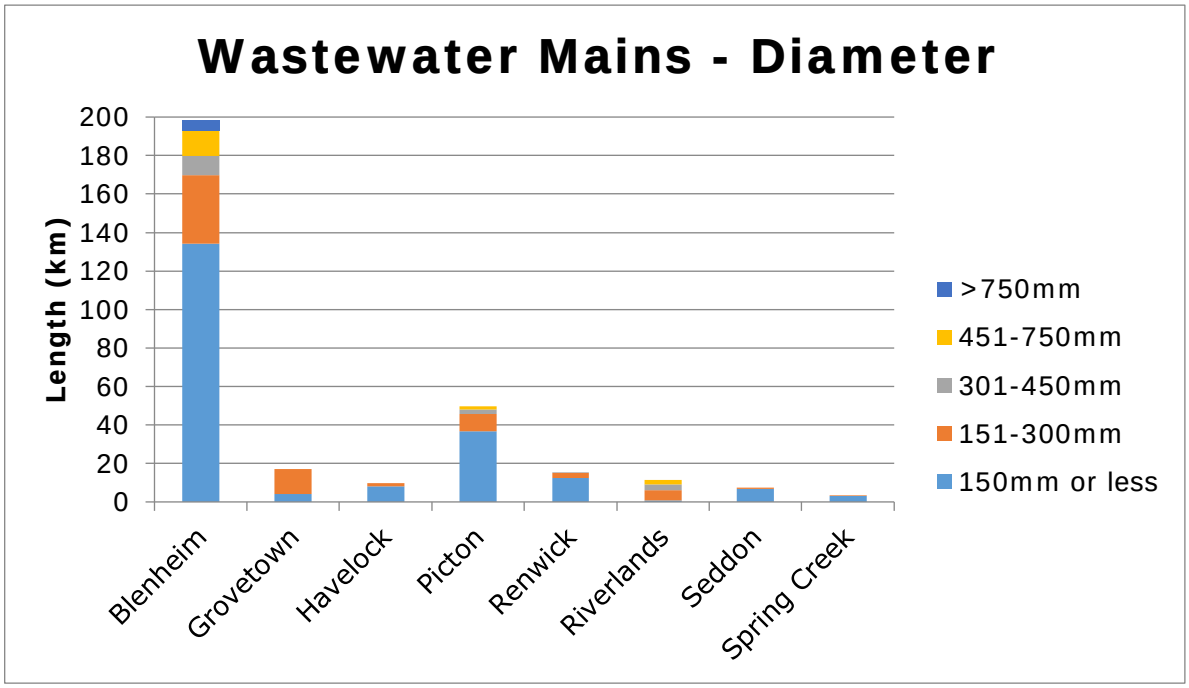



*Figure 4-3 Wastewater mains - nominal diameter.*

**Diameter** — most of the sewage network (66%) is made up of 150mm diameter or smaller diameter pipes. Typically these are the wastewater collection mains laid in suburban streets. Around 20% of the network is comprised of medium (200mm–375mm) diameter pipes whilst only Blenheim, Picton and Riverlands require pipes greater than 400mm diameter to cope with the greater flows from the population and industry.

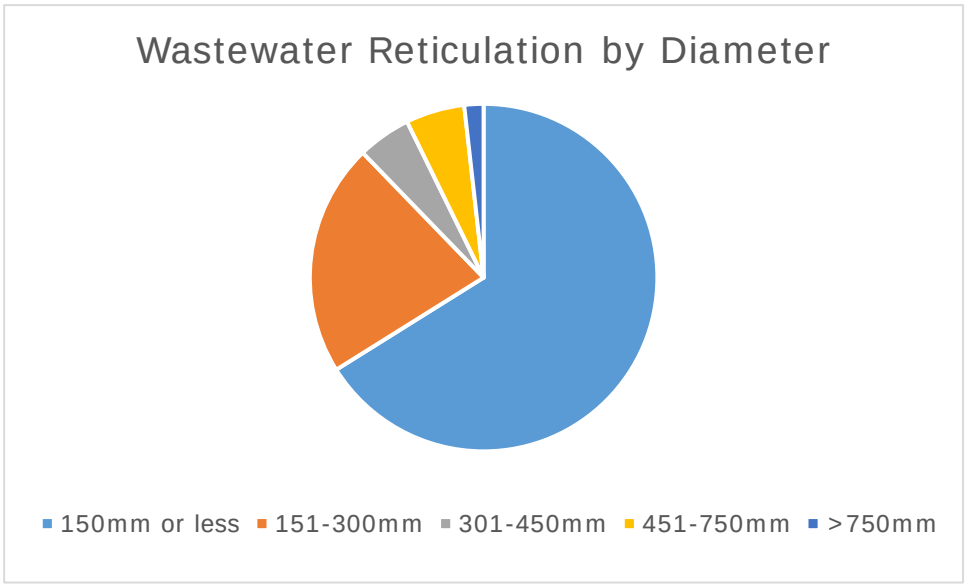



*Figure 4-4 Wastewater reticulation by diameter.*

Around 60% of the wastewater serves the population of Blenheim and a further 16% is installed in Picton. When Grovetown was reticulated with a grinder pump system in 2010 the network was increased by over 17 km (5%) to connect the township to the treatment plant at Hardings Road.

## Pump Stations

Pump station design and construction has evolved over time and a legacy of older type pump stations remains. Early pump stations were often circular masonry sumps with an internal dividing wall to form a dry well to house the pump(s) and wet-well for the collection of sewage. A concrete or masonry super-structure on the surface houses the electrical switch gear. More recently, designs have tended towards a generic construction with a single wet-well of pre-cast concrete rings with submersible pump(s) that can be raised or lowered on guide rails for servicing or repair. The switchgear is housed in a plastic kiosk on the surface. Whilst the general design has been commonly adopted, the specifics of the wet-well volume, pump and pipe sizing vary to meet the individual loads and circumstances. Around the region there are a number of unique, purpose-designed pump stations, eg, Springlands Green and the Main Outfall Pump Station (MOPS) at Riverlands.

Details of the pump stations are recorded in the asset management information system (AMIS) and maintenance and performance details are recorded — see Table 4-4. The condition grade of the pump station and its component parts is not formally recorded in fields in the AMIS. Condition grading of complex assets can be too coarse to aid decision making. Maintenance work orders are recorded against each asset as well as maintenance costs. This methodology allows managers to recognise the costs of operating each asset and gives them ready access to the maintenance details.

Following the introduction of the AMIS all routine maintenance is scheduled either based on a calendar or the run-hours of the pumps and machinery.

All pump stations are monitored remotely and controlled through the Supervisory Control and Data Acquisition (SCADA) system. The critical stations are visited to visually inspect and check the operation on a routine basis.

An inspection and high pressure cleaning programme is managed by an engineering officer using specialist contractors on a six monthly basis.

## Bio-filter Odour Beds

Four bio-filter odour beds were constructed and commissioned in 2010 to remedy recurring odour problems from septic sewage in the western relief trunk sewer and the landfill leachate line. A routine maintenance programme is being managed through the AMIS.

| Site | Type | Installation Date | Life Expectancy | Age | Remaining Life |
|---|---|---|---|---|---|
| Brayshaw Park | Civils | 2010 | 40 | 11 | 29 |
| | Electrical | 2010 | 25 | 11 | 14 |
| Polo Field | Civils | 2010 | 40 | 11 | 29 |
| | Electrical | 2010 | 25 | 11 | 14 |
| MOPS | Civils | 2010 | 40 | 11 | 29 |
| | Electrical | 2010 | 25 | 11 | 14 |
| Wither Road | Civils | 2010 | 40 | 11 | 29 |
| | Electrical | 2010 | 25 | 11 | 14 |

*Table 4-3 Odour bed details.*

## Grinder Pump Units

The costs and problems associated with laying conventional gravity sewers in areas with high groundwater levels has led to the adoption of novel alternatives in certain circumstances. Failure of on-site sewage disposal systems in Grovetown led to the design and installation of a pumped reticulation system with each property served by a grinder pump unit. Each unit consists of a mini-wet well installed on the property, with a maceration unit and pump to drive the sewage to the mains and onward to the Blenheim STP. Similar systems have successfully been installed in other peripheral extensions such as David Street, Severne Street and St Andrews.

## Sewage Treatment Plants

The two main sewage treatment plants at Blenheim and Picton have very different histories. The Blenheim plant has evolved into its current form from the original construction through the purchase of the PPCS industrial treatment plant and a number of major upgrades and extensions.

In contrast the Picton STP was newly constructed in 1999. Whilst some modifications and minor upgrades have been installed, it is largely unchanged.

Details about the individual components of the treatment plants are not currently complete in the asset management information system. The facilities and equipment at the treatment plants have been grouped into broad categories for valuation purposes but further work is required to clearly identify and monitor the specific components.

## Asset Capacity/Performance

### Sewage Treatment Plants

The performance of the treatment plants is constantly monitored for operational purposes and to meet the resource consent conditions. The resource consent for each of the plants requires an annual monitoring report to be prepared and submitted to the Council's Regulatory Department. The reports are detailed and analyse the performance of the plants against each of the conditions. Since 2013 the reports have been published on the Council's website for the benefit of all stakeholders. The Regulatory Department return comments or remedial actions as required.

Generally the treatment plants are performing satisfactorily. Abstracts from the conclusions of each of the 2019/20 reports are included below.

**Blenheim:** Treated wastewater at the outlet of Pond 14 was monitored at the required frequency. Ammoniacal nitrogen and faecal coliform concentrations were below the consent limits. While there are no consent limits for metals, concentrations in the wastewater generally met the ANZECC (2000) trigger values for a 99 percent level of protection of freshwater and marine ecosystems.

Overall, the BSTP treatment ponds and wetlands appear to be performing well. While some minor improvements in the sampling regime are required, there is overall compliance with consent conditions.

**Picton:** This assessment is based solely on the physical, chemical and microbiological monitoring as required by Consent U100802. While monitoring of effluent and the receiving environment is only carried out at specific times, it is assumed that the results from this monitoring are representative of effluent and water quality at other times, unless specifically stated otherwise.

Apart from the requirements to sample effluent monthly (noting a problem with the April 2017 analyses), the requirements of Consent U100802 were met in the 2016/17 monitoring period.

**Havelock:** The Havelock STP appears to be performing well with effluent quality within the range expected for the existing pond layout. The pond aerators were used regularly during the reporting period to maintain pond DO concentrations and no odour complaints were received.

The current consent does not include river water quality limits. However, monitoring shows that the STP discharge generally meets the Marlborough Sounds Resource Management Plan (MSRMP) standards for the Kaituna River. The Plan requires that the river be managed for fishery purposes and lists eight water quality standards to be met. It is noted that while the concentration of microbial contaminants in the river, immediately downstream of the discharge, exceeds the MSRMP quality standards, these are exceeded upstream as well. The water quality within the lower reaches of the estuary is impacted by the presence of runoff from farmland and stormwater discharges from the township, as well as the STP discharge.

**Seddon**: The Seddon STP continues to perform well, producing a wastewater quality that is considered typical for the current pond design and layout. The STP does not produce any noticeable odours. The requirements of Consent U060927 were generally met over the 2016/17 monitoring period. However, analysis of all wastewater and receiving water samples, as required by the consent, is recommended.

In preparation for plant upgrade or resource consent renewal, a detailed review of treatment plant performance is undertaken. Additional sampling and monitoring is often undertaken to improve the understanding of the plant operating conditions. A review is currently being undertaken for the Blenheim, Seddon and Havelock treatment plants.

## Sewage Pump Stations & Odour Beds

The capacity and condition of sewage pump stations is kept under regular review. All pump stations are constantly monitored through the SCADA system and alarms alert operational staff to faults or abnormal conditions.

| Locality | Street | Year Installed | Age |
|---|---|---|---|
| BLENHEIM | Colemans Road | 2010 | 11 |
| BLENHEIM | Clearwater Place | 2007 | 14 |
| BLENHEIM | Banksia Place | 2007 | 14 |
| BLENHEIM | Nottinghill Drive | 2007 | 14 |
| BLENHEIM | Battys Road | 2007 | 14 |
| BLENHEIM | Dry Hills Lane | 2005 | 16 |
| BLENHEIM | Battys Road | 2005 | 16 |
| BLENHEIM | Covent Gardens | 2005 | 16 |
| BLENHEIM | Hitaua Place | 2004 | 17 |
| BLENHEIM | de Castro Drive | 2003 | 18 |
| BLENHEIM | Farnham Drive | 2001 | 20 |
| BLENHEIM | Marlborough Ridge Drive | 1998 | 23 |
| BLENHEIM | Cherrywood Park | 1995 | 26 |
| BLENHEIM | Purkiss Street | 1983 | 38 |
| BLENHEIM | Adams Lane | 1978 | 43 |
| BLENHEIM | Brooklyn Drive | 1977 | 44 |
| BLENHEIM | Kingwell Drive | 1977 | 44 |
| BLENHEIM | Budge Street | 1971 | 50 |
| BLENHEIM | Endeavour Street | 1969 | 52 |
| BLENHEIM | Alabama Road | 1969 | 52 |
| BLENHEIM | Colemans Road | 1966 | 55 |

| Locality | Street | Year Installed | Age |
|---|---|---|---|
| BLENHEIM | Houldsworth Street | 1965 | 56 |
| BLENHEIM | Dillon Street | 1965 | 56 |
| BLENHEIM | Budge Street | 1965 | 56 |
| BLENHEIM | Middle Renwick Road | 1963 | 58 |
| BLENHEIM | Nelson Street | 1963 | 58 |
| BLENHEIM | McLauchlan Street | 1961 | 60 |
| BLENHEIM | Bank Street | 1961 | 60 |
| BLENHEIM | Purkiss Street | 1960 | 61 |
| BLENHEIM | Symons Street | 1934 | 87 |
| BLENHEIM | Gascoigne Street | 1933 | 88 |
| BLENHEIM | Lane Street | 1933 | 88 |
| BLENHEIM | Ida Street | 1933 | 88 |
| BLENHEIM | George Street | 1933 | 88 |
| BLENHEIM | Nelson Street | 1933 | 88 |
| BLENHEIM | Stuart Street | 1933 | 88 |
| HAVELOCK | Main Road | 1987 | 34 |
| HAVELOCK | Main Road | 1987 | 34 |
| HAVELOCK | Cook Street | 1987 | 34 |
| HAVELOCK | Wilson Street | 1985 | 36 |
| HAVELOCK | Inglis Street | 1985 | 36 |
| HAVELOCK | Mahakipawa Road | 1985 | 36 |
| PICTON | Lagoon Road | 1999 | 22 |
| PICTON | Beach Road | 1986 | 35 |
| PICTON | Waikawa Road | 1985 | 36 |
| PICTON | Surrey Street | 1974 | 47 |
| PICTON | Waikawa Road | 1970 | 51 |
| PICTON | Waikawa Road | 1970 | 51 |
| PICTON | Dublin Street | 1970 | 51 |
| PICTON | London Quay | 1950 | 71 |
| PICTON | Waikawa Road | 1946 | 75 |
| RENWICK | Pak Lims Road | 2005 | 16 |
| RIVERLDS | Vernon Street | 2015 | 6 |
| RIVERLDS | Vernon Street | 2001 | 20 |
| RIVERLDS | Bristol Street | 1977 | 44 |
| RIVERLDS | Sheffield Street | 1970 | 51 |
| SEDDON | Nursery Road | 2015 | 6 |
| SEDDON | Key Crescent | 1977 | 44 |
| SPRINGCK | Ferry Road | 1986 | 35 |
| SPRINGCK | Ferry Road | 1986 | 35 |

*Table 4-4 Sewer pump station locations and ages.*

The maintenance history and costs are recorded against the pump stations and their component parts. Reports will be generated from the AMIS to show the costs and extent of the work orders. The creation of the reports has not been completed and is included in the improvement plan in Chapter 6. However, maintenance activity is recorded by the operations engineer. Frequent faults are readily identified and fault investigation undertaken.

## Reticulation

Generally, the reticulation has sufficient capacity but there is little redundancy for power failure events or significant increases in inflow and infiltration.

The capacity of wastewater systems is conventionally described by the metrics of average dry weather flows (ADWF), peak wet weather flows (PWWF) and instantaneous flow rates. These are measured or calculated for the key locations on the network and at the inlet to the treatment plant. Modelling technology has developed significantly in recent years and high-quality dynamic models can now continuously predict flows at almost any point on the reticulation over any specified period based on any combination of predetermined catchment and rainfall characteristics.

