Asset Management Plan
3 Waters 2014

Rangitikei District Council

Contents

1 Introduction

Asset Management is important to the Council for a number of reasons. First, many of the services delivered by the Council rely on assets to support their delivery. Secondly, assets represent a significant investment by the Community that needs to be protected. Thirdly, asset failure can have both social and economic effects on the community.

In light of the above, Council has been undertaking Asset Management Planning for over decade. The objective of Asset Management is:

"To meet a required level of service in the most cost effective way (through the creation, operation, maintenance, renewal and disposal of assets) to provide for existing and future customers".

The Asset Management Plan is the tool for combining management, financial, engineering and technical practices to ensure that the level of service required by customers is provided at the lowest long-term cost to the community. The plan is intended to demonstrate that Council is managing the assets responsibly and that customers will be regularly consulted over the price/quality trade-offs resulting from alternative levels of service.

1.1 Background

The objectives of the Asset Management Plan are:

- To ensure strategic and operational decisions regarding the activity will be based on "best for asset" principles. Levels of service will be cascaded down through all levels of operational practices to enhance the network performance and ratepayer satisfaction. The management of the assets will be carried out within budget constraints.

- To provide clear linkages to the Annual Plan, Long Term Plan, and all other key planning processes and documents.

- To comply with the Local Government Act 2002 (LGA), specifically in relation to our activities, services and assets.

The purpose of this plan is to improve the stewardship of assets by Council on behalf of its customers and stakeholders and achieve compliance with statutory obligations. This plan specifically does that by:

- Demonstrating responsible stewardship of the assets.

- Identifying minimum lifecycle costs to provide an agreed level of service.

- Improving understanding of service level standards and options.

- Assisting with an integrated approach to Asset Management throughout the organisation.

- Improving customer satisfaction and organisational image.

- Managing the risk of failure to deliver the required level of service.
- Supporting long-term financial planning by the Council.
- Clearly justifying forward works programmes.
- Improving decision-making based on costs and benefits of alternatives.

This Asset Management Plan is intended to set out how Council manages assets in a way that is appropriate for a readership which includes executive management and elected members of the Council, interest groups, stakeholders, and other interested members of general community.

Asset Management Plans are tactical plans for achieving strategies resulting from the organisation's strategic planning process.

Asset Management Plans are a key component of the Council planning process, linking with the following plans and documents:

- **Long Term Plan (LTP)**. A plan required by the Local Government Act 2002 and Amendment Act 2010 to cover a period of at least 10 years. This plan contains key information about the Council's activities, assets, levels of service, and cost of providing services. It sets out the Council's funding and financial policies and also a financial forecast for the years covered by the plan. The LTP is now required to include a 30-year Infrastructure Strategy that includes the water, wastewater and stormwater activities.
- **District Plan**. Incorporates policies and objectives for land use and road infrastructure. It may include designations for future works that should be reflected in the Asset Management Plan.
- **Strategic plans**. Strategic plans set out broad strategic direction for the next 20 years. Asset Management Plans are prepared to reflect the strategies outlined in those documents and confirm tactics to achieve strategic goals.

The Asset Management Plan provides the data required to enable future planning for the management of assets, for example asset age, condition and replacement cost. This data is used for forward planning in the LTP.

- **Annual Plan**. Complements the LTP in the years between updates by reporting on variances. A detailed action plan on Council's projects and finances for each particular year.
- **Funding policies**. These policies state how future expenditure needs will be funded. Key policies are summarised in the LTP.
- **Business/activity plans**. The service level policies, processes and budgets defined in Asset Management Plans are incorporated into business plans as activity budgets, management strategies and performance measures.
- **Contracts**. The service levels, strategies and information requirements contained in Asset Management Plans are translated into contract specifications and reporting requirements.

- **Legislation**. The Asset Management Plan must comply with all relevant legislation and provide the means of meeting legislative requirements.

- **Bylaws, standards and policies**. These tools for asset creation and subsequent management are needed to support Asset Management practices.

- **Other documentation**. There are a number of other documents used on a day-to-day basis for management of activities. Such documents are referenced in the Asset Management Plan.

This Plan recognises the following key stakeholders:

Table 1: Key Stakeholders

External	Rangitikei District community
	Users of services (residents and visitors)
Internal	Councillors
	Asset Manager and Asset Management staff
	Finance managers
	Information technology managers
	Policy and planning managers

Council developed its first Water Asset Management Plan in 1997. The Asset Management Plans are reviewed and updated every three years. Council adopted the previous Water Asset Management Plan in 2012. This Plan is considered current and operative in terms of the condition of the networks, and the expectations of the community.

The Wastewater Asset Management Plan was first written in 1996. The Plan has been reviewed by several different parties in the past. The most recent review and gap analysis was completed by MWH. The last plan adopted by Management/Council was in 2012. The current plan has been revised to meet the requirements of the new format. The information contained within the AMP is substantially complete and up to date. With the document being used on a day-to-day basis, information will change to meet the District's changing needs.

A fundamental objective throughout the preparation (and future review) of this Asset Management Plan will be to identify potential opportunities for reductions in asset lifecycle costs.

1.2 Goals and Objectives of Asset Ownership

The objectives of the Asset Management Plan are:

- To describe how Council will implement the expectations that the community has about the management of its water, wastewater and stormwater assets through setting and delivering service levels within budget constraints.

- To provide clear linkages to the Annual Plan, Long Term Plan, and all other key planning processes and documents.

- To comply with the Local Government Act (LGA), specifically in relation to our activities, services and assets.

The purpose of this Plan is to improve the stewardship of assets by Council on behalf of its customers and stakeholders, and achieve compliance with statutory obligations.

The rationale for Council's involvement in each of the 3 Waters activities, and an overall description of them, are described in Section 2.

1.3 Plan Framework

Rangitikei District Council (the Council) is the main provider for water, wastewater and stormwater services in the District. To deliver these activities, Council establishes contracts to obtain these services via established procurement strategies.

Rangitikei District adjoins areas administered by Wanganui, Ruapehu, Napier, Tararua and Manawatu District Councils. Rangitikei District is within the area administered by Horizons Regional Council.

The strategic objective of Asset Management is to maintain the assets to a high standard. Major maintenance and construction programmes are also to be completed to improve efficiencies and safety across the District.

Maintenance intervention strategies will be based around creating efficiencies within the operational activities. Improving the timing of maintenance activities will reduce the cost per repair and increase of quantity of repairs, while retaining a high quality.

A collaborative environment will be fostered by a management group comprising the relevant Asset Manager, Project Managers and contractors. Intervention strategies will be developed as the collaborative environment develops. These strategies will be linked to the maintenance intervention strategies.

The assumptions used in Council planning that relate to Asset Management are described in Table 2. These are the assumptions adopted by Council for the Long Term Plan. They are currently in the process of being reviewed for inclusion in the Infrastructure Strategy. Once adopted, these will be updated in the relevant Asset Management Plans.

Table 2: Asset Management Assumptions

Forecasting Assumption	Risk	Level of Uncertainty	Reasons and Financial Effect of Uncertainty
Activities: Council will not exit any of the activities covered by this plan during the term of the Asset Management Plan	Council may chose to exit activities due to constrained finances	Low	Council has listed the assets covered by this plan as strategic assets, demonstrating its intention to continue with them

Forecasting Assumption	Risk	Level of Uncertainty	Reasons and Financial Effect of Uncertainty
Lives of assets: predictions contained in the Asset Management Plans are realistic	Asset lives are over stated and assets fail to deliver levels of service earlier than forecast	Low	Asset lives are reviewed regularly as part of condition assessment process
Levels of service: predictions of demand trends form a sound basis for the upgrading of assets	Council may renew or build new assets which do not meet user needs	Low	Council keeps abreast of National and International transportation trends

1.4 Core and Advanced AM

This Asset Management Plan has been prepared with the criteria of NAMS (New Zealand Asset Management Support) in mind. The NAMS International Infrastructure Management Manual (IIMM) is held up internationally as an example of best practice. This was reflected in the creation of the recent ISO 55000 standard for Asset Management, which specifically mentions the NAMS IIMM.

Asset Management (AM) maturity is defined by the International Infrastructure Management Manual (IIMM) produced by NAMS at four levels:

- Minimum.
- Core.
- Intermediate.
- Advanced.

Minimum is considered as the absolute lowest level essential for owning and maintaining a significant quantity of assets. Core represents a basic but sound level of Asset Management practices. “Intermediate” moves towards best practice, and “Advanced” is the highest level of AM maturity.

This hierarchy applies to all aspects of AM practice. There is a cost in moving from the more basic levels of AM to the higher levels in terms of time, expense and effort. It is common practice for organisation to target specific areas where they wish to invest in achieving “Intermediate” or “Advanced”, where this is justified by the criticality, risk or asset value concerned.

Rangitikei District Council has determined that all its AM practices should be at Core level. For further information, see Section 7 of this AMP.

2 Levels of Service

Rangitikei District Council aims to provide sustainable levels of service to the community in all areas. The term 'levels of service' refers to the standard to which a service is delivered to the customer. This may include targets for availability, quality, quantity, responsiveness and customer satisfaction. The Council ensures that levels of service are customer-focused, technically meaningful, and address the issues that are important to the community. Levels of service for this activity are agreed and established through community consultation.

The process for development and monitoring of levels of service can be summarised as:

- Identify the customers of the service and other parties with an interest (stakeholders).
- Define the current levels of service the organisation delivers.
- Design and carry out consultation to define the desired service level.
- Establish service targets and service achieved over a long period.
- Measure and report to community on level of service achieved.
- Review levels of service with stakeholders at regular intervals to check desirability and affordability of level of service provided.

The Asset Management Plan aims to document each of these steps for the activity, identify any issues such as adequacy of consultation, suitability of standards, or service gaps, and describe plans to address or improve them.

It is common for customers to demand a continual improvement in service, and while the Council will strive to deliver improvements, the level of service is constrained by cost considerations. It is therefore important that when Council consults with the community over levels of service, cost information is provided in order for the price/quality trade-off to be established. The main mechanism for consultation on levels of service is via the Long Term Plan.

2.1 Customer Research and Expectations

Customer drivers and community expectations are the needs, expectations and satisfaction of customers (whether residents or not), which are primary factors in defining levels of service and reviewing performance.

The identified customers who use the services provided by 3 Waters assets include:

- **Residents**. These people live in the District.
- **Ratepayers**. This includes people who own properties in the District but may or may not reside in the District.

- **Local users**. They are the users of the services provided by this activity on an occasional or regular basis.

- **Visitors**. These people do not live within the District, but visit the District to carry out business or undertake other activities.

- **Businesses**. Individuals or organisations that carry out their business in the District.

- **Other stakeholders**. Individuals or organisations that have interest in or are affected by the services undertaken by the Council. They include neighbouring local authorities, Horizons Regional Council, Community Boards and Committees, local iwi and public service providers.

2.1.1 Customer Satisfaction

The Council undertakes both customer surveys and assessments of the complaints/service request records to obtain information on the delivery of levels of service to customers. This research identifies areas that are performing well, as well as those that require improvement or intervention. Also of significant value to Council are regular meetings with various Community Committees and Boards throughout the District which provide wide-ranging information and highlight issues to be addressed. This information complements the regular inspections of assets undertaken by Council and their agents.

2.1.1.1 RFS System

The Council database has the facility to record information pertaining to a particular item, request services, and provide Council with a monitoring facility for response times to requests from Customers. The tracking of a type of activity can be monitored against contractor performance or whether a significant issue has occurred within the District.

2.1.1.2 NRB Communitrak Survey

Rangitikei District Council was involved in the National Research Bureau (NRB) Communitrak survey until recently. This provides community feedback on services, including water and wastewater, allowing tracking of changes in performance with time. The Communitrak survey is a telephone survey of residents, with results given by ward. NRB conducts research with other councils throughout New Zealand, and so we are able to compare our performance against national averages. Stormwater was not included in these surveys.

An analysis of the people involved in some way with the Communitrak surveys for Rangitikei is given in Table 3.

Table 3: Communitrak Survey Relationships

Party	Monitor Regulator	Facilitator Advocate	Partner or Funder	Provider	Customer
Resident Population					✓

Party	Monitor Regulator	Facilitator Advocate	Partner or Funder	Provider	Customer
Ratepayers			✓		✓
Local Users					✓
Visitors					✓
Local Businesses/ Industries			✓		✓
Other TLAs			✓		
Regional Council	✓		✓		
Community Boards/ committees		✓	✓		✓
Local Iwi		✓	✓		✓
Public Service providers	✓		✓		✓
NZTA	✓		✓		

Council participated in this survey every year from 1993 to 1999, then in 2005, 2007, and most recently August 2010. The 2010 survey collated responses from 404 residents of the Rangitikei District, broken down by wards as below.

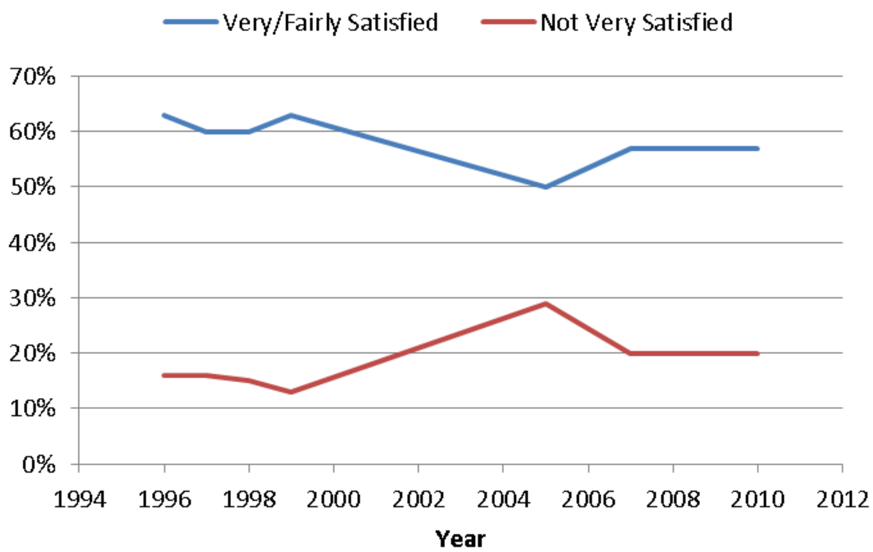
Table 4: Interviews by Ward

Ward	Interviews
Turakina	40
Bulls	60
Marton	160
Hunterville	41
Taihape	103
Total	**404**

All interviewing was conducted by telephone, with calls being made between 4.30pm and 8.30pm on weekdays and 9.30am and 8.30pm on weekends. The relevant white pages of the telephone directory were used as the sample source. Quota sampling was used to ensure an even balance of male and female respondents, with the sample also stratified according to Ward. Sample sizes for each Ward were predetermined to ensure a sufficient number of respondents within each Ward, so that analysis could be conducted on a Ward-by-Ward basis. A target of interviewing 100 residents aged 18 to 39 years was also met. Households were screened to ensure they fell within the District Council's boundaries.

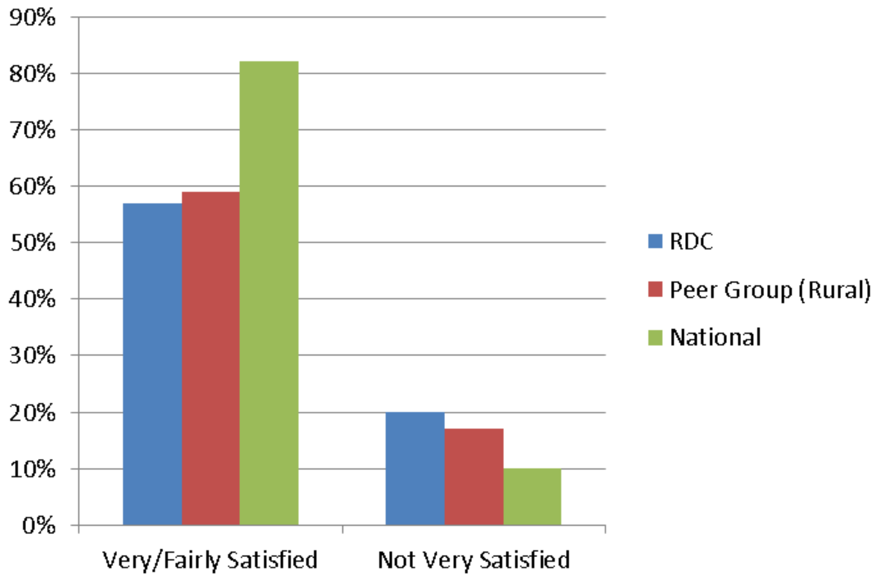
The overall results for water are shown in Figure 1 below. Satisfcation has reduced overall in the years from 1996 to 2010, although it did recover somewhat from a big dip in 2005.