The Assets and Services Department is well advanced in developing sophisticated dynamic models for the Blenheim and Picton systems. Whilst the ADWF and PWWF remain a useful overall concept of the reticulation, the detail and precision afforded by the model permits evaluation of individual pipes and assets within the reticulation and the treatment process. The models are used to replicate current conditions and to predict future flows based on growth projections. Early versions of the sewer models have accurately predicted flow characteristics of the trunk mains in the two areas. The other reticulation networks have basic models that will be developed in due course.

There are no dry weather overflows from the reticulation and there is sufficient capacity in the systems during normal operation to accommodate the flow. However certain lengths of sewer main surcharge and overflow during storm conditions or due to blockages or broken mains. Sewer overflows in wet weather conditions is a function of both sewer capacity and the rate of inflow/infiltration (I/I) of the network. The issues around managing sewer capacity issues are discussed in Chapter 3 (Future Demand) and overflow issues are discussed in Chapter 2.

Issues with insufficient capacity in the trunk main from Waikawa to Picton during wet weather, resulting in overflows from the pump stations and some manholes during storm events, are being corrected through the Picton Wastewater Upgrade Stages 1-4.

In Blenheim the McLauchlan Street pump station and the north eastern trunk sewer are also subject to surcharging and occasional overflow from the ingress of stormwater. These assets are approaching or have exceeded half of their notional life expectancy and have high risks associated with their failure. These factors are taken into consideration when planning the renewal/upgrade versus implementing an inflow management strategy. The scope of the upgrade of the McLauchlan Street area has been extended and is in progress. The Blenheim Sewer Upgrade now extends to Budge Street Pump Station and surrounding reticulation. This work is due to be completed 2021. This work also provides additional capacity to allow for grown in the north western area of Blenheim.

Overflows from the reticulation at Havelock have been experienced which have mainly been coincidental with an interruption to the power supply or high rainfall. An emergency generator is dispatched from Blenheim but overflows can occur before pumping is restored.

## Reticulation Condition

The most consistent and reliable indicator of the condition of buried reticulation pipework is the age of the pipe. There are many others factors that impact on the condition of buried pipes — material, manufacturer, depth, surface loading, bedding and surround material, pipe-laying workmanship, soil conditions, chemical composition of effluents, ground movement, groundwater level, third party interference, etc. These factors work singly or in combination on the structural integrity of the pipe. They may have a general influence over the whole length of a pipeline or be limited to isolated areas where the factors are concentrated. Failure may occur as an isolated incident or repeatedly along the pipeline's length.

The combinations and permutations of the factors result in a complexity of failure modes. From a relatively small data set it is difficult to spot trends and make predictions on the life expectancy of a pipeline. Subsequently, the decisions on repair or renewal rely more upon the

judgment of the engineers than statistical analysis. Advanced asset analysis will continue to be considered but only deployed where value is added to the decision making process.

The total reticulation network has 312 km of mains over eight networks. The Assets and Services Department is fortunate to have a stable core of operational staff with many years of experience. Staff have a reasonable understanding of the relative performance of each of the networks and have built up knowledge of the pipework and assets.

When assessing the renewal profile for wastewater reticulation, the remaining life is considered initially, then the following data is also considered:

- Maintenance history, number of tasks and dollars spent.
- Capacity, areas where pipe capacity is or likely will require upgrade from our hydraulic models.
- Criticality of the mains.
- Other planned infrastructure work being undertaken nearby that requires co-ordination, eg, roading reseal programmes.

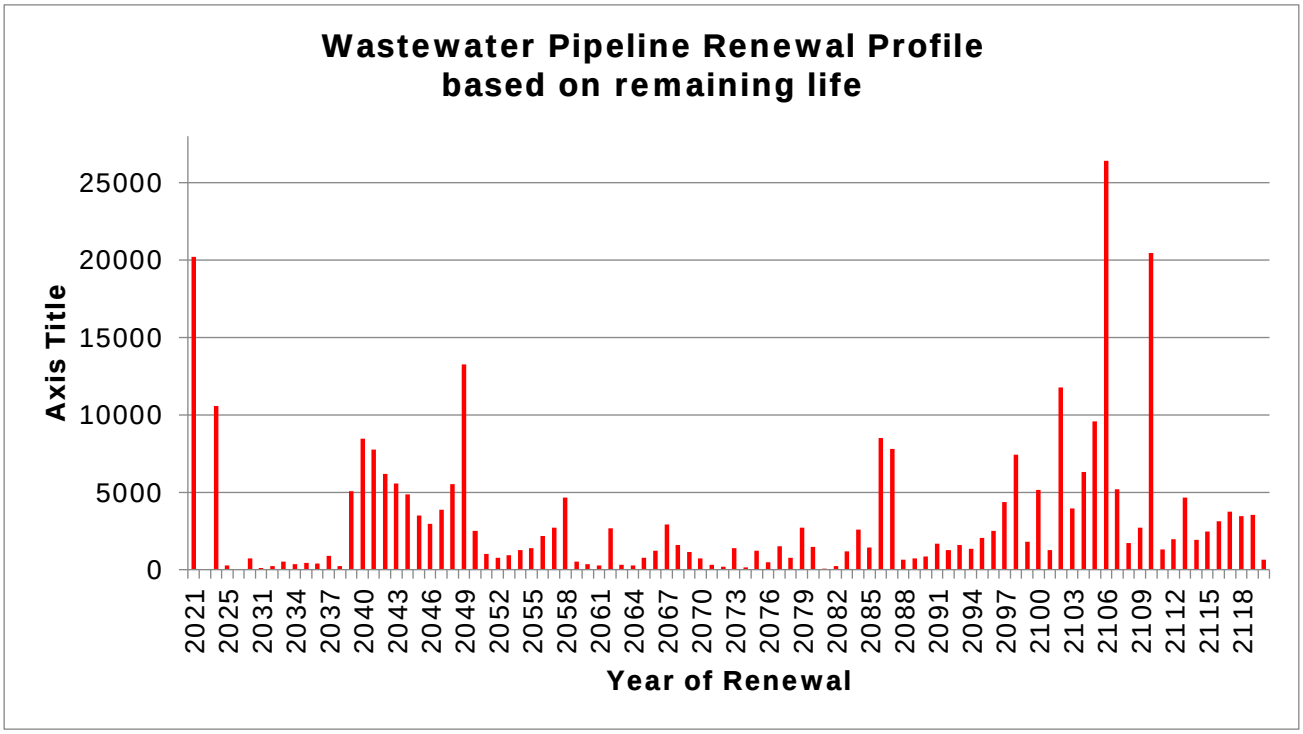



*Figure 4-5 Wastewater Pipeline remaining life expectancy — all networks.*

From here, projects can be evaluated to provide the most efficient and effective renewals profile.

The life expectancy assumes a base life for modern materials (PVC, polyethylene, steel and iron pipes) to be in line with the manufacturers' design life of 100 years. Most concrete and all earthenware/vitreous clay have an assumed base-life of 80 years and 77 years respectively. The base-life of asbestos cement pipes is in accordance with the Asbestos Cement Watermain Manual.[4]

The internal condition of pipes can be inspected with the use of a closed-circuit television camera (CCTV). A pipe's structural and service condition can be assessed through a nationally

[4] Useful Service Life envelopes are provided in the updated Asbestos Cement Manual 2017

recognised pipeline evaluation technique. CTTV has been deployed to investigate suspect pipes and to assess the condition of pipes that may require upsizing.

Since the November 2016 earthquake sequence a CCTV monitoring programme has been undertaken on sewer and stormwater pipes. Early assessment showed the earthenware and vitreous clay pipes in Blenheim had been particularly damaged by the earthquake. Significant cracking and tomos were apparent in the pipe walls. Collapse is less common but can be expected to increase as the structural integrity of the pipes has been compromised. The survey work continues but is concentrating on the wastewater reticulation in the first instance due to the potential public health implications of sewage ex-filtration.

In early 2018 the CCTV surveys continued to focus on the sewers. Individual stormwater pipelines were investigated if a problem was suspected. The stormwater reticulation will be systematically surveyed when resources become available. The programme will be informed by the outcome of the survey investigation but is likely to initially concentrate on the brittle material pipes — earthenware, vitreous clay and asbestos followed by the older concrete mains, more recent concrete and finally PVC and polyethylene.

Surveys have been targeted at mains which are suspected of having significant maintenance issues. Further work is needed to provide a systematic approach to the assessment and more comprehensive view of the network condition. A strategy as to whether to continue to target troublesome mains, areas with high I & I, or mains of a certain age or material, or particular networks, has yet be decided.

Pipe condition assessment is undertaken during routine maintenance. Training and mentoring have been provided to improve the consistency and accuracy of service repair crews undertaking in-situ assessment. Pipe samples removed during repair are returned to the service depot and a visual assessment of the condition is made. Reticulation engineering officers are normally available to supervise major repairs and make on-site condition assessments. The assessments are attached the asset record in the AMIS.

Customer service requests are all directed through the customer service department or out-of–hours service. Details are received and assessed for the urgency of response. A work order is generated as a result of the call and passed to Assets and Services Operations to resolve.

The life expectancy of asbestos cement pipes has been derived from the tables published in the New Zealand Asbestos Cement Watermain Manual (2017). The manual uses data from practical experience gathered throughout New Zealand. The study was confined to water mains and the correlation to stormwater and sewer mains has not been tested. However, for medium and large sized pipes the life expectancy is within the 72 year to 100-year range.

It is desirable to smooth the renewals programme to make the workload manageable and to avoid too much disruption to the system. Equally, it is important to maximise the useful life of the underground assets but also to avoid failure to critical services and consequential flood damage. A timely programme of condition assessment through systematic CCTV survey will provide greater confidence in the condition grading and assist with the planning of future renewals programmes. As show in Table 4-6 Maintenance Activity 2018-2020, maintenance around mains and connections makes up the majority of the number of work orders, customer requests and the highest value of reactive maintenance.

A Wastewater 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.

## 4.2 Infrastructure Risk Management

### 4.2.1 Risk Management

The Council's approach to risk management is outlined in the MDC Risk Management Strategy and Tools[5]. 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 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 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. (More detail about how the specific risks are being managed is shown in Table 5-7 in Chapter 5 of this plan.)

| | |
|---|---|
| **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. |
| **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 |

[5] Risk Management Strategy and Tools. V3.2 (Dec 2011) MDC

| | |
|---|---|
| **Legal** | Events which may lead to criminal or civil proceedings taken against the Council. |
| | in the competence of the Council to perform its core duties. |

*Table 4-5 The risks associated with Council activities.*

Risk is frequently defined 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 leading to consequences at a local or national political level.

### 4.2.2 Objectives of Risk Management

The objectives of risk management for wastewater services 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.

### 4.2.3 Risk Assessment in the Wastewater Activity

Under the guidance of the Council's Risk Manager a small team of senior operational staff, including the Operations & Maintenance (O&M) Engineer, assess the hazards associated with the operation of wastewater services.

The wastewater operation is analysed through its major constituent parts: treatment plants, distribution (the reticulation pipework, pumps and associated plant) and bio-filters. General management practices are also analysed.

The risks are also separated on a network basis so that risks to the Grovetown 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 reassessed in the light of any new information or research.

### 4.2.4 Critical Assets

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

- Sewage treatment plants.
- Main pump stations.
- 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 wastewater 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 (null).

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 wastewater system 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 wastewater system.

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 and good alerting/response procedures for system malfunction.

### 4.2.6 Emergency Response Planning

The risk assessment process and the consideration of existing and future controls for residual risks provide a convenient framework for emergency response planning. For example, power failure is a significant risk to the wastewater treatment processed. The consideration of the risk treatments (including backup network connections, emergency generators, mobile generators and wet-well 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 pump stations) and specific events that may affect multiple sites (such as earthquakes, tsunami and floods).

The Assets and 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 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 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.

### 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 and 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 CDEM 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.

In 2016 the Lifelines agencies contributed to the update of the Marlborough Civil Defence Emergency Management (CDEM) plan[6]. The development of the 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 wastewater network.

### 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 stop banks, 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 pump stations. 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.

Gravity drainage systems are particularly affected by ground movement and SCIRT has provided alternative designs systems such as mini pumped systems and vacuum systems.

Ground displacement and ground shaking has caused significant damage to linear assets. The earthenware and vitreous clay pipelines in Blenheim have been particularly affected. There is significant evidence of longitudinal and circumferential cracking, joint displacement and holing. The structural integrity of the pipes has been compromised and failure is likely.

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

The assets' life expectancy was adjusted for the 2017 revaluation and the earthenware asset value has been impaired.

The Council is in discussion with the Department of the Prime Minister and Cabinet (DPMC) on government funding support for earthquake damage. A consultant has been employed to evaluate the damage surveys and advise the DPMC.

Following the Christchurch Earthquake sequence there has been substantial research and information on the resilience of utility infrastructure. The Wairau Plain has many common geographical features with the Canterbury Basin and comparisons can be usefully made.

Lateral spread adjacent to watercourses was particularly damaging to stopbanks, utilities and other structures. New standards are being incorporated into planning and engineering designs. Setback standards define how close buildings can be located to incised watercourses.

Manholes and wet-wells tended to 'float' in liquefied ground conditions. New design standards have been developed to mitigate this effect.

### 4.2.10 Natural Hazards — Learning from Experience

New Zealand is exposed to a whole range of serious natural hazards — volcanoes, earthquakes and numerous severe weather events. 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 aftershocks. On 14th 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. The immediate effect on the wastewater system was lower than expected. However, a major CCTV survey programme has been initiated and discovered substantial structural damage to the earthenware and vitreous clay pipelines.

The Stronger Christchurch Infrastructure Rebuild Team (SCIRT) has been generous in publishing its findings and solutions. They have created a repository of technical advice and engineering standards which will assist local authorities to design and build more resilient infrastructure in future.

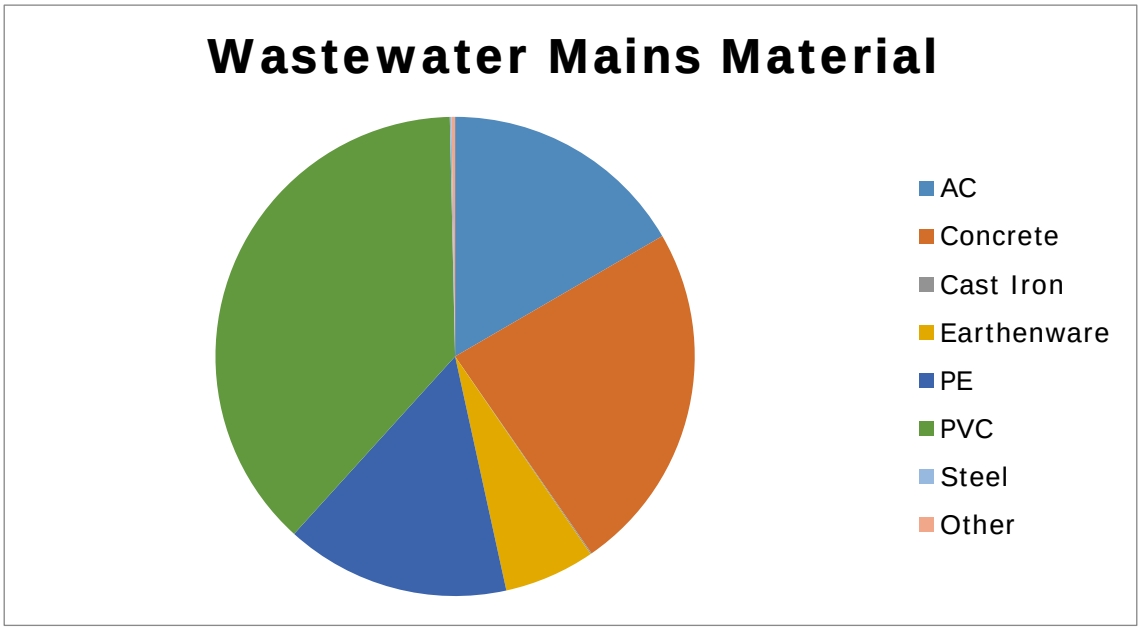



*Figure 4-6 Sewer Main Pipe Material.*

Figure 4-6 shows around 12.1 km of earthenware mains in Blenheim and 5.8 km in Picton.

The CCTV survey is also examining the older concrete mains.

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.

On the following day (15 November 2016) a major storm in the north of region caused severe local flooding. In Havelock a section of the main sewer was removed when ground was scoured along Mahakipawa Road.

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.

## 4.3 Routine Operations and Maintenance

The operation and maintenance of the wastewater system involves the procedures and tasks necessary to deliver the agreed levels of service to customers whilst ensuring serviceability of the infrastructure to maximise its useful life expectancy. A formal plan has not been documented, but the Assets and Services (A&S) Department's strategic drivers are relevant.

All strategies recognise the primary purpose of the wastewater system is to provide safe and sanitary living conditions without damage to the aquatic environment.

**Operational management** — Operational activities are undertaken by engineers and officers of the Assets and Services Department to ensure the outcomes and service standards are achieved in the most efficient and cost-effective manner.

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

**System Control and Monitoring** — The system is monitored by SCADA monitoring and where possible controlled by programme logic control (PLC). A rostered standby procedure is maintained to ensure the monitors are overseen on a 24/7 basis and alarms are responded to according to need.

**Incident management** — Staff of the A&S Department prepares and plan for managing incidents to mitigate the effects and return to business as usual as soon as possible.

**Preventative Maintenance** — Maintenance schedules are established and implemented to minimise risk and optimise the functioning and life expectancy of the assets.

**Repairs** — Repairs will be assessed and undertaken in a timely fashion to minimise the disruption to the service. The quality of the repairs needs to meet accepted industry standards.

**Reactive Maintenance** — Systems will be established and maintained to ensure failed assets are returned to service in order to meet the service standards, to protect public health and minimise the risks of environmental damage.

**Maintenance Information** — Wherever possible the asset management information system will be developed and used to facilitate the efficiency of the operation and maintenance of the network.

### 4.3.1 Operations and Maintenance Records

Below, Table 4-5 – Work Orders completed on Wastewater 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 Type/ Task Type | Financial Year | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2018/2019 | | | | | 2019/2020 | | | | |
| | Planned | | Reactive | | *CRM* | Planned | | Reactive | | *CRM* |
| | # | $ | # | $ | # | # | $ | # | $ | # |
| Additional Connections | 18 | $92,091.86 | | | | 14 | $75,438.07 | 1 | | |
| Grinder Pump Electrical | | | 57 | $41,458.96 | 56 | | | 40 | $36,118.96 | 39 |
| Grinder Pump Mechanical | 1 | $120.00 | 24 | $19,177.40 | 21 | | | 21 | $12,225.32 | 16 |
| Pump Station Building/Civil | 215 | $63,072.00 | 4 | $2,716.49 | | 269 | $77,646.36 | 20 | $12,210.76 | 5 |
| Pump Station Electrical | 5 | $5,807.71 | 46 | $22,748.46 | 9 | | | 37 | $23,077.86 | 10 |
| Pump Station Mechanical | 25 | $26,100.26 | 78 | $35,718.30 | 11 | 80 | $86,969.61 | 106 | $45,992.48 | 24 |
| Pump Station Other | 61 | $92,354.10 | 50 | $13,003.91 | 8 | 14 | $55,292.60 | 29 | $16,639.86 | 16 |
| Pump Station Power | 1 | $3,105.00 | 1 | $- | 1 | 2 | $349.35 | 5 | $941.41 | 1 |
| Pump Station Telemetry | | | 1 | $4,844.34 | | | | 5 | $1,118.07 | 2 |
| Infiltration/Leak | 1 | $26,153.41 | 2 | $120.00 | | 1 | $26,512.55 | 2 | $17,029.95 | |
| Manhole Maintenance | 2 | $514.35 | 25 | $5,585.64 | 16 | | | 17 | $9,379.71 | 10 |
| Connection Maintenance | 7 | $5,964.72 | 83 | $107,949.77 | 46 | 10 | $8,338.02 | 59 | $44,002.04 | 44 |
| Main Maintenance | 101 | $529,632.15 | 49 | $147,526.79 | 25 | 94 | $61,161.65 | 74 | $154,408.16 | 28 |
| Valve Maintenance | 16 | $7,770.72 | 3 | $1,050.67 | 1 | 14 | $4,026.53 | 13 | $13,846.21 | 8 |
| Connection Renewal | | | 3 | $7,147.98 | 1 | | | | | |
| Pipe Renewal | | | 2 | $12,610.36 | | | | | | |
| Pump Station Renewal | | | | | | 1 | $525.24 | | | |
| Treatment Plant Costs | 46 | $130,596.42 | 28 | $32,163.09 | | 61 | $197,701.03 | 33 | $84,509.98 | |
| Treatment Plant Monitoring and Testing | 1 | $2,170.31 | | | | 2 | $410.00 | | | |
| Oxidation Pond Maintenance | 35 | $101,369.64 | 11 | $18,666.24 | 1 | 15 | $15,282.85 | 12 | $3,020.02 | 2 |
| Treatment Plant Power | 1 | $70.59 | | | | | | | | |
| **TOTAL** | **536** | **$1,086,893.24** | **467** | **$472,488.40** | **196** | **577** | **$609,653.86** | **474** | **$474,520.79** | **205** |

*Table 4-5 Maintenance Activity 2018-2020.*

The Wastewater Service Repair database for the recording of customer service requests was extended in February 2011 to include sewerage and stormwater. The records are providing good data on asset performance and customer service, and are used to corroborate work orders in the AMIS.

### 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 wastewater 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 return the best compromise from four main conflicting pairings.

**Levels of service and risk versus costs** — A ‘Rolls-Royce’ fully guaranteed 24/7 wastewater service can be delivered to Marlborough customers; however, the cost of providing such a service has to be balanced against the willingness and ability of the community to pay.

The costs of providing improved levels of service can reach a point where the marginal cost becomes disproportionate to the benefit. For example, responding to a blocked sewer in two hours does not involve a significantly greater cost than responding in three hours. However, improving the response time to, say, less than one hour would involve significant additional cost in terms of disruption to the scheduled work programme. The current level of service has been developed to best balance current customer expectation with the cost of delivering the service.

**Asset maintenance versus renewal** — The A&S Department seeks the optimum balance between replacing an asset that is reaching the end of its useful life and the costs of repairing it. Currently this is achieved using the judgment of the operational engineers. One of the priorities of the asset management information system upgrade is to provide good data on maintenance costs and frequency to support the engineers’ decisions.

**Planned versus unplanned maintenance** — A well planned preventative maintenance schedule may reduce disruption to service, reduce whole life costs, schedule work to be

undertaken in a cost-effective and organised manner, and reduce the risks associated with failure. However, the costs of investigating and implementing the correct intervention interval can be high and the risks associated with the failure can be low. In these circumstances 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 wastewater infrastructure. More formal documentation and evaluation of the current process is required as there is a reliance on the experience of individual staff that may not be sustainable.

**Efficient asset utilisation versus providing redundant capacity** — There is a strong efficiency motive to correctly size and optimise the use of assets. However, there can be serious consequences to the failure of some critical assets and a level of redundancy or contingency options can be a valuable attribute. In wastewater infrastructure this is most commonly seen in duplicate pumps at sewage pump stations, additional storage designed into wet-wells, and in some cases provision of links between pipelines or treatment processes.

The above decision-making process exists within the context of risk. The function of each of the components of the infrastructure is assessed for its critical contribution to achieving the desired outcomes. The maintenance status of each asset can then be prioritised, and maintenance tasks and programmes can be planned accordingly.

Data on the performance and condition of the infrastructure is continually reviewed and monitored by the Operations Engineer and staff. Short term trends can be readily identified through trending software within the SCADA system.

### 4.3.4 Summary of Operational Costs

A summary of operational expenditure since 2016 and the forecast spending from 2021-31 is shown below.

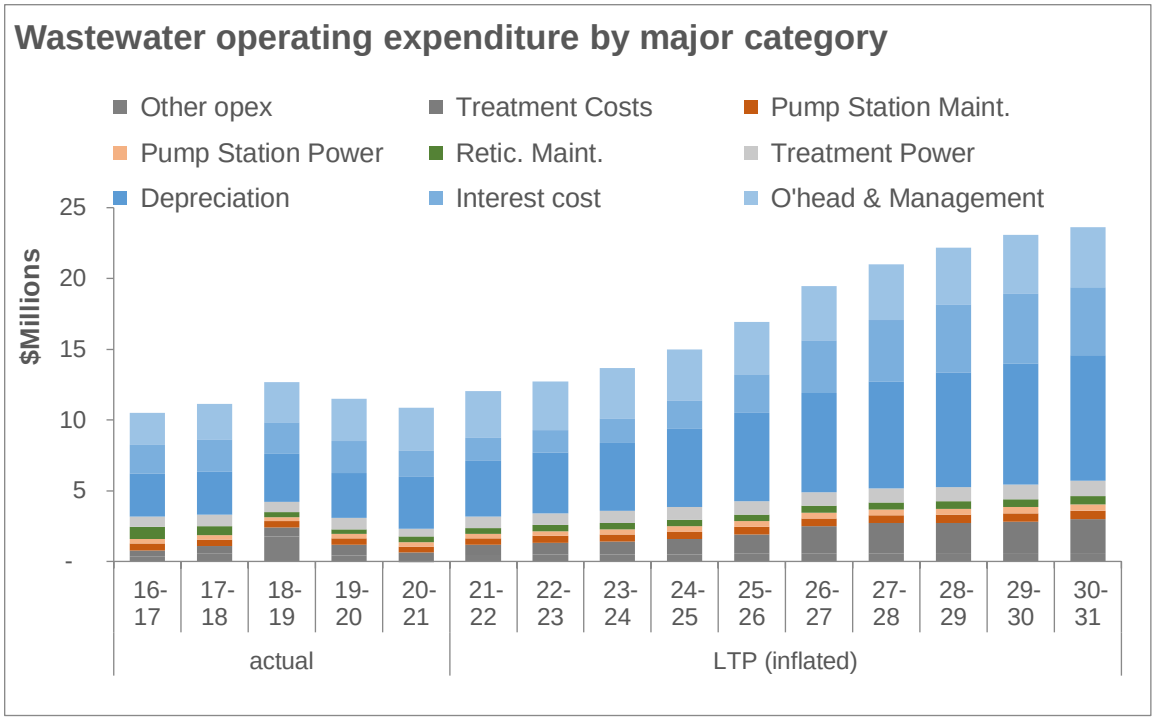



*Figure 4-7 Operational costs 2016-31.*

The total operational costs have increased to over $10M annually in the past three years. The dominant costs are depreciation, overheads, management and loan servicing costs, accounting for around 70% of the total. The costs of electrical power for pump stations has remained stable despite increased volumes and strength of effluent, mainly due to the negotiation of competitive rates from large providers. The costs of mains maintenance have increased significantly over the past ten years

partially due to increased cleaning of fats and grease, infiltration detection and the ageing network. The costs of Traffic Management are on the rise as requirements and demands for services increase.

## 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 4-6 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 treatment plants. Closed circuit television (CCTV) is a means of completing non-destructive condition assessment of pipes. CCTV delivers a snapshot of the condition of mains and helps to identify any blockages or damage that is likely to cause blockages, eg, displaced joints, but does not provide a rate of deterioration of the pipe. This non-destructive method of condition assessment will not provide an estimated year of failure of a pipe as pipe sampling does.

**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 wastewater 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 convey 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.

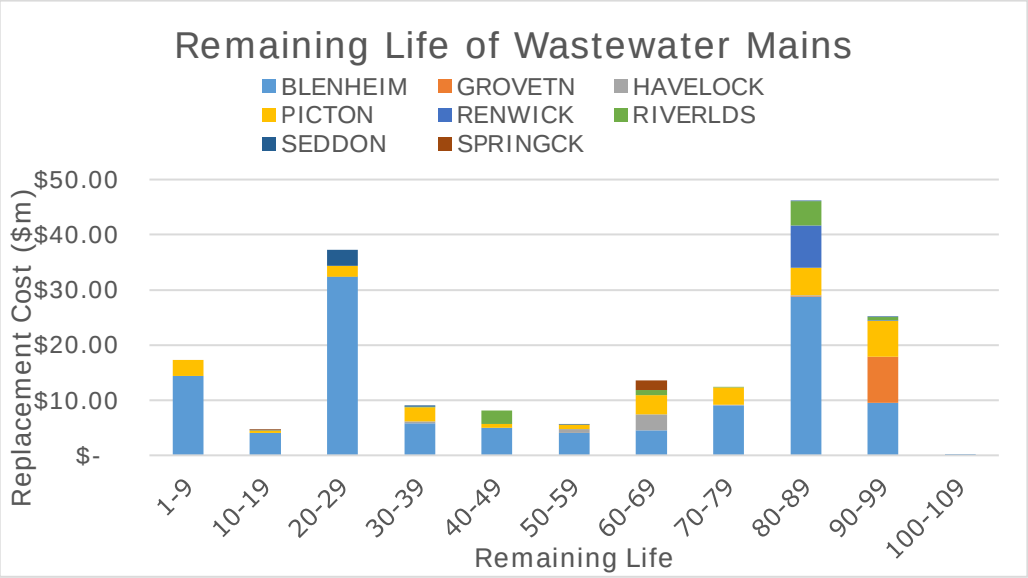



*Figure 4-8 Replacement Value and Life Expectancy – Wastewater Assets.*

The costs shown in Figure 4-8 have been determined from the revaluation data using the nominal life expectancy 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.

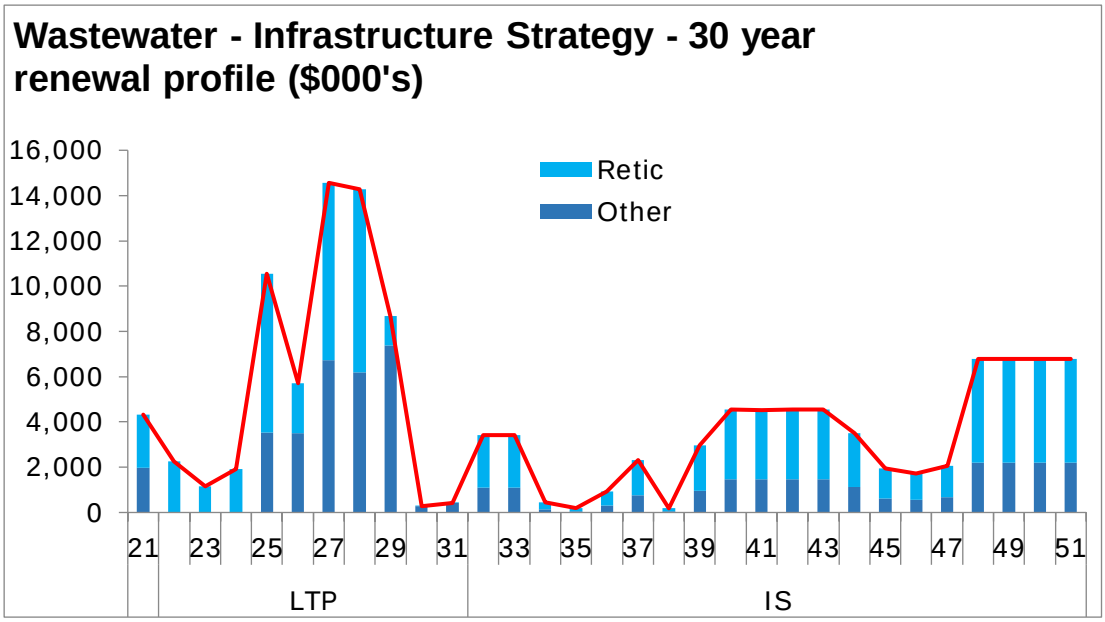



*Figure 4-9 Wastewater Renewal Profile.*

### 4.4.1 Recognising timing, including delays, of major projects

Council recognises factors that can delay the proposed timing of projects and have a significant impact on the overall capital programme. Capital project timing has previously been delayed due to:

- Finalising community consultation;
- Obtaining land access;
- Obtaining resource consents;
- The limited availability of external professional expertise;
- Receiving acceptable contract price and contractor availability.

These factors have contributed to actual expenditure falling below budget in prior years. As a result, a strategic decision was taken to limit the financing of capital expenditure to approximately $70 million for the first three years of the LTP for core Council assets. To achieve this, adjustments have been made to reduce the capital expenditure budget in the first three years of the LTP. These adjustments are not specific to projects, and Council still aims to complete all of them over the next 10 years.

The main focus is to bring Wastewater Treatment Plants up to standard to meet anticipated resource consent conditions for the future, providing for growth and reducing the risk of overflows both in wet and dry weather. 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.

Asset upgrades are included in the capital programme and the costs apportioned between growth, renewal and improved level of service.

The renewals element of the major capital projects is shown in Figure 4-10 and the capital budget is shown in Table 5-3 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 4-10 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 2021-41.

There is no significant increase in pipeline replacement activity forecast as the current trend in pipeline performance is anticipated to continue. However, the proposed programme of pipe condition assessment and data analysis may influence future projections.