Figure 1: Overall Satisfaction - Water



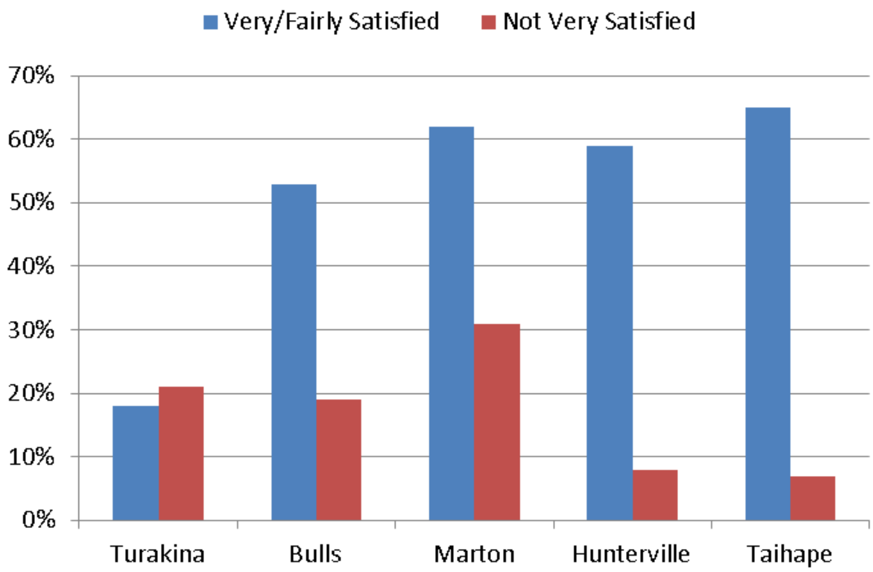
The NRB survey allows for comparison with other, similar Councils across New Zealand. Figure 2 shows that in 2010, satisfcation was slightly lower in Rangitikei than in other rural Districts that participated, but dissatisfaction was also lower. Nationally, satisfaction with water is always higher than in our peer group. This is most likely due to economies of scale in larger towns with centralised systems, which allow investment in expensive water infrastructure.

Figure 2: Peer Group Comparison 2010 - Water



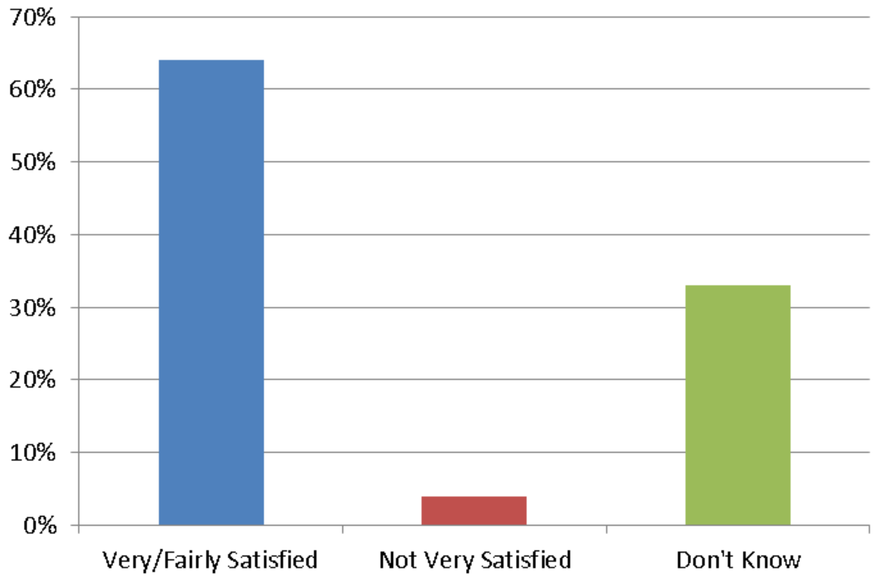
Satisfaction by area (in this case Ward) is a useful measure so that we can see where potential issues are. Figure 3 shows that in Hunterville and Taihape, the proportion of residents surveyed who were satisfied is far greater than the proportion who were not satisfied. In Marton, and to a lesser extent Bulls, there are higher proportions of residents dissatisfied with the water supply. Turakina had fewer responses, and more dissatisfaction than satisfaction. There is no reticulated water supply for Turakina. The fact that there is dissatisfaction may indicate a desire amongst the community to have one.

Figure 3: Satisfaction by Ward 2010 - Water



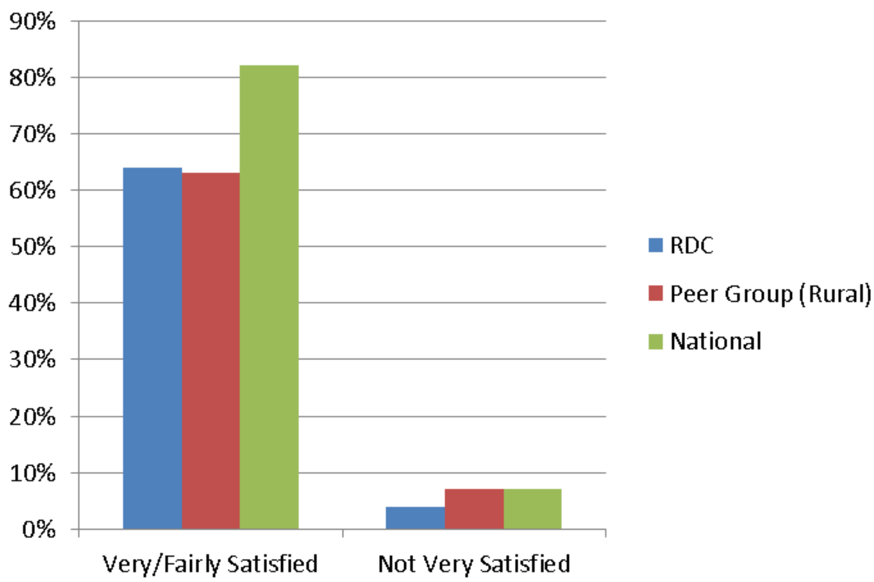
Satisfaction was only measured for the wastewater in 2010. Overall results are shown in Figure 4. Satisfaction was 64%, with only 4% of respondents not very satisfied. The high proportion of "Don't Know" responses (33%) would be due to the fact that only certain urban areas of the District have reticulated wastewater systems.

Figure 4: Overall Satisfaction 2010 - Wastewater



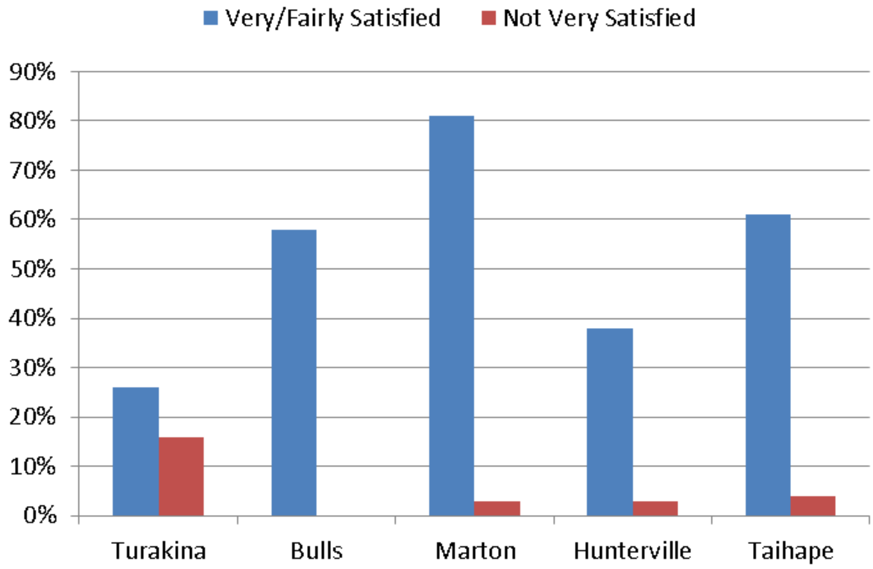
Comparison with peer group results for wastewater is favourable (see Figure 5). There were slightly more satisfied respondents for our wastewater systems than the peer group average. There were only 4% who were not very satisfied, compared with a peer group (and national) average of 7%. Again, the high satisfaction rate nationally can be attributed to larger, more expensive systems in towns or cities with a sizeable population base.

Figure 5: Peer Group Comparison 2010 - Wastewater



Satisfaction by Ward with wastewater services (as shown in Figure 6) shows that in most areas, there were few respondents who were dissatisfied with the service. In Bulls, no respondents indicated that they were dissatisfied. However, in the Turakina Ward 16% of respondents were unhappy with the service, compared with only 26% satisfaction. This highlights issues in the area. The result could be attributed partly to issues with the system at Koitiata, and partly due to the fact tha Turakina itself does not have a wastewater scheme.

Figure 6: Satisfaction by Ward 2010 - Wastewater



In addition to the data above, the 2010 survey highlighted these points:

- 27% of residents surveyed wanted RDC to spend more money on water supply. This figure was only 8% for wastewater.
- 10% asked for public consultation on water issues (with wastewater not featuring in response to this question).
- The main reasons for satisfaction with wastewater systems were that they function well and are checked regularly.

Following the 2010 NRB Communitrak survey, it was felt that the cost of the survey was not justified and it was discontinued. RDC then moved to using the Versus survey. Unfortunately, the Versus survey does not collect data on our water, wastewater or stormwater activities. At the moment, Council is considering the future of customer surveys for these activities, and it is possible they will be reinstated in some form. Until such time, feedback on these services is collected using our RFS system.

2.1.2 LGNZ 3 Waters Survey

Rangitikei District Council was a participant in the 2013-2014 Local Government New Zealand (LGNZ) 3 Waters survey. This survey was conducted among Councils throughout the country so that performance could be benchmarked nationally. Participation in this survey allows key information on issues affecting services in Rangitikei to be fed back to a national level. It also allows us to assess our performance against other, similar Councils.

2.2 Strategic and Corporate Goals

This section sets out the services provided by the 3 Waters assets, and:

- What each activity provides to the community in terms of services.
- Why Council is delivering these services.

- Significant negative effects of the activity.
- Significant changes planned to the activity (if any).

2.2.1 Community Outcomes

The Local Government Act 2002 required local authorities to identify Community Outcomes for their Districts. For Rangitikei District, these were a picture of the type of District people want to live in over the next 10-15 years. The whole community owned these outcomes. The Community Outcomes developed for Rangitikei District were:

- **CO1: Good access to health services**: achieving access to health services, whether it be the GP or the hospital is key.
- **CO2: A safe and caring community**: through effective partnership with local Police, rescue services, neighbourhood support and local initiatives.
- **CO3: Life-long educational opportunities**: that meet the lifelong needs of all members of the community.
- **CO4: A buoyant District economy**: with effective infrastructure and attractive towns that entice growth.
- **CO5: A treasured natural environment**: with a focus on sustainable use of our land and waterways.
- **CO6: Enjoying life in the Rangitikei.**

The 3 Waters activities contribute equally to: a treasured natural environment, buoyant economy, and enjoying life in the Rangitikei.

The 2010 amendment to the Local Government Act 2002 removed the requirements for Council to follow a prescribed process for identifying Community Outcomes. The amendment also redefined community outcomes as being "the outcomes that a local authority aims to achieve in order to promote the social, economic, environmental, and cultural wellbeing of its District or Region, in the present and for the future". In May 2011 the Council considered how it would respond to the changes brought about by this amendment to the Act. It was confirmed that the Community Outcomes would become the Council's Community Outcomes for the 2012 LTP. The outcomes above have been confirmed by Council as being applicable to the Long Term Plan for 2015-2025.

2.2.2 Policy Manual

Council has identified five key policy intents which enables it to play the broad role envisaged by the Act whilst ensuring that its activities remain focussed on being good quality (i.e. efficient, effective and appropriate) and cost-effective for households and businesses. These policy intents are:

1. Promoting economic development.
2. Sustaining the natural environment.
3. Supporting recreational, creative and cultural pursuits.
4. Providing opportunities for participation and social cohesion.
5. Contributing to personal and public safety.

For each of these, Council has agreed the following:

- Statement of intent.
- Wider influences.
- Links to other Council policies and strategic documents.
- Contribution from Council's activities.

The provision of 3 Waters infrastructure underpins each of these policy intents to varying degrees. The policy intents are described in greater detail in the Rangitikei District Council Policy Manual. The Policy Manual also describes Council's strategic policies governing activity and asset management planning, which tie in closely with this Asset Management Plan. The strategic objective of Council's activity and asset management planning is to "meet a required level of service in the most cost-effective way". This includes the creation, operation, maintenance, renewal and disposal of assets to provide for existing and future customers.

Council will:

- Provide core services to meet the purpose of local government, other relevant legislation and local government industry standards.
- Actively seek to improve the value-for-money and cost-effectiveness of its services.
- Particularly seek to deliver its services and activities to maximise the contribution to its five strategic policy intents.
- Manage the risk of failure in its activity and asset management planning.
- Identify performance indicators at governance and operational level to support delivery of agreed levels of service.

Where Council decides to provide a higher level of service than this minimum, it will clearly explain its reasons for doing so. This will enable customers and stakeholders to assess the compliance of Council's level of service and performance.

2.2.3 Significance and Engagement Policy

Under Section 90 of the LGA, each Council is required to have a Significance and Engagement Policy (SEP). This policy can be seen as a means for ensuring that, in making decisions, Council:

- Is clear about why it is addressing a matter.
- Has considered and evaluated the options and alternatives.
- Has information on the community view about the matter and the options for addressing it, and particularly that it has an understanding of the views and preferences of those persons likely to be affected by, or have an interest in, the matter.

A significant activity is one that has a high degree of significance in terms of its impact on either:

- The wellbeing of the people and environment of Rangitikei District; and/or
- Persons likely to be affected by or with an interest in that activity; and/or
- Capacity of the Rangitikei District Council to provide for the wellbeing of the District.

Some common examples that SOLGM provide of criteria used to determine the significance of a decision include:

- The cost of the decision.
- The reversibility i.e. once actioned, how easy would it be to reverse. The more difficult to reverse a decision, the greater its significance.
- Community interest.
- The degree of impact (i.e. the consequences) on the affected parties.
- The degree to which the decision promotes our stated Community Outcomes.
- The degree to which the decision promotes another decision or action already taken by Council.
- The impact of the decision on levels of service.
- The impact on rates or debt.
- Whether the decision involves a strategic asset. Strategic assets are those that Council needs to retain in order to maintain its ability to achieve or promote any Community Outcome.

Council's Significance and Engagement Policy is under review, in parallel with the creation of the 2015-2025 Long Term Plan. This section of the Asset Management Plan will be updated once the revised Policy has been adopted.

2.2.4 Infrastructure Strategy

For the 2015-2025 Long Term Plan, Council is required to produce an Infrastructure Strategy. This document has a strategic overview of the infrastructure services that Council provides, including water, wastewater and stormwater. It has a 30 year planning horizon, and the financial forecasts that are generated as part of this Asset Management Plan feed into it.