Asset upgrades are included in the capital programme and the costs apportioned between growth, renewal and improved level of service, as shown in Table 4-10.

## 4.5 Creation/Acquisition/Augmentation

The capital works programme is planned and led by the Planning and Development Engineer. The main drivers of the capital programme are growth and levels of service improvement.

All capital upgrade projects for the wastewater infrastructure follow a process from inception though to construction and commissioning, as outlined below.

**Identification of Need** — new infrastructure may be required to meet forecasts of growth in demand, and to address issues with the level of service which have been identified through performance monitoring and customer feedback.

**Project Prioritisation** — projects are prioritised through a risk management process of likelihood/consequence but are also influenced by cost, timescale and the structural integrity of the network.

**Alternatives and Options** — alternative 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 continues through the process.

**Project Approval** — design options are evaluated by the engineering hierarchy and presented to the Council's Assets & Services (A&S) Committee for approval. The outline budget costs and the sources of funding are also considered at this time and aligned with the objectives of the Long Term Plan. The decision of the A&S Committee is tabled for consideration and approval by the full Council.

**Detailed Design** — an approved project will progress to detailed design. Specialist engineering consultants are often employed as they have greater experience in the design of major works. Draft designs are submitted to the 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 account for local conditions.

**Tender** — once a final design has been proposed and agreed with Council engineers, most construction projects are publicised for competitive tender. The Council has a rigorous procurement policy which has been subjected to scrutiny from an independent lawyer following unsupported allegations of corruption. Returned tenders are evaluated on the basis of a series of predetermined 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.

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 contracts prior to tendering.

**Construction** — the construction phase is normally managed by Council 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 the construction to help ensure smooth progression and a successful outcome.

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

### 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 hydraulic models have been developed to provide detailed and accurate predictions of capacity throughout most of the reticulation networks. The models for Havelock and Seddon are currently less advanced.

The models are built to represent the individual characteristics of each of wastewater networks, including their response to rainfall through infiltration and inflow. They are then used to simulate a demand pattern or system configuration. The outputs of the models are compared with the actual flows, pump run times and pressures of rising mains in the system so the models can be calibrated and verified.

Areas of low capacity can be found through the models. The causes of localised problems, such as under-sized pipes, inflow and infiltration, 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.

The upgrade to the Hardings Road STP with tertiary treatment through a new wetland, partial disposal through land irrigation and a new combined outfall was thoroughly discussed with all major stakeholders through a consultative committee process. This was particularly important due to the historic and cultural significance of the site to local iwi.

There is a current prediction that the area of land in Marlborough used for vine cultivation will increase by 29%. The provision of treatment for future industrial growth at the Blenheim wastewater treatment plant will need considerable forward planning to meet increased demand. Outline plans are prepared for the additional treatment but are not detailed until the extent and timing of the growth is more apparent. Council continues to consult with representatives from the industry although there is often a reluctance from businesses to reveal their future projections. The costs of upgrades are met by the industry and part of the planning process is to negotiate a method for recovering the costs.

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.

**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 wastewater assets or taken them over by agreement from private owners. There are no plans for similar acquisitions in the future.

### 4.5.2 Summary of Future Costs

In the past the wastewater 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 5-3 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 4-10 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.

| Asset Type | Description | Growth % | LoS % | Renewal % | 2021/ 2022 | 2022/ 2023 | 2023/ 2024 | 2024/ 2025 | 2025/ 2026 | 2026/ 2027 | 2027/ 2028 | 2028/ 2029 | 2029/ 2030 | 2030/ 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Blenheim** | | | | | | | | | | | | | | |
| Treatment Plant | Blenheim Wastewater Treatment Plant Upgrade | 26% | 74% | | $25.8m | | | | | | | | | |
| Pipelines | Reclaimed Water Reticulation | 20% | 80% | | | | | | | $10m | | | | |
| Pump Stations | MOPS Pump Station Upgrade | 25% | 25% | 50% | $8m | | | | | | | | | |
| Renewals Pipelines | Blenheim Pipeline Renewals incl EQ Repairs | 10% | | 90% | $7.1m | | | | | | | | | |
| Pump Stations | Burleigh Pump Station Upgrade | 75% | 25% | | | | $6.9m | | | | | | | |
| Pipelines | Blenheim Modelled Pipeline Upgrades | 37% | 32% | 30% | $5m | | | | | | | | | |
| Pump Stations | Battys Rd Pump Station Upgrade | 80% | 20% | | | | | | | | $4.4m | | | |
| Treatment Plant | Blenheim Wastewater Treatment Plant Desludging | | 100% | | $7.8m | | | | | | | | | |
| Pipelines | MOPS to BSTP Pipeline Upgrade | 80% | 20% | | | | | | | | $3.5m | | | |
| Pipelines | Burleigh Pipeline Upgrade | 20% | 80% | | | | | | $1.9m | | | | | |
| Pipelines | Muller Road Wastewater Renewal | 5% | 12% | 83% | $1.5m | | | | | | | | | |
| Renewals Pump Stations | Blenheim Pump Station Renewals | | | 100% | $1.4m | | | | | | | | | |
| Pump Stations | Blenheim Pump Station Generators | | 100% | | $0.3m | | | | $0.3 m | | | | $0.3 m | |
| Pipelines | Murphy/Adams/Colemans/Cherry Pipeline Upgrade | 59% | 9% | 33% | | | $0.6 m | | | | | | | |
| Pump Stations | Purkiss St North/Kingwell Moorings Pump Station Renewal | 24% | 23% | 53% | $0.6m | | | | | | | | | |
| Pump Stations | Blenheim Modelled Pump Station Upgrades | 33% | 33% | 33% | $0.5m | | | | | | | | | |
| Pipelines | Purkiss Street Pipeline Replacement | 11% | 44% | 45% | $0.4m | | | | | | | | | |

| Asset Type | Description | Growth % | LoS % | Renewal % | 2021/ 2022 | 2022/ 2023 | 2023/ 2024 | 2024/ 2025 | 2025/ 2026 | 2026/ 2027 | 2027/ 2028 | 2028/ 2029 | 2029/ 2030 | 2030/ 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Havelock** | | | | | | | | | | | | | | |
| Treatment Plant | Havelock Wastewater Treatment Plant | 25% | 62% | 12% | $9m | | | | | | | | $6m | |
| Pump Stations | Havelock Pump Station Renewal | 10% | 40% | 50% | $0.07m | | $0.6 m | | | | | | | |
| **Picton** | | | | | | | | | | | | | | |
| Treatment Plant | Picton Wastewater Treatment Plant | 33% | 66% | 1% | $10.5m | | | | | | | | | |
| Pipelines | Picton Pipeline Replacements | 14% | 43% | 43% | $4.1m | | | | | | | | | |
| Pump Stations | Picton Pump Station Upgrades | 30% | 35% | 35% | $2.4m | | | | | | | | | |
| Renewals Pipelines | Picton Pipeline Renewals incl EQ Repairs | 10% | | 90% | $1.8m | | | | | | | | | |
| **Renwick** | | | | | | | | | | | | | | |
| Pump Stations | Renwick Pump Station Upgrade | 100% | | | | | | | | $1.2 m | | | | |
| **Riverlands** | | | | | | | | | | | | | | |
| Treatment Plant | Blenheim Wastewater Treatment Plant Industrial Upgrade | 20% | 80% | | $15.8m | | | | | | | | | |
| **Seddon** | | | | | | | | | | | | | | |
| Treatment Plant | Seddon Wastewater Treatment Plant | 10% | 90% | | $14m | | | | | | | | | |
| **St Andrews** | | | | | | | | | | | | | | |
| Pipelines | St Andrews Pipeline Upgrade | 14% | 86% | | | | $1.1m | | | | | | | |
| **Combined** | | | | | | | | | | | | | | |
| Connections | New connections | 100% | | | $0.7m | | | | | | | | | |

*Table4-10 Major budgeted capital projects.*

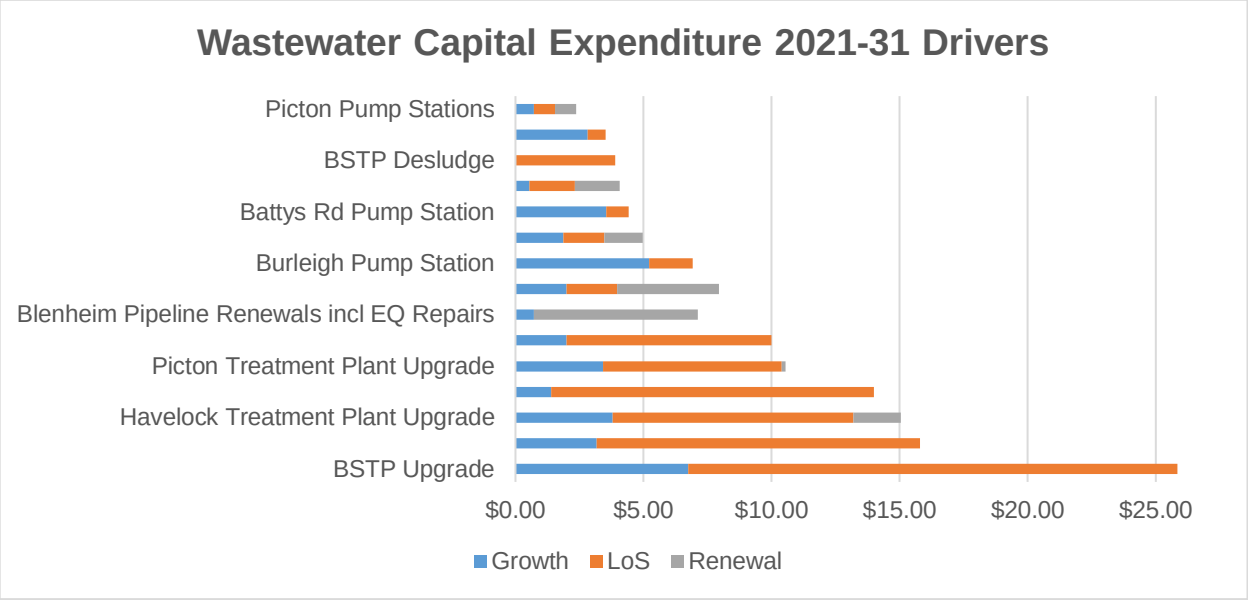



*Figure 4-11 Expenditure and drivers of wastewater capital projects.*

## 4.6 Disposal Plan

Disposal planning recognises there are costs and consequences to 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 archived as 'expired' assets in the AMIS.

The expected replacement of the Nelson Street pump station, the Dublin Street Pump Station, the Waikawa–Picton trunk sewer upgrade and the Blenheim North-East trunk sewer upgrade will all replace significant existing assets that will need to be decommissioned and disposed of as part of the project. The disposal costs have been included in the budget projections.

# Chapter 5: Financial

The wastewater activity accounts for around 8.1% of Council activity expenditure. The asset management plan therefore has important implications for the Council's overall budget and consequences for developers, ratepayers and other sources of funding which contribute to the activity.

The drivers to improve the quality of wastewater returned to the environment and to manage the quantities of wastewater 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 demand. The challenge is exacerbated by the anticipated change in demographics for the region over the medium/long term.

Generally, these 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, and the review cycle usually 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 April 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 infrastructure 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 Financial Strategy, as follows:

*"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 2021-31 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, coordinated manner can reduce costs as infrastructure development is not responding to "ad-hoc requests" for isolated, scattered, piecemeal development. Responding to ad-hoc 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 under-utilised."*

Regarding levels of service the strategy states:

*"During the development of the 2021-31 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 wastewater activity the level of service will undergo significant improvement over the course of the Long Term Plan. Treatment plants, pump stations and pipelines will be upgraded to meet growth in demand and meet levels of service.

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, eg, improve quality of wastewater discharges is funded by borrowing.
- renewals capital expenditure is funded from revenue — rates and charges — set to recover depreciation expenses, and is 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 wastewater projects are primarily to:

- upgrade wastewater treatment plants to ensure effluent discharges meet environmental standards.
- upgrade trunk mains and pump stations in Picton and Blenheim to cope with increasing flows from growth and ingress of stormwater.
- rebuild the Blenheim Main Outfall Pump Station to upgrade it so that it will be more resilient to liquefaction.

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 operational expenditure due to a number of factors:

- higher standards for effluent discharge will require additional treatment staff, chemicals, electrical power and plant maintenance.
- growing infrastructure will require additional maintenance, pumping and depreciation costs.
- finding and fixing the sources of stormwater infiltration and inflow will continue to incur costs.
- removing accumulated fat and grease from the reticulation is a growing cost.
- maintaining an ageing infrastructure will require additional maintenance.
- the costs of mitigating risks through insurances will fluctuate as national and international insurance markets respond to demand and claims.

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

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

| | Wastewater - 2021-31 (inflated) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2021-22 | 2022-23 | 2023-24 | 2024-25 | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 | 2030-31 |
| Treatment - Power | 821,600 | 850,626 | 872,396 | 896,584 | 922,385 | 948,186 | 978,018 | 1,011,076 | 1,045,746 | 1,077,997 |
| Treatment costs | 460,600 | 558,922 | 617,823 | 737,532 | 1,041,417 | 1,532,177 | 1,697,041 | 1,683,026 | 1,740,737 | 1,870,522 |
| Pump Stations - power | 312,450 | 339,018 | 368,931 | 379,160 | 390,071 | 400,982 | 413,598 | 427,578 | 442,240 | 455,879 |
| Reticulation - mains maintenance | 238,500 | 246,926 | 253,245 | 260,267 | 267,757 | 275,246 | 283,906 | 293,502 | 303,567 | 312,929 |
| Pump stations - other | 224,500 | 232,431 | 241,034 | 253,174 | 260,459 | 267,745 | 276,169 | 285,503 | 295,293 | 304,400 |
| Treatment - monitoring/testing | 202,500 | 209,654 | 215,020 | 220,981 | 227,341 | 233,700 | 241,053 | 249,200 | 257,745 | 265,694 |
| Pump stations - mechanical | 93,900 | 97,217 | 99,705 | 102,470 | 105,419 | 108,367 | 111,777 | 115,555 | 119,517 | 123,203 |
| Pump stations - buildings/civil | 73,730 | 76,335 | 78,288 | 80,459 | 82,774 | 85,090 | 87,767 | 90,733 | 93,845 | 96,739 |
| Reticulation - connection maintenance | 70,000 | 72,473 | 74,328 | 76,389 | 78,587 | 80,785 | 83,327 | 86,143 | 89,097 | 91,845 |
| Reticulation - infiltration/leaks | 70,000 | 72,473 | 74,328 | 109,127 | 112,267 | 115,407 | 119,038 | 123,062 | 127,282 | 131,207 |
| Treatment - Oxidation pond maintenance | 64,000 | 78,685 | 80,699 | 121,131 | 124,616 | 193,884 | 199,984 | 206,744 | 213,833 | 220,428 |
| Grinder Pumps - Electrical | 52,000 | 53,837 | 55,215 | 56,746 | 58,379 | 60,012 | 61,900 | 63,992 | 66,186 | 68,228 |
| Pump stations - electrical | 45,900 | 55,804 | 57,232 | 58,819 | 60,512 | 62,205 | 64,162 | 66,330 | 68,605 | 70,721 |
| Grinder Pumps - Mechanical | 35,000 | 36,237 | 37,164 | 38,194 | 39,293 | 40,393 | 41,663 | 43,072 | 44,549 | 45,922 |
| Reticulation - manholes maintenance | 18,000 | 18,636 | 19,113 | 19,643 | 20,208 | 20,773 | 21,427 | 22,151 | 22,911 | 23,617 |
| Pump stations - telemetry | 13,735 | 14,220 | 14,584 | 14,989 | 15,420 | 15,851 | 16,350 | 16,903 | 17,482 | 18,021 |
| Reticulation - valves maintenance | 5,000 | 5,177 | 5,309 | 5,456 | 5,613 | 5,770 | 5,952 | 6,153 | 6,364 | 6,560 |
| **total infrastructure costs** | **2,801,415** | **3,018,672** | **3,164,415** | **3,431,120** | **3,812,519** | **4,446,574** | **4,703,132** | **4,790,724** | **4,954,999** | **5,183,914** |
| | | | | | | | | | | |
| operating costs | 305,584 | 316,380 | 324,477 | 333,474 | 343,070 | 352,666 | 363,762 | 376,057 | 388,953 | 400,948 |
| internal charges | 77,432 | 79,612 | 81,642 | 83,672 | 85,777 | 87,882 | 90,137 | 92,543 | 95,024 | 97,505 |
| depreciation | 3,908,192 | 4,260,536 | 4,792,187 | 5,530,467 | 6,279,396 | 7,017,477 | 7,564,493 | 8,079,013 | 8,532,021 | 8,871,438 |
| interest expense | 1,630,795 | 1,612,774 | 1,748,583 | 1,991,849 | 2,679,096 | 3,724,048 | 4,351,885 | 4,795,834 | 4,960,623 | 4,821,285 |
| overheads allocated | 3,309,257 | 3,443,236 | 3,553,543 | 3,625,594 | 3,724,032 | 3,823,786 | 3,929,279 | 4,040,768 | 4,157,954 | 4,266,919 |
| **Total operating costs** | **12,032,676** | **12,731,210** | **13,664,847** | **14,996,175** | **16,923,889** | **19,452,433** | **21,002,689** | **22,174,940** | **23,089,575** | **23,642,009** |

*Table 5-1 Projected Operational Expenditure 2021-31.*

### 5.1.2 Capital Expenditure

The major focus for capital expenditure during the forthcoming programme will be the completing of the Picton Trunk Main, upgrading the Blenheim reticulation to accommodate additional flows, rebuilding a more resilient Main Outfall Pump Station to the east of Blenheim, and ensuring all treatment plants will perform to the required environmental standards.