The Infrastructure Strategy discusses the overall trends that Council needs to be aware of in planning for sustainable infrastructure in the Rangitikei District. Included in the assumptions are the likelihood that in some cases our water, wastewater and stormwater networks may need to shrink as towns reduce in size and population shifts. Projected declines in population mean a diminishing number of properties connected to our water, wastewater and stormwater systems. For smaller towns in the District, this may make such systems too expensive, particularly for wastewater with the likelihood of stricter discharge consent conditions.

The five reasons that the Infrastructure Strategy identifies for Council to either add to or abandon existing infrastructure are:

- Growing economy;
- Changing demographics;
- Rising environmental expectations;
- Climate change; or
- Earthquake resilience.

Making better use of the District's water resources is a key part of the Infrastructure Strategy. Work done to unlock the potential of under-utilised resources is referred to elsewhere in this Asset Management Plan.

The Infrastructure Strategy for Rangitikei District Council will be finalised prior to adoption of the Long Term Plan. The Asset Management Plan will align with the Infrastructure Strategy, providing an operational focus on implementing the strategy.

2.2.5 Operational Guidelines

Underneath the strategic Policy Manual are a group of operational guidelines for activities including water, wastewater and stormwater. These guidelines explain the operational direction for each of these activities, and inform the levels of service that are provided.

The Operational Guidelines for Water also contain our Rural Water Supply Policy, which applies to the Erewhon, Hunterville, Omatane and Putorino Rural Water Supplies.

2.2.6 Subdivision and Land Development

Rangitikei District Council has adopted the New Zealand Standard for Land Development and Subdivision Infrastructure (NZS 4404:2010) as its minimum design standard for work related to land development and subdivision. In addition, there is an addendum that outlines any changes specific to Rangitikei District.

2.2.7 Significant Negative Effects

The Local Government Amendment Act 2010 specifies that Council must "outline any significant negative effects that any activity within the group of activities may have on the social, economic, environmental, or cultural wellbeing of the local community".

For this Council, the first step is to identify the positive and negative effects of the activity on the four wellbeings. These effects are listed in the table below, with only those that are significant reported in the Long Term Plan.

Table 5: Significant Negative Effects

Community Wellbeing		Negative Effect	Significant	Mitigation
Water				
Social	People able to go about their business and leisure any time of the day or night without fear for their safety.	The supply of unsafe water can have a negative effect on our social wellbeing.	Yes	Water quality is monitored against the Drinking Water Standards for New Zealand.
Environmental	A self sufficient environment that preserves, values and develops our natural resources.	Extraction and the use of water resources may impact on the life-supporting capacity of ecosystems (eg river systems) and the environment generally.	Yes	The Regional Council through the resource consent process manages environmental effects; Council actively complies with resource consent conditions.
Economic	A vital community that is cohesive and characterized by community involvement.	The cost of providing and improving water supply infrastructure in some areas of the District may be beyond the ability of the community to pay.	Yes	While there are always costs for delivering a service, Council promotes the "best cost-efficient solution" philosophy to water activities.
Cultural	A community that has access to effective services.	We live in a complex cosmopolitan community with differing cultural beliefs. One of these is the direct discharge of pollutants to the environment.	Yes	Council works to minimise any cultural conflicts that may occur in the water activity e.g. by consulting with affected groups through Te Roopu Ahi Kaa and other channels.
Wastewater				

Community Wellbeing		Negative Effect	Significant	Mitigation
Social	Protecting both the environment and the health of the public.	No development and growth, and our very lives would be at risk.	Yes	Better regulation and control, coupled with better process management.
Environmental	Protecting both the environment and the health of the public.	No development and growth, and our lives would be at risk.	Yes	Better regulation and control, coupled with better process management. The Regional Council through the resource consent process manages environmental effects. Council actively complies with resource consent conditions.
Economic	Growing urbanization, climate change, and new analytical techniques that are constantly allowing us to identify new pollutants and understand the fate of others during treatment and subsequently in receiving waters have all significantly influenced the wastewater industry, contributing to satisfy the needs of a modern society.	Wastewater treatment could eventually reach crisis point where existing technologies will prove to be too expensive and energy dependent to be able to satisfy all the needs of a modern society.	Yes	New separation technologies and water reuse at the household level is reducing wastewater loadings. Localised treatment plants rather than centralized systems are now thought to be more efficient, removing pollutants at source rather than at the treatment plant.
Cultural	Wastewater treatment will have to become a joint venture between all the stakeholders, with every person having to take some responsibility for their waste.	We live in a complex cosmopolitan community with differing cultural beliefs.	No	Council works to minimise any cultural conflicts that may occur in the wastewater activity e.g. by consulting with all affected groups.
Stormwater				
Social	People able to go about their business and leisure any time of the day or night without fear for their safety.	The ponding of stormwater can have a negative effect on our social wellbeing and property.	Yes	Council actively complies with its accepted design criteria.

Community Wellbeing		Negative Effect	Significant	Mitigation
Environmental	A self-sufficient environment that preserves, values and develops our natural resources.	Collection and disposal of stormwater may impact on the life-supporting capacity of ecosystems (eg river systems) and the environment generally.	Yes	The Regional Council through the resource consent process manages environmental effects. Council actively complies with resource consent conditions.
Economic	A vital community that is cohesive and characterized by community involvement.	The cost of providing and improving stormwater supply infrastructure in some areas of the District may be beyond the ability of the community to pay.	Yes	While there are always costs for delivering a service, Council promotes the best cost-efficient solution philosophy to stormwater activities.
Cultural	A community that has access to effective services.	We live in a complex cosmopolitan community with differing cultural beliefs. One of these is the direct discharge of pollutants to the environment.	Yes	Council works to minimise any cultural conflicts that may occur in the stormwater activity e.g. by consulting with Te Roopu Ahi Kaa and through other channels.

2.3 Legislative Requirements

The key legislation relating to the management of our water, wastewater and stormwater assets are listed in the sections below.

2.3.1 Local Government Act (LGA) 2002

The Local Government Act 2002 and the Local Government Amendment Act 2010 define the purpose of local authorities as twofold:

a) to enable democratic local decision-making and action by, and on behalf of, communities; and
b) to meet the current and future needs of 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.

To help local authorities exercise the power of general competence appropriately and to meet the purpose of enabling local decision-making by or on behalf of local communities, the Act includes significant consultative requirements including:

- Council must, in the course of its decision-making process in relation to a matter, give consideration to the views and preferences of persons likely to be affected by or have an interest in the matter, and provide appropriate information delivered in ways that will enable communities to participate effectively.

- Council must, not less than once every three years, prepare and adopt a Long Term Plan (LTP) in accordance with the special consultative procedure.
- In the course of developing an LTP, the Asset Management Plan provides information on the costs of asset-based activities including proposed changes to levels of service and provision in the future.

The impacts of this legislation on levels of service are on:

- Statutory requirements for establishing minimum level of service standards.
- Frequency of reviewing level of service standards.
- Degree of community consultation, and level of information provided.
- Identification of community outcomes and priorities for the District or Region.
- Frequency of the preparation and adoption of the Long Term Plan.

2.3.2 Resource Management Act 1991

This legislation covers requirements and responsibilities to manage resources effectively and sustainably. Among other provisions, it requires Council to:

- Sustain the potential of natural and physical resources to meet the reasonable and foreseeable needs of future generations.
- Develop, monitor and review the District Plan.
- Comply with relevant Regional Plans and National Policy Statements.
- Avoid, remedy or mitigate any adverse effect on the environment.
- Take into account the principles of the Treaty of Waitangi in exercising functions and powers under the Act relating to the use, development, and protection of natural and physical resources.
- Safeguard the life-supporting capacity of air, water, soil and ecosystems.

It also provides legislation in terms of designations and financial contributions.

2.3.3 Health & Safety in Employment (HSE) Act 1992

This Act requires the provision of safe workplaces for all activities by local authority staff and contractors, and the maintenance of an audit trail to demonstrate compliance. For example, the Transit NZ Guidelines ‘’Code of Practice for Temporary Traffic Management” is a recognised standard for maintenance and construction works on legal road. The Act sets statutory requirements in terms of Health & Safety, and minimum best practice.

2.3.4 Health Act 1956

This Act requires local authorities to provide sanitary works. The duties of drinking water suppliers, and the issuing of drinking water standards, are enshrined in the Health (Drinking Water) Amendment Act 2007. The Drinking Water Standards for New Zealand 2005 (Revised 2008) detail the requirements of drinking water suppliers with regard to quality and safety of the water they produce for human consumption.

Water Safety Plans (WSPs) are required under the Health Act for a number of Rangitikei District Council water supplies. These replace Public Health Risk Management Plans (PHRMPs). Existing PHRMPs will be updated to Water Safety Plans within the timeframes required. The status of these plans is shown in Table 6.

Table 6: Water Safety Plan Status

Scheme	Category	PHRMP Status	WSP Status
Marton	Minor supply	None	Draft completed Due 30/6/2015
Taihape	Minor supply	None	Draft completed Due 30/6/2015
Bulls	Minor supply	None	Draft received by DWA Due 30/6/2015
Mangaweka	Small supply	Approved 16/3/2009	Draft completed Due 30/6/2015
Hunterville Urban	Small supply	None	Approved
Ratana	Small supply	Approved 20/3/2008	Due 30/6/2015
Erewhon Rural	Not required		
Hunterville Rural	Not required		
Omatane Rural	Not required		
Putorino Rural	Not required		

The draft Water Safety Plan for Bulls has been accepted by the Drinking Water Assessor. However, upgrades following a switchboard fire at the plant mean that the process will change somewhat, and this Water Safety Plan will need to be revised accordingly. As shown in the table above, draft Water Safety Plans have also been completed for the Marton, Taihape, Mangaweka and Hunterville Urban supplies. Work is underway to have all required Water Safety Plans finalised and approved.

2.3.5 Civil Defence Emergency Management Act 2002

The Civil Defence Emergency Management (CDEM) Act 2002 requires Local Authorities to coordinate plans, programmes and activities related to CDEM across the areas of Risk Reduction, Readiness, Response and Recovery. It also encourages cooperation and joint action within regional groups. The Act compels Councils to function at the fullest possible extent during and after an emergency and to have plans for such functioning.

2.3.6 Building Act 1991

The onus on Council is to ensure all buildings and facilities constructed comply with this Act; and to produce Project Memoranda (PIMs) that supply all available information relating to an individual property. This includes Council services and plans which impact now or may impact in the future on the property.

2.3.7 Soil Conservation and Rivers Control Act 1941

This Act requires Council to "minimise and prevent damage by floods and erosion" and provides extensive powers to achieve this. The impact on the levels of service of this legislation is that Council is required to complete an annual evaluation of flood and erosion risks, and implement an adopted risk management programme. In terms of 3 Waters, this Act is most applicable to the Stormwater activity.

2.3.8 Land Drainage Act 1908

This Act specifies that all drains and watercourses under the control of a Local Authority must be:

- Constructed and maintained so as not to be a nuisance or injurious to health.
- Properly cleared, cleansed and maintained.

In order to comply with this Act, Council will:

- Complete an annual evaluation of risk associated with the stormwater network and implement the adopted risk management plan.
- Implement a land drainage maintenance programme as agreed with community.

Again, this Act has the most relevance to the Stormwater activity.

2.3.9 Water and Sanitary Services Assessments

The Local Government Act 2002 required local authorities to assess the water services and other sanitary services (such as wastewater and stormwater) that it provided. Following production of the first round of Water and Sanitary Services Assessments (WSSAs) across the country in 2005, they were subsequently included in Asset Management Planning. WSSAs cover, among other things:

- Health risks to communities that could arise from the absence of the water and sanitary services provided.
- Quality of services currently available.

- Current and future demand for these services.
- Compliance of drinking water with the relevant standards.
- Actual or potential consequences of wastewater and stormwater discharges.

The only requirement for updating WSSAs is that this is done "from time to time". The Drinking Water Assessor does not expect revised WSSAs as there is no statutory timeframe, but will review any updated WSSAs that Council produces. Council is currently going through the process of aligning the existing WSSA with the 2015-2025 Long Term Plan to identify any gaps that need to be addressed.

2.3.10 National Environmental Standards

The Ministry for the Environment (MfE) has produced National Environmental Standards (NESs) to protect the New Zealand environment, and work towards a consistent approach to environmental management across the country. These are regulations issued under Sections 43 and 44 of the Resource Management Act 1991 (RMA).

The following NESs are currently in force:

- Air quality.
- Sources of human drinking water.
- Telecommunications facility.
- Electricity transmission.
- Assessing and managing contaminants in soil to protect human health.

The proposed NES for the measurement of water takes is now instead a set of regulations within the RMA. The proposed NES for on-site wastewater treatment systems has been withdrawn.

The NESs most applicable to Rangitikei District Council are those on sources of human drinking water and contaminated soil. The regulations are generally applied by Regional Councils in their planning. Horizons Regional Council remains the first point of contact regarding environmental issues in the District. The only NES that Rangitikei District Council has direct involvement with implementing is that for contaminated soil. Council keeps track of contaminated sites within the District, as this information has implications for Planning and Building consents.

2.3.11 National Policy Statement for Freshwater Management

The National Policy Statement (NPS) for Freshwater Management took effect on 1 August 2014. It sets out the objectives and policies for freshwater management under the Resource Management Act 1991. This NPS directs Regional Councils to establish objectives and set limits for freshwater in their regional plans. In the Manawatu-Wanganui region, this is achieved through the Horizons One Plan.

2.3.12 DIA Mandatory Performance Measures

The Local Government Amendment Act 2010 provides that the Secretary of Local Government will introduce standard performance measures that are applicable to local authorities so that the public may compare the levels of service provided in relation to a group of activities by different local authorities. The measures apply to the mandatory groups of activities as specified in the Act, namely:

- Water supply.
- Sewerage and the treatment and disposal of sewage.
- Stormwater drainage.
- Flood protection and control works.
- The provision of roads and footpaths.

Section 4 of Schedule 10 of the Amendment Act 2010, specifies the information to be provided in the Long Term Plan as part of the statement of service provision. As well as performance measures for the mandatory Groups of Activities, the Act also requires that each local authority provides information on:

- The performance measures that the Local Authority considers will enable the public to assess the levels of service for major aspects of groups of activities for which performance measures have not been specified as mandatory measures.
- The performance targets set by the local authority for each performance measure.

2.3.13 Horizons One Plan

From 2003, Horizons Regional Council began the process of combining its six key documents on environmental protection for the Region. The result of this is the One Plan, which is the plan for resource management in the Manawatu-Wanganui Region for the next ten years.

The One Plan focuses on the big four issues facing resource management in the Region:

- Water quality.
- Increasing water demand.
- Hill country erosion.
- Declining biodiversity.

The following aspects are also covered:

- Infrastructure, energy and waste.
- Te Ao Māori.
- Air quality.
- Natural hazards.
- Landscapes and historic heritage.

- Coastal activities.

This document, and the rules contained within, has a major impact on the water, wastewater and stormwater services that Rangitikei District Council provides. Horizons determines the quantity of water we can abstract from bores or streams in the Region. They also determine the quality and quantity of wastewater or stormwater that we can discharge to the environment. Most of these requirements are reflected in the resource consents we hold, which are detailed in Section 4 of this Asset Management Plan.

2.3.14 Rangitikei District Plan

The District Plan sets out rules for the use of land within the District, including permitted activities and activities for which resource consent must first be obtained. It provides a written strategy for managing the District's land-related resources, in terms of the Council's functions and duties under the Resource Management Act 1991.

2.3.15 Council Bylaws

Bylaws are generally made by Councils to address perceived nuisances and risks to public safety. For example, the Stock Droving and Grazing Bylaw 2001 reduces damage to the road surface and hazards to other users of roads. Local regulations enacted under the Local Government Act 2002, Health Act 1956 and Rating Powers Act 1988 relate to aspects of service such as:

- Building over drains.
- Obstructing water courses.
- Working around buried services.
- Breaches, offences and disputes.
- Water.
- Trade waste.

In the management of its 3 Waters assets, Council must ensure there are no justified complaints of inconsistent or incorrect enforcement of Bylaws.

2.4 Rationale

The rationale, or reasons, for Council providing water, wastewater and stormwater services are explained below.