The following charts show the major projects of the capital investment programme. The timing of the Blenheim Industrial Treatment upgrade may be adjusted depending on the growth of wine processing in the region.

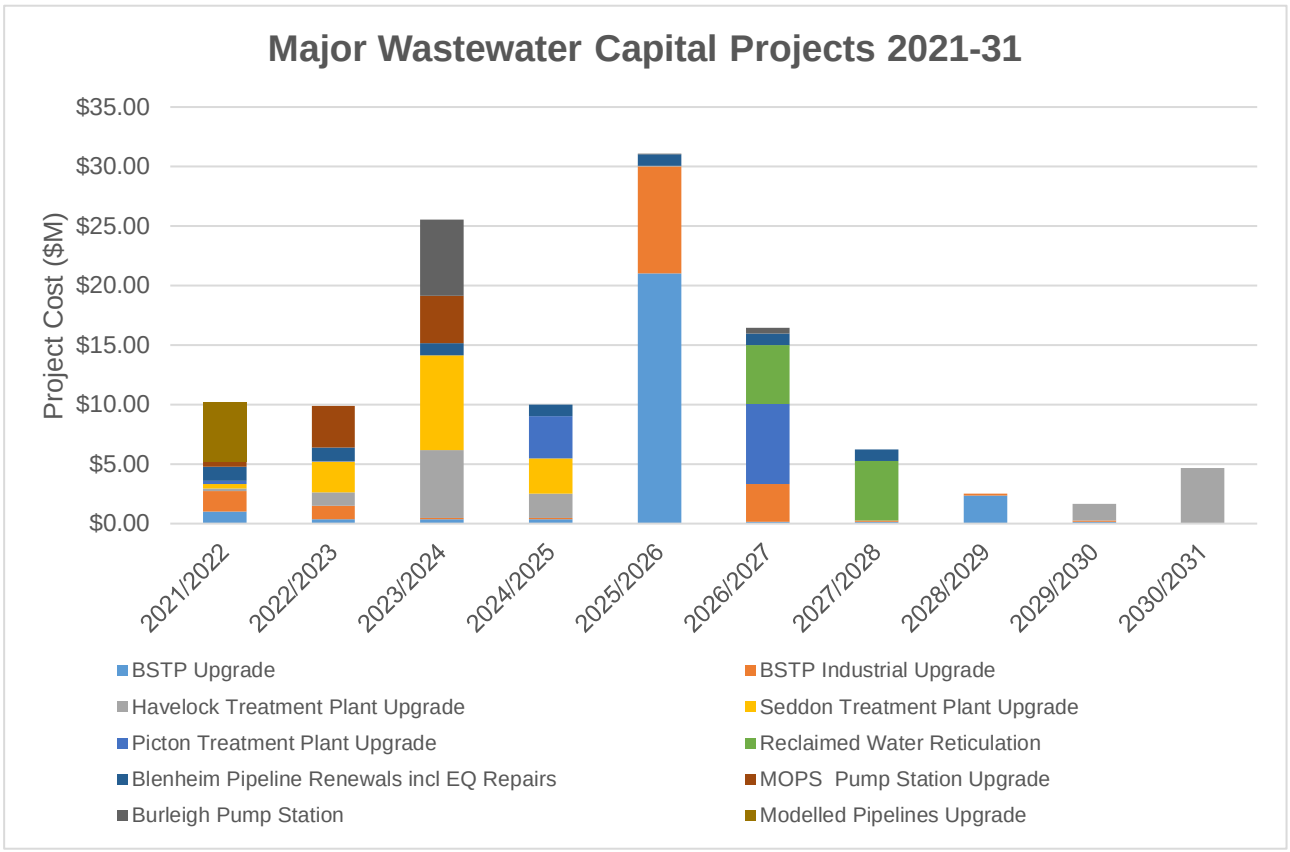



*Figure 5-1 Major capital projects 2021-31.*

The timing of the delivery of the capital programme is highly dependent on preliminary investigation and preparation — resource consent approval, land purchase, public consultation, etc. Thorough investigation is time consuming but valuable to ensure the smooth progress of works and provide 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 overall actual capital expenditure on Wastewater has ranged from $2.504M in 2017 to $16.731M in 2018, with an average of $6.643M. In the previous five years, on average 43% of the budget has been spent. This is shown in Figure 5-2 Wastewater CAPEX Budget vs Actual.

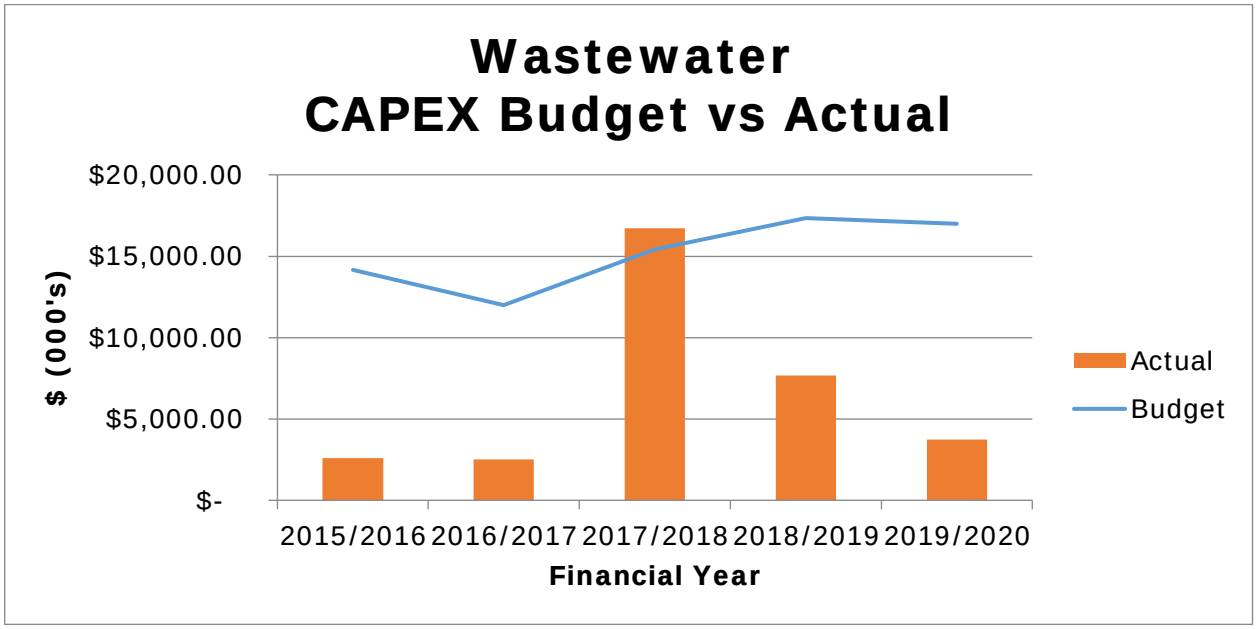



*Figure 5-2 Wastewater CAPEX Budget vs Actual.*

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 prices 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.

| | Wastewater - 2021-31 (inflated) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2021-22 | 2022-23 | 2023-24 | 2024-25 | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 | 2030-31 |
| Blenheim | | | | | | | | | | |
| renewal | 3,321,520 | 1,309,070 | 1,193,067 | 1,195,416 | 1,229,817 | 1,264,217 | 1,303,993 | 169,825 | 175,649 | 181,066 |
| other capex | 10,059,565 | 4,449,439 | 14,507,113 | 2,023,878 | 24,805,444 | 9,275,638 | 7,520,502 | 13,593,578 | 779,928 | 226,947 |
| Havelock | | | | | | | | | | |
| renewal | 22,000 | 11,389 | - | - | - | - | - | - | - | - |
| other capex | 261,592 | 1,220,976 | 6,847,592 | 2,188,472 | 63,130 | 6,008 | 6,603 | 6,675 | 1,818,891 | 6,331,001 |
| Picton | | | | | | | | | | |
| renewal | 701,180 | 302,937 | 261,634 | 261,205 | 268,722 | 276,239 | 284,930 | - | - | - |
| other capex | 1,514,333 | 3,194,673 | 1,703,233 | 4,420,369 | 656,583 | 7,767,698 | 57,568 | 26,699 | 26,361 | 20,401 |
| Renwick | | | | | | | | | | |
| renewal | - | - | 5,840 | - | - | - | - | - | - | - |
| other capex | 5,000 | 164,401 | 5,607 | 5,940 | 5,739 | 1,441,933 | 6,603 | 6,675 | 6,590 | 6,800 |
| Seddon | | | | | | | | | | |
| renewal | - | - | - | - | - | - | - | - | - | - |
| other capex | 412,806 | 2,788,326 | 8,783,823 | 3,279,738 | 5,739 | 6,008 | 6,603 | 6,675 | 6,590 | 6,800 |
| Grovetown | | | | | | | | | | |
| renewal | - | - | - | - | - | - | - | - | - | - |
| other capex | - | 22,274 | - | 24,950 | - | 25,234 | - | 28,034 | - | - |
| Riverlands Industrial | | | | | | | | | | |
| renewal | 5,500 | - | - | 12,004 | - | - | - | - | - | - |
| other capex | 2,261,786 | 1,194,427 | 163,530 | 179,278 | 10,330,341 | 3,785,074 | 198,082 | 200,244 | 197,706 | - |
| Spring Creek | | | | | | | | | | |
| renewal | 11,000 | - | - | - | - | - | - | - | - | - |
| other capex | 2,760 | 87,504 | 2,726 | 2,970 | 2,870 | 3,004 | 3,301 | 3,337 | 3,295 | 3,400 |
| St Andrews | | | | | | | | | | |
| renewal | - | - | - | - | - | - | - | - | - | - |
| other capex | - | - | 981,182 | - | 174,468 | - | - | - | - | - |
| Combined | | | | | | | | | | |
| renewal | - 1,000,000 | - | - | - | - | - | - | 1,230,618 | - | - |
| other capex | - 8,000,000 | - 6,211,973 | - 5,309,127 | 8,730,128 | 3,368,008 | 6,924,436 | 5,951,914 | 6,153,091 | - | - |
| **Total capex** | **9,579,042** | **8,533,443** | **29,146,219** | **22,324,350** | **40,910,860** | **30,775,488** | **15,340,098** | **21,425,451** | **3,015,010** | **6,776,415** |
| level of service | 7,518,797 | 6,933,001 | 16,553,666 | 7,976,733 | 27,771,810 | 11,492,751 | 256,795 | 2,622,227 | 2,060,376 | 5,186,079 |
| growth | 4,320,653 | 2,755,544 | 10,682,188 | 3,805,231 | 7,439,194 | 4,721,761 | 819,223 | 10,133,520 | 672,914 | 1,163,510 |
| renewal | - 2,260,407 | - 1,155,102 | 1,910,366 | 10,542,386 | 5,699,856 | 14,560,976 | 14,264,080 | 8,669,704 | 281,720 | 426,825 |
| **Total capex** | **9,579,042** | **8,533,443** | **29,146,219** | **22,324,350** | **40,910,860** | **30,775,488** | **15,340,098** | **21,425,451** | **3,015,010** | **6,776,415** |

*Table 5-2 Capital programme 2021-31.*

The following table (Table 5-3) shows the projected capital expenditure through to 2051 and corresponds to the objectives in the Infrastructure Strategy.

| | Wastewater 2021-51 (Inflated) | | | | | |
|---|---|---|---|---|---|---|
| | 21-26 | 26-31 | 31-36 | 36-41 | 41-46 | 46-51 |
| Blenheim | | | | | | |
| renewal | 8,248,890 | 3,094,750 | - | - | - | - |
| other capex | 55,845,440 | 31,396,593 | - | - | - | - |
| Havelock | | | | | | |
| renewal | 33,389 | - | - | - | - | - |
| other capex | 10,581,762 | 8,169,177 | - | - | - | - |
| Picton | | | | | | |
| renewal | 1,795,678 | 561,169 | - | - | - | - |
| other capex | 11,489,191 | 7,898,726 | - | - | - | - |
| Renwick | | | | | | |
| renewal | 5,840 | - | - | - | - | - |
| other capex | 186,688 | 1,468,601 | - | - | - | - |
| Seddon | | | | | | |
| renewal | - | - | - | - | - | - |
| other capex | 15,270,433 | 32,676 | - | - | - | - |
| Grovetown | | | | | | |
| renewal | - | - | - | - | - | - |
| other capex | 47,224 | 53,268 | - | - | - | - |
| Riverlands Industrial | | | | | | |
| renewal | 17,504 | - | - | - | - | - |
| other capex | 14,129,362 | 4,381,105 | - | - | - | - |
| Spring Creek | | | | | | |
| renewal | 11,000 | - | - | - | - | - |
| other capex | 98,829 | 16,338 | - | - | - | - |
| St Andrews | | | | | | |
| renewal | - | - | - | - | - | - |
| other capex | 1,155,650 | - | - | - | - | - |
| Combined | | | | | | |
| renewal | 1,000,000 | 1,230,618 | 11,626,228 | 23,006,603 | 29,440,117 | 60,696,612 |
| other capex | 7,422,964 | 19,029,441 | - | - | - | - |
| | 110,493,915 | 77,332,462 | 11,626,228 | 23,006,603 | 29,440,117 | 60,696,612 |
| capitalised overheads | | | 418,498 | 828,146 | 1,059,727 | 2,184,836 |
| **Total capex** | **110,493,915** | **77,332,462** | **12,044,726** | **23,834,748** | **30,499,844** | **62,881,447** |
| level of service | 66,754,006 | 21,618,228 | 14,297,928 | 28,293,507 | 36,205,438 | 74,644,657 |
| growth | 29,002,809 | 17,510,928 | 8,936,206 | 17,683,442 | 22,628,400 | 46,652,911 |
| renewal | 14,737,100 | 38,203,306 | 12,060,352 | 23,865,671 | 30,539,414 | 62,963,029 |
| **Total capex** | **110,493,915** | **77,332,462** | **35,294,486** | **69,842,620** | **89,373,253** | **184,260,597** |

*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 which is 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.

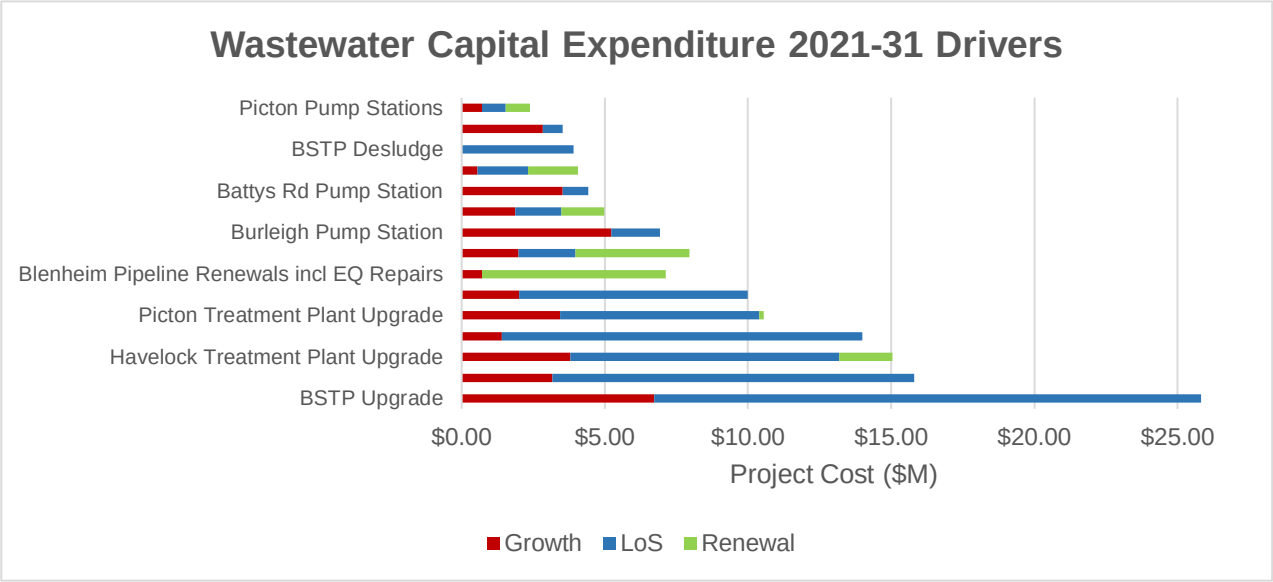



*Figure 5-3 Wastewater capital investment by main drivers.*

Figure 5-3 shows how the costs of the major capital projects have been attributed to the major drivers of growth, level of service and renewals. This information is used within the financial models to ensure funding is collected from the appropriate source.