2.4.1 Water

The Rangitikei District Council aims to provide a potable water supply to meet domestic, commercial and fire-fighting requirements via a public reticulation through the urban communities of the Rangitikei comprising Marton, Taihape, Bulls, Mangaweka, Hunterville and Ratana. It also administers rural water schemes on behalf of the appropriate committees in Erewhon, Hunterville, Omatane and Putorino at a level of service sustainable and appropriate to the community.

We provide water supplies:

- To provide an appropriately treated water supply that is efficient and sustainable, both in terms of delivery volumes and pressure, and cost to the community.
- To ensure that the present needs of the community are met without constraining future generations, and that the community is encouraged to conserve water.
- To assist with fire fighting capability in defined areas.
- Because Council is required to provide some of these services through a range of legislation as outlined in Section 3.3.
- Because the collective provision of these services and facilities is more viable than individual provision.
- Because water is a basic requirement for life, and vital to maintain a healthy community.

2.4.2 Wastewater

Wastewater services are provided by Rangitikei District Council to protect public health and the environment. The Council owns and maintains reticulated wastewater systems in Marton, Taihape, Bulls, Mangaweka, Hunterville, Ratana and Koitiata. These systems consist of a network of pipes that convey wastewater from residential and commercial properties to the town's wastewater treatment plant. Council holds resource consents for discharges of treated wastewater to either land or water from these plants.

Wastewater treatment is the process of taking waste water and making it suitable for discharge again back into the environment. Wastewater treatment systems are maintained in Marton, Taihape, Bulls, Mangaweka, Hunterville, Ratana and Koitiata.

There is a legal requirement to provide this activity as a core function of a territorial authority. This is because it falls into the category of an activity to multiple property ownerships which require a coordinating authority to provide economies of scale and other efficiencies.

The aim is to reduce the contaminants in waste water to acceptable levels so as to be safe for discharge into the environment. The Health Act requires local authorities to provide sanitary works; these include works for the disposal of sewage. Foul water drainage must comply with the provisions of the Building Regulations, 1992.

Discharge of contaminants into the environment (including onto land) requires either a rule in a regional plan, a resource consent or regulations (section 15) under the Resource Management Act 1991.

The activity endeavors to be consistent with or comply with the regional authority's standards and guidelines (Horizons One Plan), National Policy Statements and National Environmental Standards.

2.4.3 Stormwater

Council provides reticulated stormwater systems in the urban areas of Marton, Taihape, Bulls, Mangaweka and Ratana. These stormwater systems are designed to manage the risk of floods damaging property or endangering health. They consist of inlets, pipes, open drains, and outlets to receiving environments. There is a budget for rural stormwater systems, which includes small systems in areas such as Utiku, Koitiata, Rakautaua and Scotts Ferry. These are not considered fully reticulated systems, but there are Council stormwater assets in these locations that need to be maintained.

The purpose of Council's involvement in this activity is to operate and maintain domestic community stormwater schemes. In line with Council's strategic priorities, the provision of this activity provides the basic infrastructure that enables the District to attract and retain people and businesses.

There is a legal requirement to provide this activity as a core function of a territorial authority. This is because it falls into the category of an activity to multiple property ownerships which requires a co-ordinating authority to provide economies of scale and other efficiencies. There is also a need to provide this activity to a standard that ensures public safety within acceptable limits including a level of property protection. The activity also provides a degree of environmental protection from excessive surface run-off, either naturally or as a result of development. The activity endeavours to be consistent with or comply with the regional authority's standards and guidelines (Horizons One Plan) and the New Zealand Coastal Policy Statement 2010.

We provide stormwater services:

- Because collective provision of services and facilities is more viable than individual provision.
- Because protection from flooding is vital to maintain a healthy community.
- To provide and maintain stormwater disposal systems on behalf of communities that require these services and are prepared to pay the associated costs.
- To manage stormwater so as to minimise risk to people and property as well as adverse environmental effects from stormwater runoff.
- To maximise the drainage within the land drainage scheme areas in order to maximise rural productivity.
- Because Council is required to provide some of these services through a range of legislation as outlined in Section 3.3.
- Because there is a public expectation for the provision of services.

There is a need to provide this activity to a standard that ensures public safety within acceptable limits including a level of property protection. The activity provides a degree of environmental protection from excessive surface run-off, either naturally or as a result of development. The negative effects can be the significant level of investment required by community perception following particular rain events. In addition, recent rainfall patterns have called into question the historic design parameters and may mean that the capacity and capability of the existing system to provide protection to the levels normally expected by a community is exceeded. It is likely that traditional stormwater management methods will be required to meet increasingly higher standards. The public's expectations of levels of service increase with each heavy rainfall event.

2.5 Current Level of Service

A robust system for measuring, recording and reporting performance is essential to tracking whether Council is achieving its objectives and delivering the agreed levels of service. In general this can be achieved using existing systems but will require development of new processes to cover the range of measures effectively. Measurement and recording of performance will require involvement of other parties outside of the Asset Management team e.g. customer services and field staff. Buy-in from all staff involved will be essential to successful performance reporting.

Regular performance reviews of targeted improvement areas will be required and annual performance reporting is intended. Future AMPs will report on the current level of performance that has been achieved and this will contribute to the identification of further improvement actions that may be required.

Within Council there is monthly financial reporting and the progress of projects is reported quarterly to Council's management team, while level of service achievement reporting is prepared for the Annual Report. The Annual Plan and the LTP detail the reporting directly to the community. Public reporting via the Annual Plan will continue to be the key reporting tool for Council. The level of achievement of the levels of service is reported to an extent that is regarded as appropriate for the wider community. More detailed reporting will be undertaken to underpin the public reporting and assist with the prudent management of the schemes.

While the discussion within this section provides sound information on performance to date, analysis shows there are opportunities to improve the confidence in this information. Documenting trends is fundamental to ascertaining appropriate targets for the future, and improvements to this process is proposed in the 2015-18 period. This should include improved analysis and illustration of the targets set, the achievement levels and the extent of the gap between the two. Measurement of achievement occurs across a number of parameters, many of which are technical. These are described under performance measures.

From 31 July 2014, the Department of Internal Affairs requires reporting on a set of mandatory performance measures that include the water, wastewater and stormwater activities. Currently, Council is in the process of reviewing its levels of service and performance measures for these three, and other affected, activities. This review is taking into consideration the new mandatory requirements, additional measures that Council wishes to continue as best practice, and any measures that will become redundant. Once the updated levels of service and performance measures have been set, through the Long Term Plan and associated consultation process, they will be updated in this Asset Management Plan.

2.5.1 Water

The Rangitikei District Council aims to provide a potable water supply to meet domestic, commercial and fire-fighting requirements via a public reticulation through the urban communities of the Rangitikei comprising Marton, Taihape, Bulls, Mangaweka, Hunterville and Ratana. It also administers rural water schemes on behalf of the appropriate committees in Erewhon, Hunterville, Omatane and Putorino at a level of service sustainable and appropriate to the community.

Erewhon rural water and Hunterville Rural Water are constant flow systems and rely on correct operation of each consumer's restrictor. Service levels for Omatane Rural Water and Putorino are determined by the scheme management committee.

Table 7: Levels of Service - Water

Level of Service	Performance Measure	Measured By	Actual 2013-2014	Target 2014-15	Target 2015-16	Target 2016-17	Target 2017-24
Provide a reliable, accessible and safe water supply to properties on the urban reticulation systems	Incidents of non-compliance with resource consents	Inspection reports from Horizons for the various water supplies	***Not achieved:*** *S*ignificant non-compliance at Taihape (flow meter verification). Non-compliances at Taihape (abstraction rate during low flows), Mangaweka (daily abstraction rate), Marton (discharge monitoring records, Tutaenui Stream abstraction records). Attention needed at Erewhon RWS (weir gauging, flow meter verification).	0	0	0	0
	Incidents of *E. coli* detection requiring information to be passed to the Ministry of Health Drinking Water Assessor.	Weekly sampling and testing of all Council's urban reticulated supplies Random tests conducted by MidCentral Health	***Achieved:*** No *E. coli* detected during the reporting period.	0	0	0	0
	Operational compliance with legislation confirmed by Drinking Water Assessor for Marton, Taihape and Bulls schemes	Annual inspections by Drinking Water Assessor	***In progress:*** Compliance with legislation measured by status of Water Safety Plans (WSPs). Marton, Taihape and Bulls require WSPs. Draft completed for Bulls. Taihape and Marton drafts required now. All three require approval by 30 June 2015.	100%	100%	100%	100%

Level of Service	Performance Measure	Measured By	Actual 2013-2014	Target 2014-15	Target 2015-16	Target 2016-17	Target 2017-24
	Number of unplanned water supply disruptions affecting multiple properties	RFS system	***Not achieved:*** there were 9 unplanned water interruptions, affecting 108 properties. There were two problems in Bulls – one a case of low drinking-water pressure and the other was a leak in the water main. In one instance (at Murimotu Road), the disruption (to the Hunterville Rural Water Supply scheme) was caused by a water main bursting. The other six problems were in Taihape, requiring valves to be turned off.	0	0	0	0
Provide a reliable water pressure and flow which complies with the NZ Fire Service Fire Fighting Water Supplies Code of Practice	% of fire hydrants that are compliant	Checks by NZ Fire Service brigades; maintenance records	***Achieved:*** 98% of hydrants compliant, based on maintenance history. Only 11 maintenance callouts relating to hydrant faults in the reporting period.	95%	95%	95%	95%

2.5.2 Wastewater

Wastewater services are provided by Rangitikei District Council to protect public health and the environment. The Council owns and maintains reticulated wastewater systems in Marton, Taihape, Bulls, Mangaweka, Hunterville, Ratana and Koitiata. These systems consist of a network of pipes that convey wastewater from residential and commercial properties to the town's wastewater treatment plant. Council holds resource consents for discharges of treated wastewater to either land or water from these plants.

Table 8: Levels of Service - Wastewater

Level of Service	Performance Measure	Measured By	Actual 2013-2014	Target 2014-15	Target 2015-16	Target 2016-17	Target 2017-24
Provide a reliable reticulated disposal system that does not cause harm or create pollution within the existing urban areas	Compliance with resource consents	Inspection reports from Horizons for the various water supplies	***Achieved***	100%	100%	100%	100%
	Number of overflows from each network (response/ resolution time)	RFS system	***Not achieved:*** 6 overflows were reported for Taihape between September and October 2013.	≤ 3 per scheme	≤ 3 per scheme	≤ 3 per scheme	≤ 3 per scheme
	Number of reported blockages in Council's reticulation system per km (total length 109 km)	RFS system	***Partly achieved:*** 17 requests were received for wastewater blockages. One turned out to be a stormwater overflow and six were private issues. Ten blockages equates to approximately one blockage per 10.9 km of the Council's reticulated systems.	≤ 1 per 13.625 km	≤ 1 per 13.625 km	≤ 1 per 13.625 km	≤ 1 per 13.625 km

2.5.3 Stormwater

Council provides a collection and disposal system for surface and, in some instances, sub-surface water across the District. This links both private and public reticulation through the urban communities of Marton, Taihape, Bulls, Mangaweka, Hunterville and Ratana. There are also stormwater assets on a lesser scale in Utiku, Koitiata, Rakautaua and Scotts Ferry.

The key drivers of the levels of service for stormwater are community outcomes. The activity contributes equally to the treasured natural environment, buoyant economy and enjoying life in the Rangitikei.

In line with Council's strategic priorities, the provision of this activity provides the basic infrastructure which enables the District to attract and retain people and businesses. Recent rainfall patterns have called into question historic design parameters and may mean that the capacity and capability of the existing system to provide protection to the levels normally expected by a community is exceeded. It is likely that stormwater management methods will be required to meet increasingly higher standards.

Current performance measures for the stormwater activity are given in Table 9 below.

Table 9: Levels of Service - Stormwater

Level of Service	Performance Measure	Measured By	Actual 2013-2014	Target 2014-15	Target 2015-16	Target 2016-17	Target 2017-24
Provide a reliable collection and disposal system to each property during normal rainfall	Number of habitable dwellings which remain uninhabitable for over 24 hours in a heavy rain events (1 in 20-year storm)	RFS system	***Achieved:*** Seven dwellings became uninhabitable following the mid-October storms, but only two for longer than 24 hours.	≤ 20 per event	≤ 20 per event	≤ 20 per event	≤ 20 per event
	Callouts for blocked drains and faults: the targeted response times are 30 minutes for urgent callouts and 24 hours for other callouts. Targeted resolution times are 24 hours for urgent faults and 96 hours for other faults. Specific note to be made of time to respond and resolve callouts relating to manhole covers and inlets.	RFS system	***Achieved:*** 60% responded within time; 63% resolved in time; 100% resolved. There were 22 requests, during the reporting period. 8 non-urgent and 14 urgent. Of the non-urgent, 6 were responded to in time and 2 were late. Of the urgent, 7 were responded to in time and 7 were responded to late.	50% response within time, 50% resolution within time, 100% resolution total	55% response within time, 55% resolution within time, 100% resolution total	60% response within time, 60% resolution within time, 100% resolution total	Ultimately 90% response within time, 90% resolution within time, 100% resolution total

2.6 Desired Level of Service

The following are the key conclusions regarding current and target levels of service outlined in the above tables:

- Targeted consultation is required, to provide an adequate level of understanding of the issues underpinning survey results and to verify targets.

- Council needs to review technical levels of service measures at activity level to ensure they support higher level customer measures, and that they add value; that is that the monitoring system and reporting is not onerous, and the measures provide information that supports better decision-making.

- There need to be definite linkages between levels of service measures in the Asset Management Plan and KPIs in contract documents.

When these measures are introduced, Council will review its current suite of levels of service measures to remove duplication and to ensure that all major aspects of the activity and aspects of the service that are of interests to the community are reported upon efficiently and effectively.

Levels of service will continue to be reviewed to meet the requirements of the community. The main barrier in moving to a higher level of service is the cost. Increases in levels of service (for example, higher water pressure, or reduced incidence of flooding) can be achieved, but there is usually a higher cost involved moving to these higher levels. Conversely, moving to a lower level of service would usually result in cost savings. Any changes will be consulted on, and where feasible the cost implications of changing levels of service will be outlined.

3 Growth & Demand

3.1 Demand Drivers

3.1.1 Population

Demand for water, wastewater and stormwater services is affected by population. Statistics New Zealand has extended the sub-national population projections based on the 2006 Census from 2031 to 2046. The projections based on 2013 Census data will not be available until February 2015 and so, as requested by the SOLGM working party, Statistics New Zealand have made this new data available to territorial authorities in order to inform the 30 year infrastructure strategy required for the Long Term Plan. Rangitikei District Council has gained access to this data.

Two datasets are available at local government level. The first is projections of the various demographic characteristics - total population, births, deaths, net migration, median age. The second is the projected population by 5-year age groups and sex. High, medium and low projection rates are provided. The cautionary note accompanies the data that extending the projections beyond 2031 may result in the population becoming unrealistically high or low by 2046. This is particularly relevant for Territorial Authorities at the extremes of population change.