## 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 gave consideration to 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 Sewerage and 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 for by lump sum contributions.

The overall costs of providing the wastewater activity is 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 wastewater 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 wastewater 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 wastewater service to be funded through a combination of general rates, uniform annual charge and tradewaste 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 typically:

- 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 wastewater reticulation consists of nearly 4,000 pipes with individual age, length, diameter and life expectancy characteristics. A data set has been collected of the out-turn costs of sewer and stormwater 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.

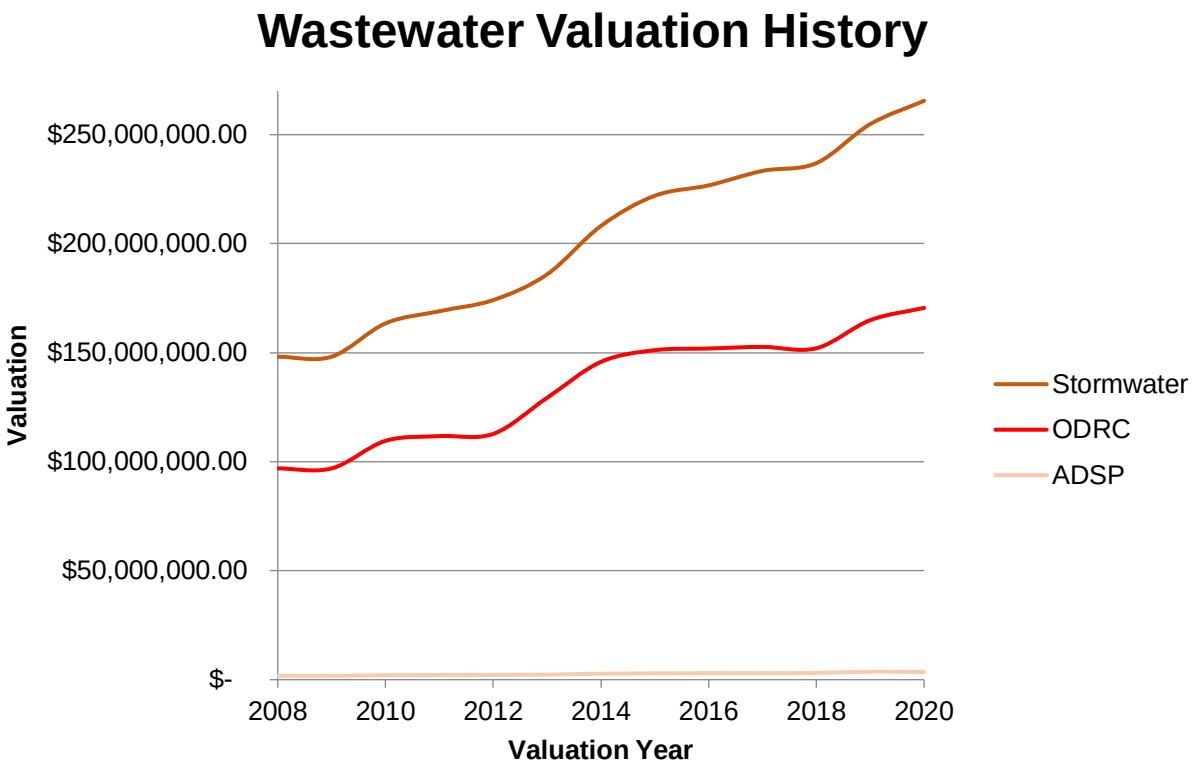



*Figure 5-4 Summary of Wastewater Valuation History 2008-2020.*

The data from wastewater and stormwater contracts have been combined to try to obtain a reasonable data-set to estimate a schedule of rates despite there being some inherent differences between the activities.

New assets are added to the register as they are bought, built or vested to the Council.

### 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 Wastewater Assets at the time of the 2020 Valuation was $3.52M.

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 2015 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 is 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 wastewater reticulation. Subsequent CCTV surveys has shown significant damage to the stormwater and wastewater earthenware pipes. The surveys have not been completed but in 2017 there was sufficient evidence to reduce the life expectancy of wastewater and stormwater earthenware and vitreous clay pipes to a maximum of five years.

### 5.3.4 Optimisation

The Marlborough wastewater 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.

Small wastewater pump stations are increasingly being standardised to a single wet-well, with submersible pumps and the switchgear being accommodated in a glass reinforced plastic (GRP) cabinet. The valuation assumes this design will be used wherever possible in future.

The NAMS guidance has generally been accepted for estimating the useful life of plant and equipment unless there is clear local evidence to the contrary. Continuous inspection and on-site condition assessment during planned pre-emptive maintenance is currently undertaken.

## 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. Topics include legislation, inflation, interest rates 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 wastewater assets are described below or in greater detail elsewhere in this plan.

The life expectancy of the wastewater 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 wall thickness. Life expectancy of all 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, air valves, fittings, apparatus, branch connections and service connections to the boundary of the road. The rates are an average across all ground conditions and depths, and include trench support and de-watering.

The adopted life expectancies suggest there is a significant amount of pipework that is beyond its theoretical life. The current programme of post-earthquake CCTV surveys will provide substantial evidence of the condition of earthenware and vitreous clay pipelines. Other materials will be investigated in due course. The pipes will be condition graded and the life expectancy can be adjusted accordingly. This will provide a sound platform for financial and renewal planning.

The life expectancy of plant and equipment assumes the continuation of the good standard of planned pre-emptive maintenance currently undertaken.

| 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 and 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 | |

*Useful service times reduced on earthquake damage and mains in Blenheim and Picton and Asbestos Cement mains in Renwick.

| Non-Reticulation Assets | Civil | Electrical | Mechanical |
|---|---|---|---|
| **Biofilter** | 40 | 25 | |
| **Pump Station** | 40 | 25 | 40 |
| **Source** | | | |
| **Storage** | | | |
| **Treatment Plant** | 100 | 25 | *40\|80\|100 |
| **Meters** | | 10 | 10 |

* split evenly across components of WW Treatment Plants.

*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.

The following table provides an indication of the quality of data held regarding the wastewater reticulation in each of the service areas.

| Quality of Asset Data - Critical Wastewater Mains | | | | | | | |
|---|---|---|---|---|---|---|---|
| **INSTALLATION DATE RELIABILITY** | | | | | | | |
| Reliability | | # assets | | Length (m) | | Value ($) | |
| 0 | Unknown | 2 | 1% | 136.8 | 0% | 106,996.80 | 0% |
| 1 | Actual data known | 276 | 88% | 33431.8 | 88% | 30,203,090.92 | 89% |
| 2 | Data based on confidence of other attributes | 32 | 10% | 3150.6 | 8% | 3,098,373.05 | 9% |
| 3 | Best guess to nearest decade | 4 | 1% | 1062.1 | 3% | 485,752.00 | 1% |

| **MATERIAL RELIABILITY** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Reliability | | # assets | | Length (m) | | Value ($) | |
| 0 | Unknown | 3 | 1% | 97.2 | 0% | 83,812.19 | 0% |
| 1 | Actual data known | 304 | 97% | 37119.0 | 98% | 33,223,995.45 | 98% |
| 2 | Data based on confidence of other attributes | 7 | 2% | 565.0 | 1% | 586,405.13 | 2% |
| 3 | Best guess to based on dia or install date | 0 | 0% | 0.0 | 0% | - | 0% |

| **DIAMETER RELIABILITY** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Reliability | | # assets | | Length (m) | | Value ($) | |
| 0 | Unknown | 4 | 1% | 149.8 | 0% | 114,512.32 | 0% |
| 1 | Actual data known | 309 | 98% | 37624.1 | 100% | 33,771,900.68 | 100% |
| 2 | Data based on confidence of other attributes | 1 | 0% | 7.4 | 0% | 7,799.77 | 0% |
| 3 | Best guess to based on material or install date | 0 | 0% | 0.0 | 0% | - | 0% |

**TOTAL DATA QUALITY**

| Reliability | | # assets | | Length (m) | | Value ($) | |
|---|---|---|---|---|---|---|---|
| 0 | Unknown | 9 | 1% | 383.8 | 0% | 30,5321.31 | 0% |
| 1 | Actual data known | 889 | 94% | 108174.93 | 95% | 97,198,987.05 | 96% |
| 2 | Data based on confidence of other attributes | 40 | 4% | 3722.96 | 3% | 3,692,577.95 | 4% |
| 3 | Best guess to based on other attributes | 4 | 0% | 1062.06 | 1% | 48,5752 | 0% |

| **Quality of Asset Data - Critical Wastewater Mains** | **B** |
|---|---|

*Table 5-5 Estimate of data quality.*

### 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 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 2021-31 Improvement Programme — issues identified and to be progressed.

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

6.5 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.

Wastewater 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 5-5 Estimate of data quality.

### 6.1.7 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 future. Improvement is required as technology progresses, the operating environment changes and the aspirations of stakeholders evolve. The provision of wastewater 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 following Wastewater Asset Management – Improvement Plan.

### 6.2.1 2021-31 Improvement Programme

Issues identified, and to be progressed in future, are outlined below.

# WASTEWATER ASSET MANAGEMENT - IMPROVEMENT PLAN

| | 2018 Improvements | 2018 Responsibility | 2018 Target Date | 2021 Update | 2021 Improvements | 2021 Responsibility | 2021 Target Date |
|---|---|---|---|---|---|---|---|
| MODELLING | Development of dynamic hydraulic models for remaining reticulation systems (Havelock & Seddon).<br><br>Ensure existing models are updated and checked through modelling staff succession | Transition from incumbent Services Development Engineer to Consultants<br><br>Development Engineer | TBD<br><br>Ongoing | Havelock and Seddon Wastewater Models in progress.<br>Regular updates to Blenheim and Picton Models as and when required. | Calibrated and validated Wastewater models for Havelock and Seddon | Planning & Development Engineer, Services Development Engineer, Consultants | Havelock, 2022<br><br>Seddon, 2024 |
| AMIS | Prepare and implement business intelligence reports from the new AMIS | Asset Management Engineer | 2018/2019 | | | | |
| | Continued improvement of field data capture and the "back-office" approval system | Asset Management Engineer/Operations Manager | 2018 onwards | | | | |
| ASSET REGISTER | Continue "sweeping" network areas to transfer hard copy plans to electronic data | Asset Management Engineer | Ongoing | | | | |
| | Correction of "best estimate" data in the asset register | Asset Management Engineer | Ongoing | | | | |
| URBAN GROWTH | Continue to develop agreed service plans for the new development zones | Infrastructure Projects Engineer | Ongoing | | | | |
| | Continue to monitor population growth trends and adjust infrastructure plans accordingly | Planning and Development Engineer / Operations Engineer / Asset Management Engineer | Ongoing | | | | |

# WASTEWATER ASSET MANAGEMENT - IMPROVEMENT PLAN

| | 2018 Improvements | 2018 Responsibility | 2018 Target Date | 2021 Update | 2021 Improvements | 2021 Responsibility | 2021 Target Date |
|---|---|---|---|---|---|---|---|
| FINANCIAL FORECASTS | Ensure operation and financial asset reconciliation is achieved and maintained | Asset Management Engineer / Accountants | June 2018 onwards | | | | |
| CONDITION MOINTORING | Extend pipe condition sampling and surveys to improve life expectancy projections. Prioritise critical assets | Operations and Maintenance Engineer / Asset Management Engineer | 2018 onwards | 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, eg, 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 operative skills in identification and recording of asset condition | Operations and Maintenance Engineer / Asset Management Engineer | Ongoing | Ongoing challenge in consistency across staff | Continue to develop understanding and consistency | Asset Management Engineer, Operations and Maintenance Engineer | Ongoing |
| | Improve the quality and consistency of condition grade recording and reporting systems | Operations and Maintenance Engineer / Asset Management Engineer | 2018 | Data capture improvements through work orders of maintenance tasks | | | |
| | Develop an automated method to return CCTV data to the AMIS and ensure there are good data interrogation and reporting tools to assist renewal decision making | Asset Management Engineer / IT | 2018 | AMIS cannot take the CCTV data, team working on a project to deliver a suitable means of storage and data capture | Develop appropriate and accessible system for recording and storing data, link data with AMIS wherever possible | CCTV Development Team | Ongoing |

| WASTEWATER ASSET MANAGEMENT - IMPROVEMENT PLAN | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2018 Improvements | 2018 Responsibility | 2018 Target Date | 2021 Update | 2021 Improvements | 2021 Responsibility | 2021 Target Date |
| | Develop business intelligence reports to assist with renewal decision making | Asset Management Engineer | 2018 | Custom reports developed within AMIS | | | |
| PERFORMANCE MONITORING | Improvement business intelligence reporting on asset performance | | | Custom reports developed within AMIS | | | |
| RESILIENCE | | | | | Improve understanding of interdependencies across Lifelines Sector | Asset Management Engineer, Lifelines Utilities Co-ordinator, Operations and Maintenance Engineer | 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 | Ongoing as knowledge increases |
| INFLOW AND INFILTRATION | Continue I&I investigation and develop a long term strategy for reduction | Operations and Maintenance Engineer | Ongoing | | | | |

| WASTEWATER ASSET MANAGEMENT - IMPROVEMENT PLAN | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2018 Improvements | 2018 Responsibility | 2018 Target Date | 2021 Update | 2021 Improvements | 2021 Responsibility | 2021 Target Date |
| | Package rehabilitation/renewal contracts for efficiency and encourage specialist no-dig techniques | Planning and Development Engineer / Operations Engineer / Asset Management Engineer | 2019/2020 | | | | |
| **PROACTIVE MAINTENANCE SCHEDULING** | Improve data collection recording of scheduled maintenance activities | Operations and Maintenance Engineer / Asset Management Engineer | 2019 | Maintenance schedules established within AMIS where applicable | | | |
| **DEMAND MANAGEMENT** | Develop a comprehensive wastewater management strategy | Operations and Maintenance Engineer / Asset Management Engineer | 2021 | Specific strategy has not been developed by management of the network continues as per the Infrastructure Strategy and Asset Management Plan | | | |

*Table 6-2 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: Wastewater Infrastructure Background and History

## Blenheim Sewage Treatment Plant

The Blenheim plant has evolved over many years. The original aeration ponds have been augmented with the treatment ponds that formerly served the PPCS meat processing plant. There have been major upgrades to the plant in recent years to meet the rapidly growing discharges from the wine industry. The most recent work was the construction of a major new wetland, tertiary treatment and outfall that will deliver improved effluent quality and facilitate irrigation to land. A new outfall pipeline has been constructed into the Wairau River estuary.

Most of the original Blenheim township was built on drained marshland on the braided floodplain of the Wairau River. Due to this topography and groundwater conditions, gravity sewers were built to very low gradients and required a series of pump stations to move the wastewater east and downstream of the town.

The original system was constructed in the early 1930s to serve a population of around 6,000 people. Sewage was collected in large septic tanks before discharge into the Ōpaoa River on the eastern boundary of town without further treatment. In 1962 the Springlands area was added to the scheme and a decision was made to investigate upgrading the treatment system. In 1968/69 a single oxidation pond was built at the current site on Hardings Road with an area of 16.4 ha, designed for a population of around 20,000. In 1990/91 an aeration lagoon was added upstream of the oxidation pond to reduce the soluble biological oxygen demand (BOD) and to balance peak loads entering the oxidation pond. By 1995, it was evident that increased capacity was required to cater for the domestic population growth, as well as increased industrial loads. New consent conditions required an improved effluent quality, particularly a reduction in faecal coliforms.