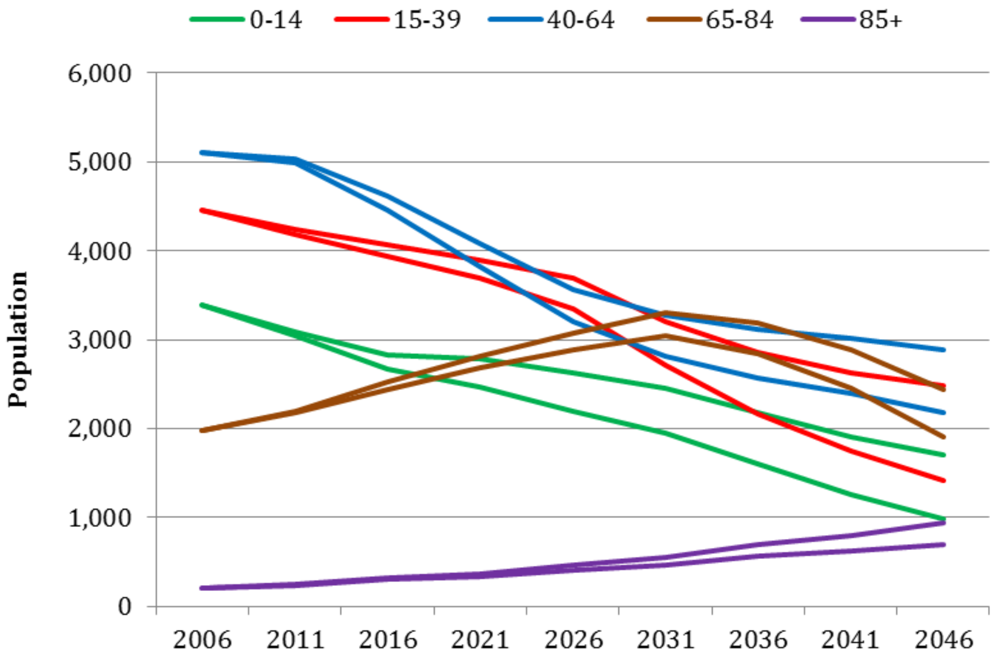
The Census 2013 data gives a resident population count of 14,016. This count underestimates the usually resident count; figures for usually resident count based on the 2013 Census will be released in mid August, but Statistics NZ advice is that this is likely to be raise the population count in Rangitikei to about 14,500. Their advice is that the medium projection for Rangitikei is likely to be slightly optimistic. For the purposes of planning, it is suggested that a range between low and medium projections are used in the LTP. It is important to note that the low projections suggest 75% of the population predicted by the medium series projections. In other words, there is a significant difference between the medium and low projections. The mid-point is given in the following table:

Table 10: Population Projections – Rangitikei District

Age Group	2006	2011	2016	2021	2026	2031	2036	2041	2046
0-14	3,390	3,065	2,750	2,625	2,410	2,205	1,895	1,580	1,345
15-39	4,460	4,215	4,005	3,795	3,515	2,960	2,505	2,185	1,945
40-64	5,110	5,015	4,540	3,950	3,385	3,040	2,840	2,700	2,535
65-84	1,980	2,190	2,480	2,745	2,985	3,170	3,015	2,675	2,175
85+	210	245	310	355	440	505	625	710	820
All ages	15,150	14,730	14,085	13,470	12,735	11,880	10,880	9,850	8,820

The range between low and medium projections is given in the following graph. The importance of this graph is that it indicates the uncertainty of the cumulative impact of year on year changes in the projections from medium to low.

Figure 7: Population Projections by Age Group



The data is only available at District level. However, if it is assumed that the factors affecting population change are evenly spread across area units within the District i.e. the relative proportions of age groups remains the same, then some estimation of population projections at area unit level can be made.

The following table gives the mid-point in the low and medium projections as they might relate to an area unit level, assuming that depopulation occurs evenly across the District (i.e. that the proportions of people of various age groups living in area units remains the same as 2006):

Table 11: Area Unit Projections

Community	2006	2011	2016	2021	2026	2031	2036	2041	2046
Marton	4,723	4,637	4,499	4,362	4,197	3,992	3,711	3,388	3,049
Lake Alice	3,008	2,897	2,731	2,579	2,398	2,203	1,991	1,786	1,590
Pohonui-Porewa	2,075	2,004	1,889	1,777	1,647	1,510	1,366	1,231	1,099
Taihape	1,802	1,759	1,692	1,624	1,542	1,443	1,323	1,198	1,069
Bulls	1,702	1,649	1,584	1,526	1,452	1,349	1,232	1,113	1,000
Moawhango	722	694	649	606	557	504	452	407	364
Hunterville	447	438	423	407	389	369	342	313	282
Ratana Community	360	347	328	312	291	268	240	213	186
Mangaweka	173	168	159	149	138	127	115	103	91

Community	2006	2011	2016	2021	2026	2031	2036	2041	2046
Koitiata	95	95	94	91	88	85	81	75	69
Ngamatea	43	41	39	37	34	30	27	24	21
District	**15,150**	**14,730**	**14,085**	**13,470**	**12,735**	**11,880**	**10,880**	**9,850**	**8,820**

The percentage change at an area unit level is given below:

Table 12: % Change by Area Unit

Community	Low Projection	Mid Point	Medium Projection
Marton	53%	65%	76%
Lake Alice	43%	53%	63%
Pohonui-Porewa	43%	53%	63%
Taihape	48%	59%	70%
Bulls	47%	59%	70%
Moawhango	40%	50%	61%
Hunterville	52%	63%	74%
Ratana Community	41%	52%	62%
Mangaweka	43%	52%	62%
Koitiata	61%	72%	84%
Ngamatea	38%	49%	60%
District	**47%**	**58%**	**69%**

In other words, the most optimistic view is that there will be between less than two thirds of the current population living in the non-urban areas and about three quarters of the current population living in the urban areas of Marton, Bulls, Taihape and Hunterville.

In terms of spread geographically across the District, 80% of the population is projected to live south of Hunterville.

In addition, depopulation is unlikely to occur evenly between urban/rural and north/south of the District.

Statistics NZ further advise that the important unknown in their calculations is the figure assumed for net migration from the District to elsewhere. If this differs significantly from the figure assumed, then the impact on the population predictions will also be significant. Net migration is assumed to be 700-800 per five year period in the medium projections and 900-1,000 per five year period in the low projections.

Finally, it does not appear that the projections for the Ratana Community have taken account of the potential for the new development to increase population at the Pa. These forecasts from Statistics NZ are based on historic data, with trends extrapolated into the future. They do not consider local knowledge about development, such as the Waipu Trust development at Ratana or the number of dairy conversions happening in the sand country of the Rangitikei. They also leave out the anecdotal evidence that certain communities in the Rangitikei are nearing (or have reached) the minimum population necessary to support their local farming community, and are unlikely to decline much further.

3.1.2 Social Trends

The key societal trends likely to impact on the long term provision of the Council's facilities and services are:

- There is increased connectivity through social media.
- There are changing lifestyles among different generations.
- There is a trend in the family structure to single parent families.
- Cheaper housing is being sought.
- Increased environmental awareness.
- Access to good schooling is a determining factor when moving to rural areas.
- Safety of towns and parks is a growing issue for families.
- Access to the mountain, lake and river is being sought.
- There is a shift of farm owners living in the townships and travelling to their farms to work.

3.1.3 Economic Trends

The key economic trends likely to impact on the long-term provision of the activity are:

- Higher prices for oil and other energy sources will impact on affordability of some traditional delivery options.
- Long term unemployment is unlikely to decline in the short term as the current slow economic activity will continue into 2012, and perhaps beyond.
- The number of people in the workforce will decline due to the aging population. There will also be an increase though in the number of older people working, particularly part time.
- A growing proportion of residents will be reliant on fixed and investment incomes. Affordability will become an increasingly important issue.
- Continued growth in jobs centred on Palmerston North, with job declines in smaller and more remote townships. This has significant impact on the increasing need for public transport linking towns and Palmerston North.

- Accessibility to SH1 and SH3, is good for jobs/businesses, and needs to be capitalised on by the District.

The challenge for the District will be growing the economy despite a declining population. Key to this will be increasing productivity in the rural sector, as well as unlocking landlocked land.

Within the 30-year planning horizon of this Asset Management Plan, we will experience the retirement of the Baby Boomer generation. This could impact on our ability to fund services into the future, and must be considered in our long-term planning.

3.1.4 Sustainable Development

The most widely quoted definition of sustainability and sustainable development, is that of the Brundtland Commission of the United Nations on 20 March 1987:

"sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

At the 2005 World Summit it was noted that this requires the reconciliation of environmental, social and economic demands - the "three pillars" of sustainability. In New Zealand the Local Government Act 2002 also recognizes a fourth pillar, that of cultural wellbeing. The four pillars of sustainability are not mutually exclusive, and can be mutually reinforcing.

Asset Management provides for the delivery of agreed levels of service in the most cost-effective manner for present and future generations. Taking a sustainable approach is therefore an underlying principle of Asset Management, rather than a factor only considered when significant decisions are made. The development and implementation of this Asset Management Plan demonstrates the commitment made by Council to the sustainable management of assets.

Section 4 of this Asset Management Plan describes how sustainability is considered at each stage of the asset lifecycle. More general sustainability considerations for the Council are outlined below.

Council has implemented new environmental initiatives in recent years. This has been in response to a number of things:

- Increased public awareness of the environment and the need to preserve and restore it.
- International and national responses to climate change and its impacts.
- Increases in environmental standards with respect to resource consent conditions.
- Withdrawal of products considered to be harmful to the environment.

The environmental initiatives for this Council include:

- Recycling paper, plastics and other office products.
- Disposing of hazardous goods such as chemicals and asbestos following industry-approved practices.
- Utilising products that have a lower carbon footprint and/or can be recycled.

In addition the Council requires compliance with resource consent conditions to take and/or discharge from/to the environment.

Council is aware of the advantages of using energy wisely, including the opportunities that exist to reduce operating costs by conserving energy and to reduce future costs by implementing technology, which reduces the demand for energy, whilst still delivering, agreed levels of service. Basic energy management techniques for the Council are:

- Use of new technology that delivers the same output and/or levels of service with lower energy use.
- Use of sustainable energy sources such as wind and solar where feasible.
- Reducing the use of vehicles.
- Siting buildings to maximise solar energy gain.
- Insulating individual assets to reduce heat loss e.g. water heaters, hot water pipes.
- Reducing energy use by turning off devices when not in use, and covering swimming pools when not in use.

3.2 Demand Forecasts

This section contains information on projected demand for each of the 3 Waters activities. Demand projections have been made based on the generic demand drivers above, as well as factors that are specific to water, wastewater or stormwater.

3.2.1 Water

As indicated earlier, the greatest challenge for providing sustainable infrastructure in the Rangitikei District is the declining population and subsequent reduction in the rating base. Across the District, our water supplies will be affected by this demographic change.

The main potential growth area for water supply is the Marton township, particularly from an industrial point of view. Council's water infrastructure needs to support any major industry wishing to locate to the town.

Having said this, there are developments occurring around the District, such as the potential 60-lot subdivision at Ratana Pa. In this case, the needs of the new subdivision are being considered in the current upgrade work in progress for the town's water supply.

The availability of water is closely associated with development. Industrial, agricultural, business and residential development all depend on the availability, quantity and quality of water. Development in one sector ultimately has a flow on effect onto the other sectors.

Therefore, the Rangitikei District's future development will rely heavily on the availability of water and the responsible management, distribution and protection of water sources. Due to this demand for water the Rangitikei District Council and Ministry for Primary Industries have jointly funded a strategic water assessment for the District. This review included a specific assessment of the Hunterville Rural scheme, the findings of which are discussed in Section 4.13.

Climate change has a major impact on water demand. There is an increasing acceptance within the community that a higher frequency of droughts is the reality now, and will continue to be so in the future. The challenges of dealing with these events during summer (and with an increasing frequency of floods in the winter) are a major factor in dealing with demand for water.

3.2.2 Wastewater

Similarly to the comments on water above, wastewater services in Rangitikei are in general faced with declining populations to serve. This means that wastewater flows will mostly remain the same or decrease.

Trends in occupancy, however, mean that there are now proportionally more houses for the same number of people. This means that our wastewater systems need to be able to accommodate new connections, even if the total wastewater flows are not increasing significantly.

The ability to cater for new industry in areas such as Marton is a consideration for wastewater as well as water. New industrial developments could require additional investment in reticulation as well as treatment, depending on their nature, and this must be included in future planning. The second anaerobic lagoon currently being installed at Marton WWTP will go some way to future-proofing that plant against such developments.

Similarly, the proposed 60-lot subdivision at Ratana will have the effect of increasing wastewater flows. The current treatment plant for Ratana was sized for the existing township. The increases in wastewater flows that would come about from such a substantial development mean that investigation will be required into the ability of the current system to cope. The most likely scenario is that some of our wastewater mains would need upsizing, and that the treatment process would need to be enhanced or expanded upon. As investigation work proceeds, funding will be budgeted in future years to deal with these additional requirements.

3.2.3 Stormwater

The impacts of climate change will be felt strongly by the stormwater activity. In general, predictions from NIWA for New Zealand are that the intensity of storm events will increase, as will the frequency of large events. In other words, an event that may have occurred every 20 years in the past would be expected to occur more often than that under future scenarios.

In addition, community expectations around stormwater management have increased. There is little tolerance for surface flooding, and our stormwater systems need to be adequate to deal with flows without inconveniencing the public or allowing damages to occur.

However, stormwater is just as prone to the effects of a diminishing rating base as our other activities. For this reason, there will be a need to perform cost-benefit analysis on stormwater projects, on a case-by-case basis. In a world where there is less than unlimited funding to tackle all stormwater issues, the highest priority would be given to those that can achieve the most impact with the least spending.

There is also an increasing trend, again on a case-by-case basis, for Council to require private property owners or developers to deal with stormwater on-site. In previous decades, the philosophy behind stormwater management was to concentrate flows and discharge them to waterways. This is becoming increasingly less acceptable, largely for environmental reasons. Now, if stormwater from a development is unable to be collected and dealt with effectively by the existing Council network, we may require developers to install features such as soakholes or wetlands within property boundaries. This is known as the principle of hydrological neutrality; in other words, dealing with water that falls on a property within that property.

The proposed 60-lot subdivision at Ratana is a prime example where the developer is being asked to deal with stormwater within the boundaries of the subdivision, to avoid placing extra strain and expense on the town's stormwater system.

3.3 Demand Impacts on Assets

The potential impacts of projected demand on our assets are listed in Table 13.

Table 13: Demand Impacts

Issues	Impact on assets
Demographic trends	Less mobility, especially for older persons. Greater emphasis on health requirements for older people.
Economic trends	With a growing proportion of people living on low incomes, RDC will need to ensure that the facilities provided are affordable. Ability to "cash up" and retire with a nest egg to the District may increase the number of retired people moving into District .
Social trends	The community will seek Council services that support a community that looks after its own and is "safe and caring". Higher public demand for energy efficiency, conservation and protection of the environment. Some existing facilities will not be required.
Other trends	Climat change will impact on the existing water, wastewater and stormwater infrastructure. Affordable recreation opportunities may increase visitor numbers to the District thus impacting on infrastructure.

The major impacts of demand on our water assets, as alluded to above, will be the need to maintain them with less and less funding available, while also catering for any future growth and development that occurs. Increasingly, Council may be forced to set a lower level of service in order to reduce the financial burden on ratepayers. This could mean that in some locations, services become more decentralised, and some infrastructure (e.g. rainwater tanks) is privately owned. This is the case for water, wastewater and stormwater services. Certainly, the trend in stormwater is for decentralising, hydrological neutrality, and the favouring of natural systems such as wetlands and riparian planting over centralised, reticulated systems.

Like other rural Councils, we face significant cost barriers in providing services to meet demand. Larger metropolitan authorities tend to have centralised systems with a large rating base, and the economies of scale that arise from this. Rangitikei, on the other hand, has a number of small schemes, geographically separated, that duplicate services across each of our communities. Per capita, this is a more expensive system to own and operate, but with a large District and small population, there is no practical alternative.

Town redevelopments in Marton, Taihape, Bulls and Hunterville could impact on requirements for water, wastewater and stormwater infrastructure in the CBDs of these towns.

3.4 Demand Management Plan

The traditional organisational approach to changes in demand has largely been to upgrade or create new assets, without attempting to question or modify demand. This approach tends to raise community expectations and invariably leads to even further demand. Increasing focus on strategic planning, fiscal responsibility, user pay principles, and service level reviews has created greater awareness of the need to manage demand.

Demand management (sometimes called non-asset solutions) is a key Asset Management strategy that involves asset managers implementing management techniques to seek to modify demand for the services. Demand management ensures that:

- The utilisation/performance of existing assets is optimised.
- The need for new assets is reduced or deferred.
- The Council's strategic objectives are met.
- A more sustainable service is provided.
- The Council is able to respond to the community's needs.