Upgrading was undertaken in stages between 1999 and 2001. The first stage comprised of the construction of an inlet screen as well as two new primary ponds (total area of 22 ha). Stage Two involved the desludging of the original 16.4 ha pond and formation of a primary pond and three maturation ponds. The sludge was air dried and carted to a landfill.

Effluent from the domestic treatment ponds used to discharge continuously by gravity to the Ōpaoa River through an 825 mm diameter concrete pipeline. In 2012 a major new project was commenced to build a series of eight tertiary wetland treatment ponds and a new combined outfall into the Wairau Estuary (see below.) On completion of the work the old outfall to the Ōpaoa River was decommissioned.

## Blenheim Industrial Ponds

The industrial sewage treatment plant (STP) ponds were formerly owned by the PPCS meat processing plant. MDC purchased the ponds and treatment plant when the works closed down in 2002. The former PPCS factory site has now been subdivided and is now known as Cloudy Bay Business Park (CBBP). New industries, particularly grape processing and wineries, have moved onto this site and the adjacent Riverlands Industrial Estate.

In 2003/04, during the vintage, discharges of wastewater with high BOD were received at the domestic treatment ponds, which became overloaded in terms of oxygen demand and their performance deteriorated. As a result of this overloading, MDC decided to separate the major industrial flows from the domestic portion and treat most of the industrial wastewater separately. Wastewater from the CBBP and Riverlands Industrial Estate was separated from the domestic stream in 2006, with the Canterbury Meat Packers flows diverted to the Industrial STP in 2007. Tradewaste discharges in Blenheim continue to contribute about 15% to the domestic flow which is typical for communities of this size.

MDC upgraded the industrial ponds to aerated ponds in a series, in time to treat the 2006 vintage. The combined industrial wastewater from CBBP, Riverlands Industrial Estate and CMP (now ANZCO) is screened and then flows into two treatment ponds, where mechanical aerators provide for BOD removal and full mixing.

Winery wastewater loads continued to increase rapidly and the industrial ponds were further upgraded for the 2009 vintage with additional aeration (to a total of 1700 kW) and installation of twin dissolved air flotation (DAF) units for solids separation and recycling to create an activated sludge process.

The industrial treatment ponds used to discharge, through a 375 diameter AC Class A pipeline to the Wairau Estuary over four hours on the ebb tide. The pipeline is not used regularly but remains in place to be used during times when the new outfall or the wetlands is closed for maintenance.

## 2012 Upgrade

A new consent (U071181) was applied for, and granted, in 2011 for a major upgrade to the plant. The upgrade includes:

- The decommissioning of the domestic outfall to the Ōpaoa River and re-direction of domestic treated wastewater to Pond 6.
- The construction of a new wetland treatment process consisting of a series of eight connected ponds to the north of Pond 6.
- A new 1050 mm outfall pipe and pump station connecting the final wetland (Pond 14) to the Wairau Estuary. Final effluent is discharged by gravity, or pumped where necessary. Discharge to the Wairau Estuary is restricted to the ebb tide except during significant storm events.
- When weather and soil moisture conditions are suitable, effluent is applied to land around the ponds. During summer this significantly reduces the volume of effluent discharged to water.

Construction was completed in early 2014.

## Picton

Picton and Waikawa are served by an extended aeration treatment plant which was completed in 1999. The plant performs very well and produces an effluent of consistent high quality. The old outfall pipeline that used to be conspicuous along the shore of Kaipupu Point has now been replaced by a new and improved underwater pipe, and the old pipeline has been removed.

A major upgrade of the trunk sewer between Waikawa and Picton commenced in 2017. Recent urban growth around Waikawa and infiltration of stormwater into the sewers had caused the existing infrastructure to be over-taxed and sewer overflows were not uncommon. The project to fix this involves renewing 3.2 km of trunk sewer and three pump stations. A treatment facility to provide partial treatment of a planned sewer overflow during very large storms has been incorporated into the design. A pipe has also been installed parallel to the trunk main that can be used to return treated wastewater for irrigation to land in future. The total cost of the project will be around $28M.

The Picton Sewage Treatment Plant (PSTP) is located off Gravesend Place and treats wastewater from the Picton and Waikawa Bay areas. The treatment process is based on an extended aeration basin, which is clarified with ultra-violet disinfection of the final effluent. Sludge is stabilised in facultative ponds. A new submerged pipeline and diffuser was constructed in 2012/13. Extensive investigation was undertaken to achieve the most efficient design for the dispersal of the effluent into harbour.

Regular overflows on the Waikawa-Picton trunk main points to the need for an upgrade of this pipeline. This is discussed further in Chapters 2 and 3.

## Havelock

Traditional oxidation ponds are used to treat effluent in Havelock and Seddon.

Reticulated sewerage collection was introduced to Havelock in 1985. Sub-catchment areas within the settlement drain to one of five pump stations that pump the sewage to the oxidation pond close to the Kaituna River via a main pump station at Mahakipawa Road.

Effluent from the plant could be variable with occasional high faecal coliform/enterococci counts and high levels of BOD and suspended solids in the outfall. In 2009 the single facultative treatment pond was extended by the commissioning of an adjacent maturation pond. The extension was completed with a bund wall to partially divide the second pond and a new outfall to the Kaituna River. A new screen and inlet and permanent facilities for a brush aerator were deferred.

Due to the sensitivity of the receiving environment and potential risk to human health, additional effluent and river quality monitoring was carried out over the 2014/15 summer. The results of the monitoring will be analysed and the risk to health from contact with the waters of the Kaituna River calculated. The findings will then be used to set pond effluent standards. Treatment options to meet those standards will then be reviewed.

The upgrade should be designed to meet the needs of a population of 1,200 with an average dry weather flow of 350 $m^3$/day and a future peak wet weather flow of 3,500 $m^3$/day.

## Seddon

Seddon is served by an oxidation pond followed by multiple maturation ponds, with the final effluent discharging to Starborough Creek in an incised cutting. The population of Seddon has declined marginally in the last few years although fluctuations in itinerant vineyard workers can cause significant seasonal variations. The treatment plant generally operates within its design capacity. A brush aerator can be deployed to assist with treating occasional high BOD loadings.

Investigations have been undertaken into the potential for land-based treatment in order to reduce the volume discharged to the creek.

## Spring Creek

In 2010 a new pump station and second pond was built at the outlet of the Spring Creek Sewage Treatment Plant (STP). The outfall to the Wairau River was decommissioned and the effluent from the ponds is now pumped through a new pipeline to the Blenheim STP inlet for treatment. The pipeline is also used to convey sewage from the Grovetown grinder pumps.

More details about the wastewater infrastructure are included in Chapter 4.

# Appendix 2: Levels of Service Performance Indicators 2021-31

## Levels of Service 2021-31 : Sewerage Including Treatment and Disposal

**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). | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 |
| | The total number of complaints received by the territorial authority about any of the following:<br>(a) sewage odour<br>(b) sewerage system faults<br>(c) sewerage system blockages, and<br>(d) the territorial authority's response to issues with its sewerage system,<br>expressed per 1000 connections to the territorial authority's sewerage system. | 8 | 8 | 8 | 8 | 8 |
| **System and Adequacy** Provide a level of service quality that minimises environmental risks. | The number of dry weather sewerage overflows from the territorial authority's sewerage system, expressed per 1000 sewerage connections to that sewerage system. | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| **Discharge Compliance** Provide a reliable wastewater service with adequate system capacity and performance. | Number of wet weather sewerage overflows from the territorial authority's sewerage system, expressed per 1000 sewerage connections to that sewerage system. | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| | Compliance with the territorial authority's resource consents for discharge from its sewerage system measured by the number of:<br>(a) abatement notices<br>(b) infringement notices<br>(c) enforcement orders, and<br>(d) convictions received by the territorial authority in relation those resource consents. | 0 | 0 | 0 | 0 | 0 |
| **Fault Response Times** Provide a service that is timely and responsive to customers' needs. | Where the territorial authority attends to sewerage overflows resulting from a blockage or other fault in the territorial authority's sewerage system, the following median response times (in hours) measured: | | | | | |
| | (a) attendance time: from the time that the territorial 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 |
| | Seddon | 2 hours | 2 hours | 2 hours | 2 hours | 2 hours |
| | Havelock | 2 hours | 2 hours | 2 hours | 2 hours | 2 hours |
| | (b) resolution time: from the time that the territorial authority receives notification to the time that service personnel confirm resolution of the blockage or other fault. | 4 hours | 4 hours | 4 hours | 4 hours | 4 hours |

# 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.

**Rainfal**l —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 (eg, refrigeration emissions from air-conditioning, reduce travel by holding virtual meetings, working from home, etc), Council operations (eg, 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.<br><br>Continue to increase the number of plug-in hybrid vehicles in Council's fleet and investigate use of electric vehicles. | Staff time<br>$ | Investigate opportunities to transition the majority of Council's fleet away from fossil fuels (ie, replace with plug-in hybrid and electric vehicles). | Transition the majority of Council's fleet away from fossil fuels (ie, 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 | BAU | Continue to invest in forest plantations and participate in the ETS programme. Explore | Continue to invest in forest plantations and participate in the ETS programme. |

| Goals | Targets | Actions (2019-2021) | Resources | Actions 2021-2024 | Actions 2024+ |
|---|---|---|---|---|---|
| | | programme. Explore opportunities to undertake carbon sequestration planting on Council land. | | opportunities to plant carbon forests on Council land (eg, river berm land). | Explore opportunities to plant carbon forests on Council land (eg, river berm land). |
| | | (vi) Continue to work with communities to develop catchment care programmes (eg, 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 | Staff time | Review programmes for reducing green | Implement programmes for reducing |

| Goals | Targets | Actions (2019-2021) | Resources | Actions 2021-2024 | Actions 2024+ |
|---|---|---|---|---|---|
| | | waste to landfills. | | waste to landfills and composting. | green waste to landfills and composting. |
| | (b) Council decisions for planning and infrastructure design supports private individuals and businesses to reduce their emissions by 80% by 2050.<br>*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:<br>(a) low carbon footprint buildings;<br>(b) highly energy efficient buildings;<br>(c) renewable energy use in buildings;<br>(d) reductions in refrigeration emissions from air conditioning and disposal of refrigerants;<br>(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 | (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 | BAU | Implement action plan to increase public transport use. | Implement action plan to increase public transport use. |

| Goals | Targets | Actions (2019-2021) | Resources | Actions 2021-2024 | Actions 2024+ |
|---|---|---|---|---|---|
| | engine vehicles on Marlborough roads declines. | prepare action plan to increase public transport use. | | | |
| | | (ii) Investigate ways to incentivise use of alternative transport modes, such as ride sharing and EVs. | Staff time | Investigate ways to incentivise use of alternative transport modes, such as ride sharing and EVs. | Investigate ways to 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 (ie, water supply sources, stormwater, wastewater, | 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 be assessed for climate change | Implementation of AMPs through network development projects.<br>Funding obtained through future plans. |

| Goals | Targets | Actions (2019-2021) | Resources | Actions 2021-2024 | Actions 2024+ |
|---|---|---|---|---|---|
| | | transportation, and solid waste) and their vulnerability to natural hazards and climate change. The plans will also identify what infrastructure will become redundant. | | risks at their proposed location, before decisions on siting of a new asset/replacement of existing assets are made.<br>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").<br>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 mapping of the coastal | $ | Undertake mapping | Update mapping |

| Goals | Targets | Actions (2019-2021) | Resources | Actions 2021-2024 | Actions 2024+ |
|---|---|---|---|---|---|
| | | 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 | Staff time | Website maintenance and updates. | Website maintenance and updates. |

| Goals | Targets | Actions (2019-2021) | Resources | Actions 2021-2024 | Actions 2024+ |
|---|---|---|---|---|---|
| | | and private mitigation, and Council's adaptation 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 |
| | (c) Decisions of Council consider the | (i) Include assumptions for climate change in | Staff time | Include assumptions for climate change in | Include assumptions for climate |

| Goals | Targets | Actions (2019-2021) | Resources | Actions 2021-2024 | Actions 2024+ |
|---|---|---|---|---|---|
| | implications of climate change for current and future generations. | the Long Term Plan, including provision for uncertainty, based on latest scientific evidence from the Intergovernmental Panel on Climate Change (IPCC). | | the Long Term Plan, including provision for uncertainty, based on the latest scientific evidence. | 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 | |
|---|---|---|---|---|---|
| BLENHEIM | Biofilter | $ 598,071.83 | $ 422,415.78 | $ 17,565.60 | |
| | Pond | $ 13,360,769.49 | $ 13,360,769.49 | $ - | |
| | Pump Station | $ 12,915,843.45 | $ 3,946,950.15 | $ 287,923.31 | |
| | Treatment Plant | $ 2,937,163.53 | $ 998,123.20 | $ 79,478.56 | |
| BLENHEIM TOTAL | | $ 29,811,848.30 | $ 18,728,258.62 | $ 384,967.47 | |
| GROVETOWN | Pump Station | $ 1,452,679.14 | $ 814,673.66 | $ 69,616.92 | |
| **GROVETOWN TOTAL** | | **$ 1,452,679.14** | **$ 814,673.66** | **$ 69,616.92** | |
| HAVELOCK | Pond | $ 566,674.01 | $ 566,674.01 | $ - | |
| | Pump Station | $ 821,459.76 | $ 349,019.07 | $ 17,816.89 | |
| | Treatment Plant | $ 233,523.40 | $ 111,828.40 | $ 6,240.07 | |
| **HAVELOCK TOTAL** | | **$ 1,621,657.17** | **$ 1,027,521.48** | **$ 24,056.96** | |
| PICTON | Pond | $ 1,112,795.74 | $ 1,112,795.74 | $ - | |
| | Pump Station | $ 9,313,560.13 | $ 8,411,338.26 | $ 168,900.53 | |
| | Reticulation | $ 1,624,623.27 | $ 1,462,160.94 | $ 20,307.79 | |
| | Treatment Plant | $ 6,437,372.53 | $ 4,103,092.53 | $ 121,063.05 | |
| **PICTON TOTAL** | | **$ 18,488,351.67** | **$ 15,089,387.47** | **$ 310,271.37** | |
| RENWICK | Pump Station | $ 808,046.35 | $ 503,874.82 | $ 20,278.10 | |
| **RENWICK TOTAL** | | **$ 808,046.35** | **$ 503,874.82** | **$ 20,278.10** | |
| RIVERLANDS | Biofilter | $ 133,944.91 | $ 94,321.89 | $ 3,962.30 | |
| | Pump Station | $ 5,225,424.24 | $ 4,153,267.34 | $ 116,573.05 | |
| | Reticulation | $ 56,130.29 | $ 47,459.17 | $ 1,734.23 | |
| | Treatment Plant | $ 25,077,160.62 | $ 20,614,889.11 | $ 413,350.10 | |
| **RIVERLANDS TOTAL** | | **$ 30,492,660.06** | **$ 24,909,937.51** | **$ 535,619.68** | |
| SEDDON | Pond | $ 553,000.53 | $ 553,000.53 | $ - | |
| | Pump Station | $ 302,378.58 | $ 215,644.39 | $ 7,540.68 | |
| | Reticulation | $ 187,492.24 | $ 165,618.15 | $ 3,124.87 | |
| | Treatment Plant | $ 347,039.57 | $ 243,039.86 | $ 4,143.98 | |
| **SEDDON TOTAL** | | **$ 1,389,910.92** | **$ 1,177,302.93** | **$ 14,809.53** | |
| SPRING CREEK | Pond | $ 350,125.29 | $ 350,125.29 | $ - | |
| | Pump Station | $ 259,533.16 | $ 101,351.40 | $ 5,693.80 | |
| | Treatment Plant | $ 1,006,402.53 | $ 802,904.37 | $ 28,092.94 | |
| **SPRING CREEK TOTAL** | | **$ 1,616,060.98** | **$ 1,254,381.06** | **$ 33,786.74** | |
| STANDR | Pump Station | $ 100,329.99 | $ 66,375.83 | $ 4,955.75 | |
| **ST ANDREW TOTAL** | | **$ 100,329.99** | **$ 66,375.83** | **$ 4,955.75** | |
| **OTHER TOTAL** | | **$ 85,781,544.58** | **$ 63,571,713.38** | **$ 1,398,362.52** | **Length (m)** |
| BLENHEIM | Reticulation | $ 117,789,808.20 | $ 62,543,343.72 | $ 1,408,673.46 | 198347.4 |
| GROVETOWN | Reticulation | $ 8,442,364.55 | $ 7,602,841.28 | $ 84,423.71 | 16995.1 |
| HAVELOCK | Reticulation | $ 4,352,109.57 | $ 2,884,435.87 | $ 45,769.91 | 9663.1 |
| PICTON | Reticulation | $ 27,567,185.60 | $ 18,308,241.15 | $ 345,338.51 | 49706.3 |
| RENWICK | Reticulation | $ 7,770,865.99 | $ 6,688,224.08 | $ 77,708.71 | 14964.7 |
| RIVERLANDS | Reticulation | $ 8,481,606.13 | $ 6,245,829.18 | $ 92,473.91 | 11525.8 |
| SEDDON | Reticulation | $ 3,601,288.41 | $ 1,596,085.25 | $ 48,619.34 | 7281.8 |
| SPRING CREEK | Reticulation | $ 1,760,487.04 | $ 1,141,723.10 | $ 18,204.80 | 3608.5 |
| **RETICULATION TOTAL** | | **$ 179,765,715.49** | **$ 107,010,723.63** | **$ 2,121,212.35** | **312092.7** |
| **WASTEWATER TOTAL** | | **$ 265,547,260.08** | **$ 170,582,437.01** | **$ 3,519,574.87** | **312092.7** |

# Appendix 7: Wastewater Capital Budget 2021-31

| | Wastewater - 2021-31 (inflated) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2021-22 | 2022-23 | 2023-24 | 2024-25 | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 | 2030-31 |
| Blenheim | | | | | | | | | | |
| renewal | 3,321,520 | 1,309,070 | 1,193,067 | 1,195,416 | 1,229,817 | 1,264,217 | 1,303,993 | 169,825 | 175,649 | 181,066 |
| other capex | 10,059,565 | 4,449,439 | 14,507,113 | 2,023,878 | 24,805,444 | 9,275,638 | 7,520,502 | 13,593,578 | 779,928 | 226,947 |
| Havelock | | | | | | | | | | |
| renewal | 22,000 | 11,389 | - | - | - | - | - | - | - | - |
| other capex | 261,592 | 1,220,976 | 6,847,592 | 2,188,472 | 63,130 | 6,008 | 6,603 | 6,675 | 1,818,891 | 6,331,001 |
| Picton | | | | | | | | | | |
| renewal | 701,180 | 302,937 | 261,634 | 261,205 | 268,722 | 276,239 | 284,930 | - | - | - |
| other capex | 1,514,333 | 3,194,673 | 1,703,233 | 4,420,369 | 656,583 | 7,767,698 | 57,568 | 26,699 | 26,361 | 20,401 |
| Renwick | | | | | | | | | | |
| renewal | - | - | 5,840 | - | - | - | - | - | - | - |
| other capex | 5,000 | 164,401 | 5,607 | 5,940 | 5,739 | 1,441,933 | 6,603 | 6,675 | 6,590 | 6,800 |
| Seddon | | | | | | | | | | |
| renewal | - | - | - | - | - | - | - | - | - | - |
| other capex | 412,806 | 2,788,326 | 8,783,823 | 3,279,738 | 5,739 | 6,008 | 6,603 | 6,675 | 6,590 | 6,800 |
| Grovetown | | | | | | | | | | |
| renewal | - | - | - | - | - | - | - | - | - | - |
| other capex | - | 22,274 | - | 24,950 | - | 25,234 | - | 28,034 | - | - |
| Riverlands Industrial | | | | | | | | | | |
| renewal | 5,500 | - | - | 12,004 | - | - | - | - | - | - |
| other capex | 2,261,786 | 1,194,427 | 163,530 | 179,278 | 10,330,341 | 3,785,074 | 198,082 | 200,244 | 197,706 | - |
| Spring Creek | | | | | | | | | | |
| renewal | 11,000 | - | - | - | - | - | - | - | - | - |
| other capex | 2,760 | 87,504 | 2,726 | 2,970 | 2,870 | 3,004 | 3,301 | 3,337 | 3,295 | 3,400 |
| St Andrews | | | | | | | | | | |
| renewal | - | - | - | - | - | - | - | - | - | - |
| other capex | - | - | 981,182 | - | 174,468 | - | - | - | - | - |
| Combined | | | | | | | | | | |
| renewal | - 1,000,000 | - | - | - | - | - | - | 1,230,618 | - | - |
| other capex | - 8,000,000 | - 6,211,973 | - 5,309,127 | 8,730,128 | 3,368,008 | 6,924,436 | 5,951,914 | 6,153,091 | - | - |
| **Total capex** | **9,579,042** | **8,533,443** | **29,146,219** | **22,324,350** | **40,910,860** | **30,775,488** | **15,340,098** | **21,425,451** | **3,015,010** | **6,776,415** |
| level of service | 7,518,797 | 6,933,001 | 16,553,666 | 7,976,733 | 27,771,810 | 11,492,751 | 256,795 | 2,622,227 | 2,060,376 | 5,186,079 |
| growth | 4,320,653 | 2,755,544 | 10,682,188 | 3,805,231 | 7,439,194 | 4,721,761 | 819,223 | 10,133,520 | 672,914 | 1,163,510 |
| renewal | - 2,260,407 | - 1,155,102 | 1,910,366 | 10,542,386 | 5,699,856 | 14,560,976 | 14,264,080 | 8,669,704 | 281,720 | 426,825 |
| **Total capex** | **9,579,042** | **8,533,443** | **29,146,219** | **22,324,350** | **40,910,860** | **30,775,488** | **15,340,098** | **21,425,451** | **3,015,010** | **6,776,415** |

## Appendix 8: Wastewater Capital Budget 2021-51

| | Wastewater 2021-51 (Inflated) | | | | | |
|---|---|---|---|---|---|---|
| | 21-26 | 26-31 | 31-36 | 36-41 | 41-46 | 46-51 |
| Blenheim | | | | | | |
| renewal | 8,248,890 | 3,094,750 | - | - | - | - |
| other capex | 55,845,440 | 31,396,593 | - | - | - | - |
| Havelock | | | | | | |
| renewal | 33,389 | - | - | - | - | - |
| other capex | 10,581,762 | 8,169,177 | - | - | - | - |
| Picton | | | | | | |
| renewal | 1,795,678 | 561,169 | - | - | - | - |
| other capex | 11,489,191 | 7,898,726 | - | - | - | - |
| Renwick | | | | | | |
| renewal | 5,840 | - | - | - | - | - |
| other capex | 186,688 | 1,468,601 | - | - | - | - |
| Seddon | | | | | | |
| renewal | - | - | - | - | - | - |
| other capex | 15,270,433 | 32,676 | - | - | - | - |
| Grovetown | | | | | | |
| renewal | - | - | - | - | - | - |
| other capex | 47,224 | 53,268 | - | - | - | - |
| Riverlands Industrial | | | | | | |
| renewal | 17,504 | - | - | - | - | - |
| other capex | 14,129,362 | 4,381,105 | - | - | - | - |
| Spring Creek | | | | | | |
| renewal | 11,000 | - | - | - | - | - |
| other capex | 98,829 | 16,338 | - | - | - | - |
| St Andrews | | | | | | |
| renewal | - | - | - | - | - | - |
| other capex | 1,155,650 | - | - | - | - | - |
| Combined | | | | | | |
| renewal | 1,000,000 | 1,230,618 | 11,626,228 | 23,006,603 | 29,440,117 | 60,696,612 |
| other capex | 7,422,964 | 19,029,441 | - | - | - | - |
| | 110,493,915 | 77,332,462 | 11,626,228 | 23,006,603 | 29,440,117 | 60,696,612 |
| capitalised overheads | | | 418,498 | 828,146 | 1,059,727 | 2,184,836 |
| **Total capex** | **110,493,915** | **77,332,462** | **12,044,726** | **23,834,748** | **30,499,844** | **62,881,447** |
| level of service | 66,754,006 | 21,618,228 | 14,297,928 | 28,293,507 | 36,205,438 | 74,644,657 |
| growth | 29,002,809 | 17,510,928 | 8,936,206 | 17,683,442 | 22,628,400 | 46,652,911 |
| renewal | 14,737,100 | 38,203,306 | 12,060,352 | 23,865,671 | 30,539,414 | 62,963,029 |
| **Total capex** | **110,493,915** | **77,332,462** | **35,294,486** | **69,842,620** | **89,373,253** | **184,260,597** |

## Appendix 9: Wastewater Operational Budget 2021-31

| | Wastewater - 2021-31 (inflated) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2021-22 | 2022-23 | 2023-24 | 2024-25 | 2025-26 | 2026-27 | 2027-28 | 2028-29 | 2029-30 | 2030-31 |
| Treatment - Power | 821,600 | 850,626 | 872,396 | 896,584 | 922,385 | 948,186 | 978,018 | 1,011,076 | 1,045,746 | 1,077,997 |
| Treatment costs | 460,600 | 558,922 | 617,823 | 737,532 | 1,041,417 | 1,532,177 | 1,697,041 | 1,683,026 | 1,740,737 | 1,870,522 |
| Pump Stations - power | 312,450 | 339,018 | 368,931 | 379,160 | 390,071 | 400,982 | 413,598 | 427,578 | 442,240 | 455,879 |
| Reticulation - mains maintenance | 238,500 | 246,926 | 253,245 | 260,267 | 267,757 | 275,246 | 283,906 | 293,502 | 303,567 | 312,929 |
| Pump stations - other | 224,500 | 232,431 | 241,034 | 253,174 | 260,459 | 267,745 | 276,169 | 285,503 | 295,293 | 304,400 |
| Treatment - monitoring/testing | 202,500 | 209,654 | 215,020 | 220,981 | 227,341 | 233,700 | 241,053 | 249,200 | 257,745 | 265,694 |
| Pump stations - mechanical | 93,900 | 97,217 | 99,705 | 102,470 | 105,419 | 108,367 | 111,777 | 115,555 | 119,517 | 123,203 |
| Pump stations - buildings/civil | 73,730 | 76,335 | 78,288 | 80,459 | 82,774 | 85,090 | 87,767 | 90,733 | 93,845 | 96,739 |
| Reticulation - connection maintenance | 70,000 | 72,473 | 74,328 | 76,389 | 78,587 | 80,785 | 83,327 | 86,143 | 89,097 | 91,845 |
| Reticulation - infiltration/leaks | 70,000 | 72,473 | 74,328 | 109,127 | 112,267 | 115,407 | 119,038 | 123,062 | 127,282 | 131,207 |
| Treatment - Oxidation pond maintenance | 64,000 | 78,685 | 80,699 | 121,131 | 124,616 | 193,884 | 199,984 | 206,744 | 213,833 | 220,428 |
| Grinder Pumps - Electrical | 52,000 | 53,837 | 55,215 | 56,746 | 58,379 | 60,012 | 61,900 | 63,992 | 66,186 | 68,228 |
| Pump stations - electrical | 45,900 | 55,804 | 57,232 | 58,819 | 60,512 | 62,205 | 64,162 | 66,330 | 68,605 | 70,721 |
| Grinder Pumps - Mechanical | 35,000 | 36,237 | 37,164 | 38,194 | 39,293 | 40,393 | 41,663 | 43,072 | 44,549 | 45,922 |
| Reticulation - manholes maintenance | 18,000 | 18,636 | 19,113 | 19,643 | 20,208 | 20,773 | 21,427 | 22,151 | 22,911 | 23,617 |
| Pump stations - telemetry | 13,735 | 14,220 | 14,584 | 14,989 | 15,420 | 15,851 | 16,350 | 16,903 | 17,482 | 18,021 |
| Reticulation - valves maintenance | 5,000 | 5,177 | 5,309 | 5,456 | 5,613 | 5,770 | 5,952 | 6,153 | 6,364 | 6,560 |
| **total infrastructure costs** | **2,801,415** | **3,018,672** | **3,164,415** | **3,431,120** | **3,812,519** | **4,446,574** | **4,703,132** | **4,790,724** | **4,954,999** | **5,183,914** |
| | | | | | | | | | | |
| operating costs | 305,584 | 316,380 | 324,477 | 333,474 | 343,070 | 352,666 | 363,762 | 376,057 | 388,953 | 400,948 |
| internal charges | 77,432 | 79,612 | 81,642 | 83,672 | 85,777 | 87,882 | 90,137 | 92,543 | 95,024 | 97,505 |
| depreciation | 3,908,192 | 4,260,536 | 4,792,187 | 5,530,467 | 6,279,396 | 7,017,477 | 7,564,493 | 8,079,013 | 8,532,021 | 8,871,438 |
| interest expense | 1,630,795 | 1,612,774 | 1,748,583 | 1,991,849 | 2,679,096 | 3,724,048 | 4,351,885 | 4,795,834 | 4,960,623 | 4,821,285 |
| overheads allocated | 3,309,257 | 3,443,236 | 3,553,543 | 3,625,594 | 3,724,032 | 3,823,786 | 3,929,279 | 4,040,768 | 4,157,954 | 4,266,919 |
| **Total operating costs** | **12,032,676** | **12,731,210** | **13,664,847** | **14,996,175** | **16,923,889** | **19,452,433** | **21,002,689** | **22,174,940** | **23,089,575** | **23,642,009** |

## Appendix 10: Wastewater Operational Budget 2021-51

| | Wastewater 2021-51 (Inflated) | | | | | |
|---|---|---|---|---|---|---|
| | 21-26 | 26-31 | 31-36 | 36-41 | 41-46 | 46-51 |
| Treatment - Power | 4,363,591 | 5,061,024 | 5,686,204 | 6,509,090 | 7,451,060 | 8,529,349 |
| Treatment costs | 3,416,295 | 8,523,502 | 9,866,603 | 11,294,459 | 12,928,950 | 14,799,977 |
| Pump Stations - power | 1,789,631 | 2,140,278 | 2,404,663 | 2,752,657 | 3,151,011 | 3,607,013 |
| Reticulation - mains maintenance | 1,266,695 | 1,469,151 | 1,650,633 | 1,889,506 | 2,162,948 | 2,475,961 |
| Pump stations - other | 1,211,599 | 1,429,111 | 1,605,647 | 1,838,010 | 2,103,999 | 2,408,482 |
| Treatment - monitoring/testing | 1,075,496 | 1,247,392 | 1,401,480 | 1,604,297 | 1,836,465 | 2,102,231 |
| Pump stations - mechanical | 498,711 | 578,420 | 649,872 | 743,919 | 851,576 | 974,812 |
| Pump stations - buildings/civil | 391,587 | 454,174 | 510,277 | 584,123 | 668,655 | 765,420 |
| Reticulation - connection maintenance | 371,776 | 431,197 | 484,462 | 554,572 | 634,827 | 726,697 |
| Reticulation - infiltration/leaks | 438,194 | 615,996 | 692,089 | 792,246 | 906,896 | 1,038,139 |
| Treatment - Oxidation pond maintenance | 469,130 | 1,034,873 | 1,162,710 | 1,330,973 | 1,523,586 | 1,744,073 |
| Grinder Pumps - Electrical | 276,177 | 320,318 | 359,886 | 411,968 | 471,586 | 539,832 |
| Pump stations - electrical | 278,268 | 332,022 | 373,036 | 427,020 | 488,817 | 559,557 |
| Grinder Pumps - Mechanical | 185,888 | 215,599 | 242,231 | 277,286 | 317,414 | 363,349 |
| Reticulation - manholes maintenance | 95,600 | 110,879 | 124,576 | 142,604 | 163,241 | 186,865 |
| Pump stations - telemetry | 72,948 | 84,607 | 95,058 | 108,815 | 124,562 | 142,588 |
| Reticulation - valves maintenance | 26,555 | 30,800 | 34,604 | 39,612 | 45,345 | 51,907 |
| total infrastructure costs | 16,228,140 | 24,079,343 | 27,344,033 | 31,301,156 | 35,830,938 | 41,016,253 |
| estimated uplift (mainly los driven) | | | 33,375,022 | 86,954,412 | 170,744,435 | 299,461,972 |
| operating costs | 1,622,985 | 1,882,386 | 2,114,915 | 2,420,977 | 2,771,332 | 3,172,388 |
| internal charges | 408,136 | 463,090 | 535,900 | 613,454 | 702,230 | 803,854 |
| depreciation | 24,770,777 | 40,064,443 | 44,357,192 | 44,357,192 | 44,357,192 | 44,357,192 |
| interest expense | 9,663,096 | 22,653,676 | 24,106,427 | 24,106,427 | 24,106,427 | 24,106,427 |
| overheads allocated | 17,655,663 | 20,218,707 | 29,530,883 | 33,804,478 | 38,696,532 | 44,296,545 |
| **Total operating costs** | **70,348,797** | **109,361,645** | **161,364,372** | **223,558,096** | **317,209,086** | **457,214,632** |