The focus of demand strategies for the Council is to:

- Reduce peak demand, which is a major factor related to the ultimate capacity of an individual Council asset or network of assets.
- Reduce average demand, seeking to modify both the peak and base demand, which is applicable where there are constraints in resources, financial gains to be made or there is an adverse environmental impact to be addressed.

Demand management is an integral part of the decision-making process of Council with respect to assets. The typical process followed to evaluate demand management options is as follows:

Table 14: Demand Management Option Analysis

Phase	Action
Scope	Define scope of services to be assessed.
	Specify objectives of demand analysis.
	Identify criteria for selecting demand management strategy.
Research	Identify current demand.
	Identify current service delivery potential.
	Assess future trends in demand for service.
	Identify corporate strategies relevant to service.
	Identify actual customer demands (rather than wants).

Phase	Action
Analyse	Assess ability of asset to provide required levels of service.
	Explore all options that avoid investing in new assets.
	Evaluate options against selection criteria.
	Test acceptability with community/users, review and modify.
	Adopt chosen demand management strategy.
Action	Implement demand management programme.
	Put in place measures to monitor demand and performance.
	Assess effectiveness of demand management strategy.
	Undertake on-going review of strategy, modify as necessary.

3.4.1 Water

The current demand management techniques used by Council for the water activity are outlined in Table 15:

Table 15: Demand Management - Water

Demand Component	Method	Example
Operation	Pressure demand management	Where very high pressures exist within a network, pressure management devices are installed to return pressures to an acceptable range. For instance, three Pressure-Reducing Valves (PRVs) have been installed in Marton. These will be commissioned in the near future, following determination of the optimal settings to be used. Pressure zones can also be monitored to assess leakage within these smaller areas, rather than simply town-wide. This allows areas of concern to be identified, and issues found more easily.
	Water restrictions and rationing	Water restrictions have been used as a measure to manage summer drought times when garden and lawn watering increases demand beyond the capacity of either the reticulation or the water source. These apply to urban schemes only, as rural schemes are already on trickle-feed supply.
Regulation	Council bylaws	Council bylaws provide for the implementation of policies to enforce efficiencies of water use.

Demand Component	Method	Example
Incentives	Water metering and pricing	Council policy is to meter commercial users of water and extraordinary users that are either outside of the water rateable area or have land areas of a large size. Water rates and water meter charge rates are calculated for each water scheme to recover the actual cost of operating and managing that system. Universal water metering was historically in place in areas such as Bulls. This has been discontinued in recent years.
Education	Water conservation and public education	Council has a responsibility to promote water conservation and the efficient use of water. Actively this is portrayed through a culture within Council to achieve the most cost-efficient supply system possible, and through a public education programme using handouts and articles in the Council newspaper publications. Rainwater tanks will be promoted to supplement water supply and attenuate stormwater flows.
Demand substitution	Water leakage control detection and repairs	Proactive, acoustic leak detection will be carried out across the District. Work will be done to quantify water losses across each scheme. As time goes on, this data will be improved and estimates will become more accurate.

3.4.2 Wastewater

There are fewer options available to reduce the demand for wastewater services than there are for water. Some of this demand is linked to demand for water, as most water supplied to consumers subsequently enters the wastewater system. Currently identifed demand management options for wastewater are given in the following table.

Table 16: Demand Management - Wastewater

Demand Component	Method	Example
I&I	Investigation	CCTV and smoke testing to determine where inflow (of stormwater) and infiltration (of groundwater) to the wastewater system is occurring. Remedial works to address this can then be programmed.

3.4.3 Stormwater

The current demand management techniques used by Council for the stormwater assets are outlined in the following table.

Table 17: Demand Management - Stormwater

Demand Component	Method	Example
Private property runoff	Hydrological neutrality	On a case-by-case basis, Council limits the amount of stormwater entering its system by requiring property owners or developers to contain stormwater from their properties on site.
System failures	Proactive inspections and maintenance	These will be carried out regularly to be aware of any issues with the stormwater system, allowing repair and minimisation of issues during extreme storm events.

3.5 Asset Programmes to Meet Demand

Meeting demand is a key part of owning and operating assets. The assets in our water, wastewater and stormwater networks exist only to cater to demand for these services. In Section 4, asset programmes to meet demand are described on a per-scheme basis. These programmes include renewals that ensure our assets are performing well, new works to cater for growth, and new works to improve the level of service given by particular assets.

4 Lifecycle Management Plan

Lifecycle management focuses on Asset Management options and strategies from initial planning through to disposal, while considering all relevant economic and physical consequences. The effective application of Asset Management principles will ensure the reliable delivery of service, reduce the long-term cost of ownership, and in this way reduce service costs.

Assets have a lifecycle as they move through from the initial concept to the final disposal. Depending on the type of asset, its lifecycle may vary from 10 years to more than 100 years. Key stages in the asset lifecycle are:

- **Asset planning**: when the new asset is designed. Decisions made at this time influence the cost of operating and maintaining the asset, and the lifespan of the asset. Alternative, non-asset solutions should also be considered at this time.

- **Asset creation or acquisition**: when the asset is purchased, constructed or vested in Council. Capital cost, design and construction standards, commissioning the asset, and guarantees by suppliers influence the cost of operating the asset and the lifespan of the asset.

- **Asset operations and maintenance**: when the asset is operated and maintained. Operation relates to a number of elements including efficiency, running costs and throughput. This is usually more applicable to mechanical plant than static assets such as pipes. Maintenance relates to preventative maintenance where minor work is carried out to prevent more expensive work in the future; and reactive maintenance where failure occurs.

- **Asset condition and performance monitoring**: when the asset is examined and checked to establish the remaining life of the asset. This is done in order to determine what corrective action may be required, including maintenance, rehabilitation or renewal; and within what timescale.

- **Asset rehabilitation and renewal:** when the asset is restored or replaced to ensure that the required level of service can be delivered.

- **Asset disposal and rearrangement**: when a failed or redundant asset is sold off, put to another use, or abandoned.

Council owns and is therefore responsible for the management of urban and rural water supplies, wastewater schemes and stormwater schemes within the District. The urban water schemes in most areas provide an "on-demand" service to consumers and have provision for some firefighting capacity from water supply mains. The rural schemes are intended to supply water for stock and domestic use on a continuous, but restricted supply, basis.

4.1 Background Data

This section contains information on the assets we hold in each water, wastewater and stormwater scheme. There are ten water supplies, seven wastewater schemes and six stormwater schemes within the District. The current section contains overall or generic data on each of these activities. Information specific to each scheme is given in specific sections, beginning with Marton Water in Section 1.1.

4.1.1 Physical Parameters

In terms of this plan, the definition of an asset is a physical item that has value and contributes to providing a service. The assets we own for water, wastewater and stormwater are almost entirely physical components of these systems. As such, they have physical characteristics such as age, condition, diameter, etc. The overall physical parameters for 3 Waters are given in this section.

4.1.1.1 Water

A summary of the Council's water supply assets is given in the following table.

Table 18: Summary of Water Supply Assets (29 Jan 2015)

Asset Type	Asset Parameters	Replacement Cost ($)
Mains	397.4 km total	18,034,000
	6.4 km of rising mains	120,000
	22.0 km of trunk mains	1,040,000
	342.9 km of service mains	15,574,000
	18.3 km of rider mains	823,000
Fittings	1118 valves	880,000
	754 fire hydrants	893,000
	26 bulk meters	1,600
Connections	23.0 km of service lines	495,000
	3168 tobies	156,000
	1436 meters	183,000
	30 backflow preventers	28,000

4.1.1.2 Wastewater

The following table contains a summary of our wastewater assets.

Table 19: Asset Summary – Wastewater (29 Jan 2015)

Asset Type	Asset Parameters	Replacement Cost ($)
Mains	100.7 km total	2,104,000
	95.9 km of gravity mains	1,926,000
	4.8 km of rising mains	178,000
Fittings	1417 manholes	405,000
	11 LHCEs	0
	88 inspection points	8,800

Asset Type	Asset Parameters	Replacement Cost ($)
Connections	22.0 km of service lines	1,447,000

4.1.1.3 Stormwater

The table below contains a summary of Council's key stormwater assets.

Table 20: Asset Summary – Stormwater (29 Jan 2015)

Asset Type	Asset Parameters	Replacement Cost ($)
Gravity Mains	51.3 km	1,590,000
Manholes	922	367,000
Open Drains	40.2 km	0
Sump Leads	5.7 km	76,000
Service Connections	0.9 km	5,100
Sumps	1288	65,000
Wingwalls	46	14,000

As well as holding information on our own stormwater assets, Council also keeps some information on stormwater systems located on private property, as well as assets owned by Horizons Regional Council. This is partly because these privately or regionally owned systems can impact on our own stormwater network, and partly to keep track of ownership in case this is not clear. The Asset Management Plan does not contain details on those assets which are outside Council ownership.

4.1.2 Asset Capacity/Performance

Capacity and performance are two separate, but related, aspects of the assets we own.

The capacity of an asset is its ability to meet demand now and in the future. For example, the capacity of a sewer main is its ability to convey the amount of wastewater it is currently required to, as well as its potential ability to convey additional amounts in the future. The capacity of a Water Treatment Plant as a whole is the quantity of water it can treat to the desired standard, usually expressed in cubic metres per day. Utilisation is a related term, and can be expressed as the proportion of an asset that is utilised. For example, if a Water Treatment Plant was capable of treating 10,000 m^3/day but was on average treating only 7,500 m^3/day, its utilisation would be 75%.

The performance of our assets is their ability to perform the function expected of them. A newly installed water main will most likely have excellent performance. The performance of a main that is 50 years old and known to be leaking will be lower. Our Asset Register contains a field for each asset where we indicate its performance. This information is largely collected from experience by our operators in the field. The performance grading system used is:

1. Excellent.
2. Good.
3. Average.
4. Poor.
5. Very Poor.

Performance is displayed on a per-asset basis in the sections below. Capacity is not graded in the same way as performance. The sections below discuss the overall capacity of each network, rather than assessing it on a per-asset basis.

Council has had network models created for several water and wastewater schemes. These models are calibrated against real data in the field. They allow us to see the overall capacity of a scheme, and to test the impacts of making changes to it such as adding in new reticulation, or changing the existing reticulation.

Water network models have been created in InfoWorks Water Supply (IWWS) for these water supplies:

- Bulls
- Hunterville
- Hunterville Rural
- Mangaweka (not updated or calibrated)
- Marton
- Ratana
- Taihape (not updated or calibrated)

In the case of Hunterville Rural, updating the network model will assist with investigations on our ability to transfer unallocated water units to different locations within the scheme. There could potentially be spare capacity on this, and other, water supply schemes. This potentially creates opportunities for growth, whether domestic, agricultural or industrial. Capacity is discussed per scheme later in this section of the Asset Management Plan. Future work will involve more accurate forecasting of future demand to gain a better understanding of where spare capacity exists.

The following wastewater schemes have been modelled in InfoWorks Collection Systems (IWCS):

- Marton
- Taihape

As well as modelling capacity, our water and wastewater models can help us to assess the performance of our reticulation, and check on efficiency measures such as water loss or pressure.

IWCS is capable of running stormwater models, but none have been created for Rangitikei as yet.

4.1.3 Asset Condition

The assessment of asset condition is an essential part of Asset Management Planning. Asset condition assessments are undertaken to determine:

- Where the asset is in its lifecycle.
- The remaining effective life of an asset.
- The rate of deterioration of the asset.
- When asset rehabilitation or replacement will be required.
- The risk of failure.
- The frequency of inspection required to manage risk of failure.
- Financial cashflow projections.

The data collected is used to support core Asset Management activities such as risk management, predictive modelling, planned maintenance, rehabilitation, asset valuation, and budget forecasting. It also allows for:

- Planning for the long-term delivery of the required level of service.
- Prediction of future expenditure requirements.
- Management of risk associated with asset failures.
- Refinement of inspection, maintenance and rehabilitation strategies.
- Selection of work priorities.
- Utilisation of cost-effective renovation options by avoiding premature asset failure.
- Identification of deferred maintenance.

The condition rating system used follows NAMS guidelines, and in general terms can be described according to the following table.

Table 21: Condition Rating System

Condition Rating		Description
1	Excellent	Excellent condition. Only normal maintenance required.
2	Good	Minor defects only. Minor maintenance required.
3	Average	Significant maintenance required.
4	Poor	Significant renewal/upgrade required.
5	Very Poor	More than 50% of asset requires replacement.

A summary of the condition of water, wastewater and stormwater assets across the District is given in the figures following. Later on in this section of the AMP, asset condition is broken down to a scheme level.

Figure 8: Asset Condition - Water

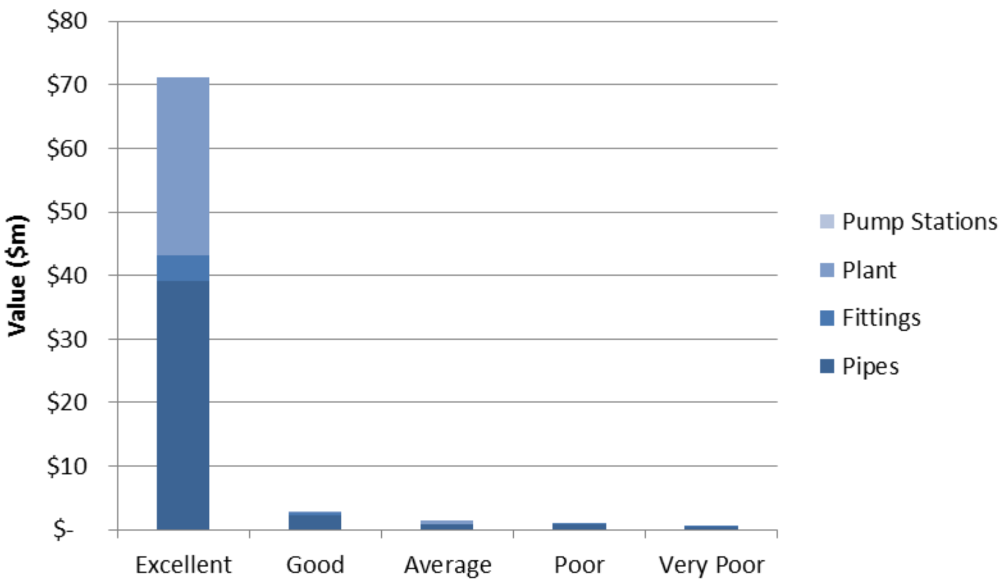


Figure 9: Asset Condition - Wastewater

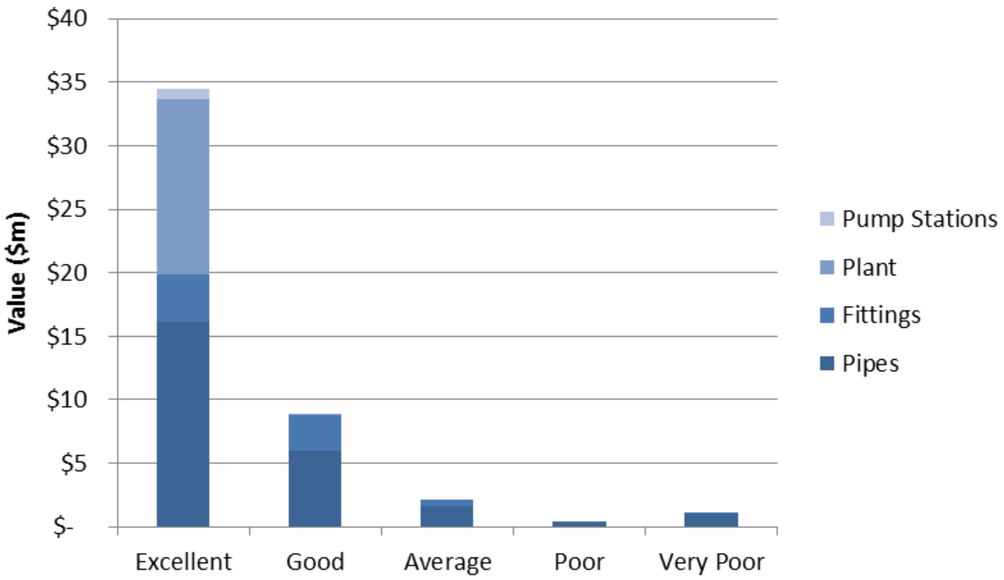
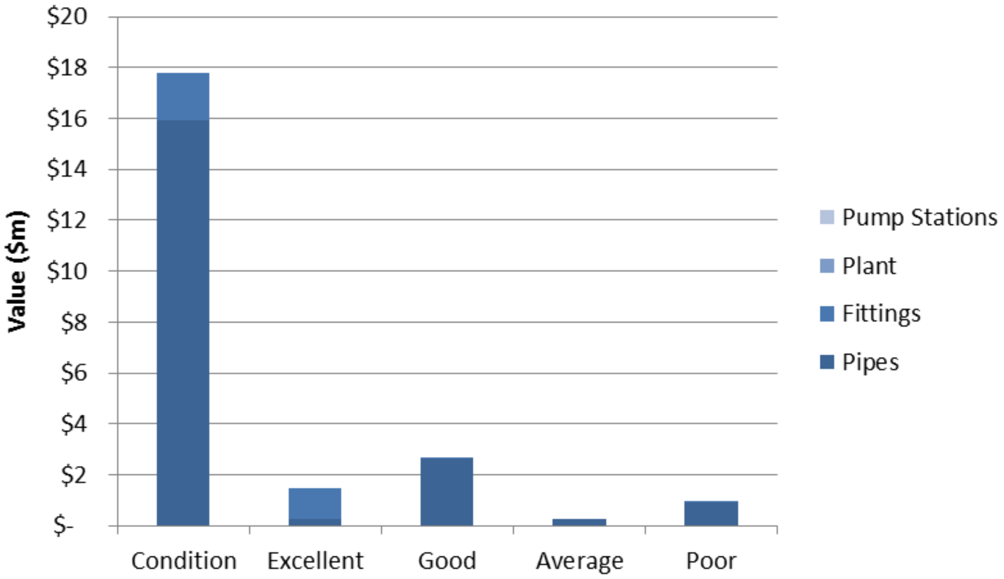


Figure 10: Asset Condition - Stormwater



4.1.4 Historic Data

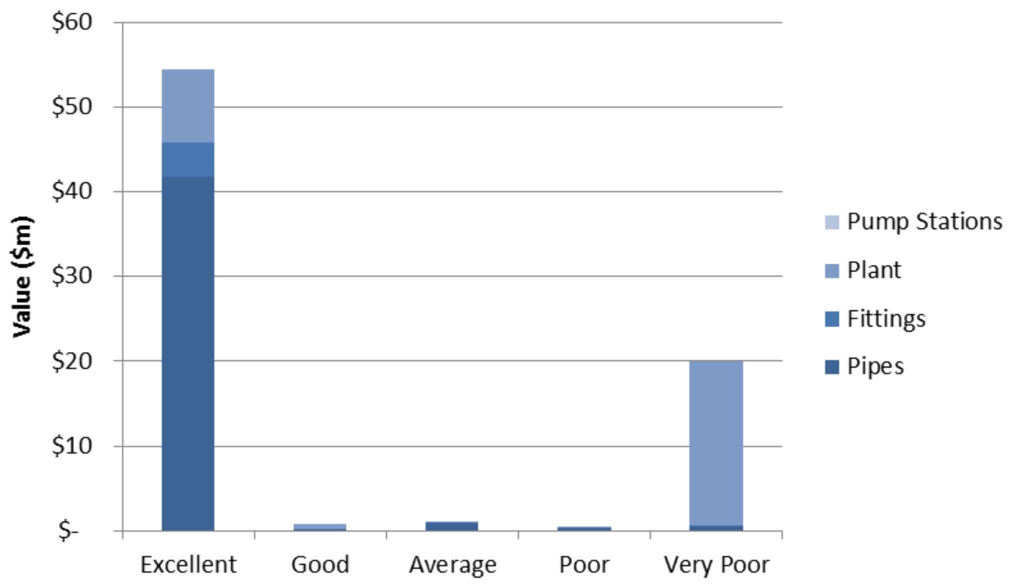
Council owns assets that in some cases are more than 100 years old. This is obviously a lot further back than the experience of current staff reaches. Rangitikei District Council as it now stands was formed from the Rangitikei County, Marton Borough and Taihape Borough Councils; historic asset information has come from a variety of sources.

Many of our water, wastewater and stormwater assets are buried, meaning they cannot be easily inspected or, in some cases, even found. Historic records are held, and modern asset information systems ensure we are constantly improving the data we have. But there are still gaps in information for certain areas or assets.

During the period 1998-1999, Council undertook a programme to digitise records on our infrastructure assets. GPS locations of known assets were recorded. This began the process of electronic record-keeping for our assets. There still remain cabinets of historic, hard copy plans that have not been digitised to date.

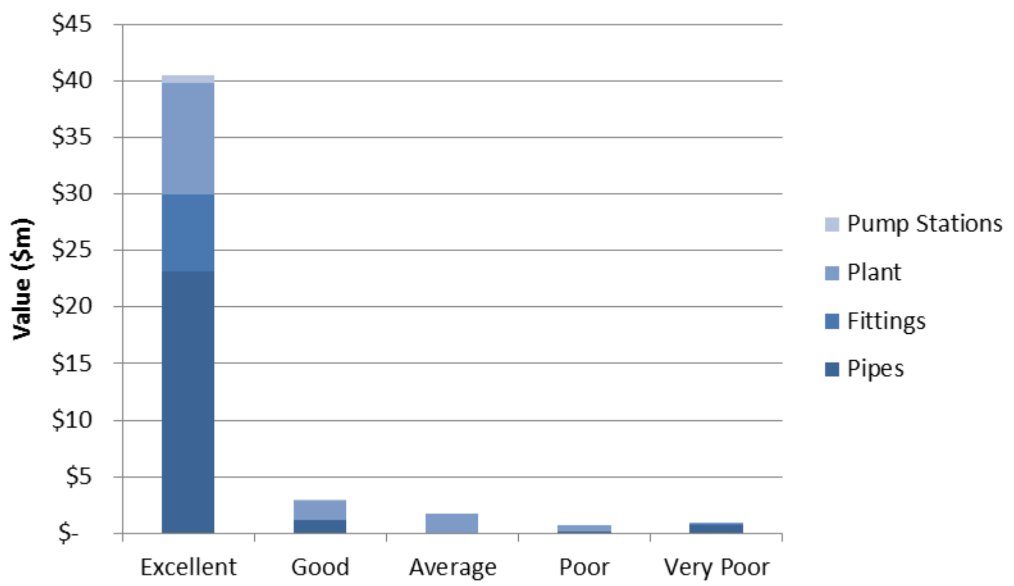
Figure 11 shows the confidence levels on the asset information held on our water assets. Most of the information is graded "Excellent". There is, however, a significant amount of assets for which information has been graded "Very Poor".

Figure 11: Data Confidence - Water



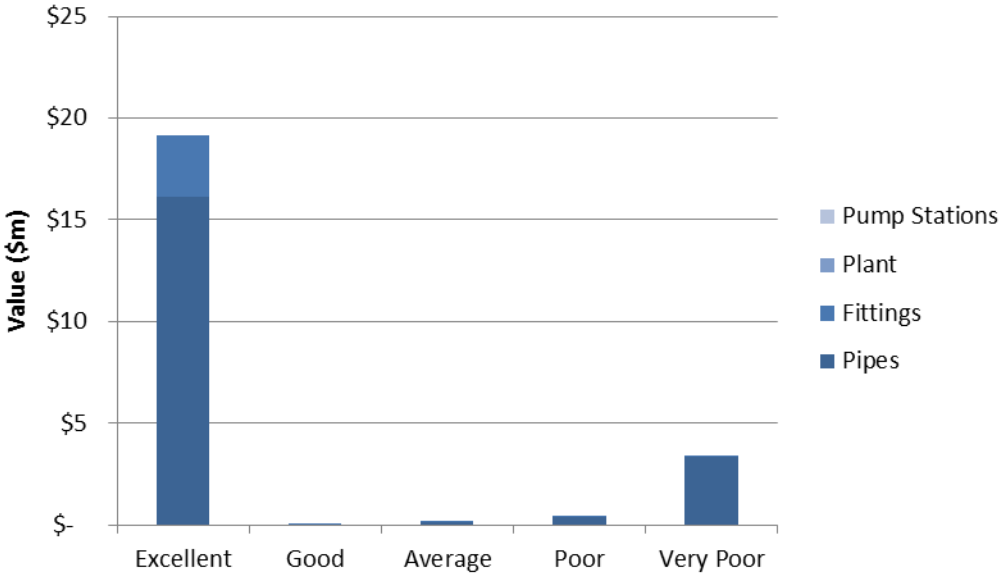
Confidence gradings for information on wastewater assets are given in Figure 12. As can be seen, most wastewater asset information is reliable and has been graded "Excellent". There are however some assets for which the information is less reliable. MWH consultants carried out componentisation work on WWTPs in recent years, so most data on those assets is reliable.

Figure 12: Data Confidence - Wastewater



Data confidence for stormwater assets in Rangitikei is shown in Figure 13. Similar to water, the confidence in asset information for stormwater is mostly “Excellent”, but with a significant amount graded “Very Poor”. The stormwater assets for which information is “Very Poor” are all pipes.

Figure 13: Data Confidence - Stormwater



Later sections of this Asset Management Plan detail the information held on a per-scheme basis, as this can vary, especially with the age of each scheme.

4.2 Routine Operations and Maintenance Plan

4.2.1 Operations and Maintenance Plan

Routine maintenance is the regular ongoing day-to-day work that is necessary to keep assets operating, including instances where portions of the asset fail and need immediate repair to make the asset operational again.

The 3 Waters network and treatment facilities are managed day to day by Council staff; performing routine maintenance, monitoring compliance with resource consents, attending to customer requests for service. Major repairs or capital work is undertaken by contractors.

Maintenance objectives are linked to the operational levels of service specifying appropriate performance criteria and prioritising operational risks.

Typically these service objectives are linked to:

- Provide and maintain 3 Waters utility systems on behalf of communities that require these services and are prepared to pay the associated costs.
- Manage 3 Waters utility systems so as to minimise risk to people and property.
- Minimise adverse environmental effects from 3 Waters utility services.

Historically, the focus of maintenance at the RDC has been to undertake corrective actions on unplanned breakdowns. There is a dearth of historical records to allow analysis of faults. Basic servicing tasks have been conducted based on operator experience rather than utilising a reliability centred maintenance schedule.

Two categories of routine maintenance are carried out: unplanned, and planned.

Unplanned (or reactive) maintenance is work carried out in response to reported problems such as pipe breaks or equipment failures. When these unexpected disruptions to service occur, Council response procedures are designed to return the system to normal operation within the agreed level of service time periods.

Planned maintenance is work programmed throughout the year minimises the risk of mechanical breakdowns. This work is essential to maintaining a level of service to the community.

4.2.1.1 Water

Operations & Maintenance (O&M) manuals are in the process of being created for all Water Treatment Plants. These will be produced progressively as plant upgrades are completed. The first O&M manual to be produced for water will be for the Marton plant.

Piping and Instrumentation Diagrams (P&IDs) will be produced for each plant along with the O&M manuals. There is an existing P&ID for Marton WTP, but this needs to be revised to account for recent upgrade work.

The water network and treatment facilities are managed day to day by Council staff; performing routine maintenance, monitoring compliance with resource consents, attending to customer requests for service. Major repairs or capital work is undertaken by contractors.

O&M projects to be carried out for the District's water supplies include:

- In-house fire hydrant flow and testing programme.
- Backflow preventer testing programme.
- Valve testing and renewal programme.

4.2.1.2 Wastewater

The routine maintenance requirements for wastewater reticulation assets are covered in the reticulation maintenance contract specification. They include:

- Pump station check (record readings and clean probes) – weekly.
- Pump station inspection (mechanical/civil) – 3 monthly for all pump stations. This checks for pipe, pump and structure deterioration.
- Electrical inspection – 12 monthly for pump stations and treatment plants (where applicable).

These inspections are effective in reducing equipment breakdown and identifying problems before they become costly to repair. Maintenance jobs planned and unplanned are not yet recorded specifically against the asset.

Minor blockages are dealt with by staff as they occur. Blockages are recorded on the GIS plans, which affect the pipe's historical performance score.

Operations & Maintenance manuals are in the process of being created for all Wastewater Treatment Plants. As for water, these will be produced progressively as plants are upgraded.

4.2.1.3 Stormwater

General operational maintenance is carried out by Council staff assisted by specialist contractors as required. Maintenance objectives are linked to the operational levels of service specifying appropriate performance criteria and prioritising operational risks.

Typically these service objectives are linked to:

- Provide and maintain stormwater disposal systems on behalf of communities that require these services and are prepared to pay the associated costs.
- Manage stormwater so as to minimise risk to people and property.
- Minimise adverse environmental effects from stormwater runoff.

Historically, the focus of maintenance at the RDC has been to undertake corrective actions on unplanned breakdowns. There is a dearth of historical records to allow analysis of faults by the engineer. Basic servicing tasks have been conducted based on operator experience rather than utilising a reliability centred maintenance schedule.

The stormwater systems are generally gravity systems with no mechanical components.

System improvements in 2005 have allowed the capture of maintenance data on the reticulation networks, and will be extended to include similar processes for above ground assets. Further changes are planned to provide more accurate feedback by the operators, including:

- GPS locations of faults.
- Flushing and root cutting programmes.

The operational focus for the last two years has been on resolving historical flooding issues. This has involved excavation of open drains, upgrading of inlet structures with debris grates and construction of retention bunds on reticulation immediately outside the urban area.

Analysis of historical data provided by contractors, staff and customer service requests will establish a proactive maintenance schedule. This will provide a basis for a regular inspection and maintenance schedule for this asset and:

- Define the asset objectives and functions.
- List and identify asset systems and their functions.
- Failure modes, effects and criticality analysis (FMECA).
- Analyse maintenance intervals:
    - Fixed interval.

- On condition interval.

Historically Council has operated reactively to maintenance requirements. The trigger point for this has been complaints from the public. Council is moving towards more proactive programming of maintenance. There will always be a need to do some reactive maintenance; but if more planned maintenance can be brought into the balance, issues can be addressed before they become larger and more urgent. Planned maintenance will include inspections of all asset components from inlet structures, pipelines (via CCTV inspections), manholes, outlets and open drains (both public and private).

Unlike other urban areas, which tend to be fully reticulated, road sumps often act as the catchments sole collection, conveyance and discharge system. Being under the Road Asset group this can lead to discontinuity in Levels of Service and greater coordination is proposed.

Routine maintenance is the regular ongoing day-to-day work that is necessary to keep assets operating, including instances where portions of the asset fail and need immediate repair to make the asset operational again.

The current policy is that the drains are considered private where they flow through private land and that the cleaning responsibility is with the land owner.

Council's in house engineering standards have been reviewed in conjunction with Manawatu District Council and a combined standard based on NZS 4404:2010 and addendum of specific local conditions adopted. The adoption of this standard and a local addendum is common practise for most Local Authorities around the country and assists contractors, suppliers and developers in providing consistency and certainty in being able to meet standards and specifications.

The Council owns plant equipment for water blasting and clearing pipes of grit and minor root intrusion. This plant is held in Marton and readily available for service requests. The road asset maintenance contract documents specify street cleaning levels of service, which removes kerbside leaves and regular removal of accumulated debris in sumps.

Some open drains in Mangaweka which are maintained by the road contractor have been overgrown with blackberry and other plant species which reduces the performance of the network.

In Ratana, there is a small section of concrete pipe 450 mm diameter pipes that seems to be laid beneath a residence, which required cleaning. Much of the natural drains are located in the rear of private properties which may hinder cleaning of drains.

O&M projects are underway to install or upgrade inlets in Bulls, Hunterville, Mangaweka and Ratana for Health & Safety reasons.

4.2.2 Operations and Maintenance Strategy

Council's in house engineering standards have been reviewed in conjunction with Manawatu District Council and a combined standard based on NZS 4404:2010 and addendum of specific local conditions adopted. The adoption of this standard and a local addendum is common practise for most Local Authorities around the country and assists contractors, suppliers and developers in providing consistency and certainty in being able to meet standards and specifications.

RDC employ the following non asset strategies within the 3 Waters utilities:

Table 22: Non-asset Strategies

Strategy	Description
Alternative Technologies	Alternative technologies are considered as appropriate
Approved Materials	Only approved materials shall be used in the 3 Waters utilities to ensure the quality and longevity of the asset
Backflow Prevention	Maintaining a register of backflow preventers. Inspecting and testing them according to building regulations and best practice.
Energy Efficiency	Energy savings and management carried out in a logical manner for the facilities
Health and Safety Audits	Audits undertaken randomly to ensure all work completed by Council and operational staff complies with the Health and Safety in Employment Act, Utilities Access Act 2010 and Traffic Management Regulations
Leak Detection	To proactively detect and repair leaks within the water supply.
Monitoring Planned vs Unplanned Maintenance	The mix of Planned vs Unplanned Maintenance will be analysed periodically to allow optimising of the activities
Network Modelling	Network Modelling is carried out to ensure renewal and capital works are programmed appropriately and assist in the identification of faults in the system when low pressures or flows are identified
Pressure Monitoring	Pressure Monitoring is carried out by Council staff to measure compliance with Levels of Service and calibrate network models
Supervision of Facilities	Supervision of Facilities to ensure these buildings and critical assets are maintained appropriately
Telemetry System	The telemetry system will be utilised to assist in monitoring the water demand profile, controlling operations and increase the knowledge of the asset operation therefore enabling efficiencies to be introduced
Water Meters	Water meters are installed on domestic/commercial/industrial connections to provide accurate consumption records. Water meters remain the property of the Council
Wastewater Meters	Wastewater meters are installed at several pump stations and treatment plants to provide accurate pump and flow records but not at all locations

Strategy	Description
Water Quality	Water supply to comply with Health (Drinking Water) Amendment Act 2007 and appropriate Ministry of Health Grading Testing for FAC undertaken as per compliance requirements Testing for ecoli undertaken as per compliance requirements
Water Supply Shutdown	All shutdowns to be managed as per RDC Standard Operating Procdures to protect the quality of the water, the asset and provide appropriate notification to the customer and MoH where appropriate
Effluent Quality	Routine sampling of effluent quality to comply with Resource Consent requirements
Sludge Monitoring	Annual sampling of sludge depth to monitor operational performance of ponds
Stormwater Quality	Investigation into whether stormwater quality is an issue surrounding state highways or arterial roads
Secondary Overland Flow Paths	Secondary overland flow paths will be investigated and recorded as appropriate to allow sustainable management of these and ensure development is controlled in these areas
Flooding History	Flooding history with severity (property, basement, house) and rainfall indicator will be recorded against the relevant property for future analysis of stormwater network needs
Infiltration	Infiltration surveys carried out to assess the amount of cross-connections between the stormwater and wastewater networks

RDC employ the following asset strategies (planned & unplanned) within the 3 Waters utilities.

Table 23: Asset Strategies

Asset	Activity	Frequency	Comments
Facilities			
Water - Headworks/Treatment	Inspection	Monthly	Or as appropriate
Wastewater - Treatment	Inspection	Daily	Or as appropriate

Asset	Activity	Frequency	Comments
Reservoirs and Holding Tanks	Inspection	Yearly	No formal programme exists for the cleaning and internal inspection of reservoirs and holding tanks.
Pump Stations	Inspection	Weekly	
Pumps	Tested	Monthly	Or as appropriate
Siphons	Inspection	Annually	Or as appropriate
Pipe bridges	Inspection	Annually	Or as appropriate
Gutters and Sumps	Cleaned	Six Monthly	
SCADA	Inspection	Yearly	
Turbidity Meters	Calibration	3 Monthly	
Chlorine Lines	Replacement	Yearly	
Backflow Preventors	Testing	Yearly	
Safe Working Load on Lifting Gear	Certification/Inspection	Yearly	
Switchboards	Inspection by Electrician	Yearly	
Water mains			
Critical Mains	Inspection	Annually	Includes associated fittings such as valves and hydrants etc.
Selected Mains	Condition Assessment by Pipe Sampling	As required	All sections of mains removed during repairs are kept for future analysis. In addition to this selected mains targeted by age/material etc. are to be sampled proactively
Dead End Mains and Low Points	Flushing	Annually	To be developed and included as an Improvement Item
Water valves			
All Valves	Evaluation and exercise	5 yearly	

Asset	Activity	Frequency	Comments
Special valves			
PRV/PSVs	Inspection	Six Monthly	
Restrictors			
Restrictors	Inspection	3 yearly	
Fire hydrants			
All Hydrants	Fire flow Testing	5 yearly	By NZFS
Service connections			
Flow/Pressure Tests		Reactively	Following complaint from customers
Unplanned maintenance			
All	When a defect has been identified, remedial work is programmed before the risk and consequence of failure become unacceptable		
All	Priority is given to defects which are a safety hazard, likely to cause premature failure or severe economic deterioration		
All	Remain alert and prepared for emergency situations		
All	Respond to and repair failures by the most economic method available, making temporary repairs if major repairs or renewals are required		

4.3 Renewal Strategy

Renewal expenditure is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original capacity. Work over and above restoring an asset to original capacity is new works expenditure.

The strategy used to determine when assets are renewed is risk-based. It follows a similar procedure to the risk management described in Section 5 of this Asset Management Plan.

Renewal priority is based on:

- The likelihood of asset failure, from 1 (least likely) to 5 (most likely)
- The consequences of asset failure, from 1 (lowest) to 5 (highest).

The consequences of asset failure are determined by the criticality of that asset. For example, a trunk main that supplies water to an entire town has a higher criticality than a rider main that serves a small number of properties.

Critical assets will be renewed as a higher priority than non-critical assets, as the consequences of their failure are high. Non-critical assets may be "sweated" by prolonging their lives, and increasing the amount of reactive maintenance if necessary.

The likelihood of asset failure is assessed using a combination of these asset attributes:

- Remaining useful life.
- Condition.
- Performance.
- Construction material.

Each of these attributes is given a weighting, and the resulting scores are multiplied to come up with a likelihood rating.

Once the consequence and likelihood have been determined, Table 100 and Table 101 from the Risk Management section of the Asset Management Plan are used to give the overall risk of asset failure, and the priority for renewal.

4.3.1.1 Water

Evaluating pipe performance and condition for water networks is more arduous than for gravity networks. It is not practical to inspect the pipe using CCTV inspections to obtain its physical condition. Typically pipe conditioning involves sampling pipe walls, expensive leak detection or hydraulic modelling. Pipe performance is judged by flow rates and pressure as reported from hydrant testing or computer modelling. Its economic performance may be assessed by its material availability, installation technique or accessibility. Condition is assessed based on any visual inspections during repairs and by the historical record of breaks per km of pipe.

Scheduling of asset renewals is performed with reference not only to risk, but also to available budgets and alignment with the renewal of other services in the same location.

Renewal works are planned in conjunction with other utility services or roadworks in the area to reduce site costs.

To provide operational and maintenance savings, all fittings and service pipes should be replaced at the same time as the water main renewal. In the past this has not happened with maintenance staff still being called to areas with new mains. Current practice is to renew all service pipes and fittings along with the water mains.

4.3.1.2 Wastewater

Historical maintenance and inspection records are used to calculate an asset condition/performance score for assets. The score indicates the remaining physical or economic life expectancy for the asset determined during the valuation process. Where assets are identified as having a small remaining life, a visual inspection may be required to verify its state.

For pipe assets a suitable repair option may be more economic than full renewal. An estimate of the pipe's new base life is made so the repair costs can be capitalised.

Performance of pipes is affected by poor gradient (dips), inflow of ground water, root intrusion, poor installation of laterals. Condition is affected by surface damage, cracking, holes etc. An Excel template has been developed to assist the engineer determine the benefit/cost of a repair option.

Council's in house engineering standards have been reviewed in conjunction with Manawatu District Council and a combined standard based on NZS 4404:2010 and addendum of specific local conditions adopted. The adoption of this standard and a local addendum is common practice for most Local Authorities around the country and assists contractors, suppliers and developers in providing consistency and certainty in being able to meet standards and specifications.

4.3.1.3 Stormwater

The Asset Management System treats each inlet and outlet structure, manhole, section of pipe etc, as an individual asset with its own calculated replacement date.

The calculated replacement dates for these assets needs to be modified to account for secondary criteria.

- Align pipe segment replacement dates within a single street to the average date.
- Prioritise projects by criticality rankings.
- Align all inlet and outlet structures and manholes associated with a pipe replacement date.
- Align street replacements with other utility plans such as water, wastewater or street reconstruction projects.

Pipe replacement dates may be modified by up to 10 years to smooth the projected workload using the above criteria.

Completion of the network CCTV inspection and grading exercise over the next five years will refine the lists to obtain greater benefit from this expenditure. Some reprioritization is expected following this work.

Costs associated with future discharge resource consents and there compliance are an unknown at this stage.

4.4 Creation/Acquisition/Augmentation Plan

New works are those works that create a new asset that did not previously exist, or works which upgrade or improve an existing asset beyond its existing capacity. They may result from growth, social or environmental needs. The main reason for creating an asset is to satisfy or improve the level of service, provide for new demand or to provide a commercial return.

The creation of assets through subdivision development is paid by the developer, while works associated with the creation of Council assets is funded via loans or rates and is subject to the LTP and Annual Plan process.

The Council receives assets that are vested in it, but there has been no direct exchange of funds. In the case of infrastructural assets, the value of exchange is deemed to be at the current valuation at time of issue of the 224 Certificate. For all donated and subsidised assets, the initial value recorded is the current valuation value at the date of acquisition.

An important interface exists between the fixed assets register and the Asset Management Planning process. It involves accurately reflecting the optimised depreciation replacement costs for the asset components within the Council's financial system, and capturing the on-going renewal, acquisition and disposal of assets.

Assets are recorded at component level e.g. mains and valves and at element level in the AssetFinda database e.g. mains – pipe type, size and length; valves – type and size. An asset is initially recorded at cost with a vested asset including direct materials and labour. The total cost of an asset includes:

- Design, Management & Supervision costs, including:
  - Survey costs.
  - Resource Consent costs.
  - LIM costs, etc.
- Construction costs, including:
  - Material costs
  - Installation costs
  - Labour & Plant costs, etc.
- Site preparation.
- Architectural and Engineering fees.
- Freight.
- Commissioning.
- Import duties.
- Agent's commission.
- Legal fees.

The cost does not include feasibility costs, evaluation costs or financing costs.

Asset costs are initially recorded in the capital expenditure ledger, for the initial aggregation of costs and Annual Plan reporting. The balance in this ledger represents the amount of work undertaken by Council at any given time.

On a yearly basis, the value of completed assets or completed stages of major assets are transferred out of work in progress into the fixed asset system. The transfer is driven by the Certificate of Practical Completion and 224 Certificate in relation to subdivisions. The value of the assets is broken down into components. This includes vested assets.

Any significant subsequent expenditure after the initial recording of an asset can be capitalised under two conditions. These are:

- It is probable that the expenditure will result in a higher Level of Service, or increase the useful life over the initial expected Level of Service or useful life.

- The expenditure was necessary to obtain the previously expected Level of Service or useful life, and would have been considered part of the initial costs, but for time of expenditure.

Council's in house engineering standards have been reviewed in conjunction with Manawatu District Council and a combined standard based on NZS 4404:2010 and addendum of specific local conditions adopted. The adoption of this standard and a local addendum is common practice for most local authorities around the country and assists contractors, suppliers and developers in providing consistency and certainty in being able to meet standards and specifications.

4.5 Disposal Plan

Disposal is any of the activities associated with disposal of a decommissioned asset, including sale, demolition or relocation.

All pipeline renewals identified have a corresponding disposal either through the pipes being removed and disposed of at the landfill, or being left in the ground if the water services are renewed using 'no-dig' techniques or the asset is replaced in a new location. A report records each disposal and the details put in the AssetFinda database. Similarly, replacement of components at treatment plans and pumping stations usually involves disposal of those items being renewed/upgraded.

Buried assets remain in the ground unless economic to remove or they pose a potential hazard.

In all cases asset disposal processes must comply with Council's legal obligations under the Local Government Act 2002, which covers:

- Public notification procedures required prior to sale.

- Restrictions on the minimum value recovered.

- Use of revenue received from asset disposal.

Under the 3 Waters no assets for disposal are considered to be eligible to be for sale.

When considering disposal options all relevant costs of disposal will be considered, including:

- Consultation/advertising.

- Obtaining resource consents.

- Professional service, including engineering, planning and legal survey.

- Demolition/making safe.

- Site clearing, decontamination, and beautification.

Any major water treatment plant component requiring renewal is given an estimated cost for decommissioning. As this cost is incorporated into replacement value, of the asset, it is not considered here. In terms of the cost of reducing levels of service, there are no identified disposals for water treatment at this time.

4.6 Bulls Water

4.6.1 Background Data

Bulls is located beside the Rangitikei River on two old river flats. Water is abstracted from several shallow bores. From there it is treated before being pumped to two water reservoirs at Tricker's Hill on the northwestern side of Bulls in the farmland adjacent to Tricker's Hill Road. These two reservoirs have a total capacity of 540 m^3. A trunk main from these reservoirs supplies the entire town of Bulls. A 227 m^3 water tower located in Taumaihi Street previously supplied the RNZAF zone. This zone has now been combined with the town. The Taumaihi Street reservoir is now used solely for backwashing, and as a backup. The filling station being installed on this street will also be supplied from this reservoir.

The water is treated by a modified Candy/Patterson filter station, which was initially built in 1965. The treatment plant filters underwent a major upgrade in the 2009/2010 financial year and is providing good quality water.

There are 681 metered connections supplying a resident population of 1800 with up to 1200 m^3/day.

The town generally has a lower water pressure than other communities, but is maintained above 30m of head.

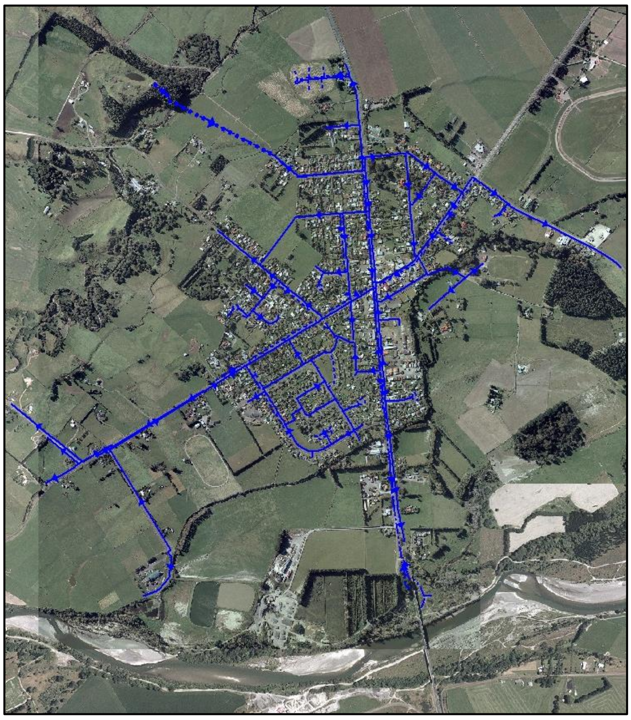
The following table list the resource consents associated with the Bulls Water Supply.

Table 24: Resource Consents – Bulls Water

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Abstraction – Bore	103868	16 Jan 2022	1,125 m^3/day	Adjacent to Bulls WTP
Abstraction – Bore	6903	16 Jan 2022	1,700 m^3/day (combined) 120 m^3/h (combined)	Four bores adjacent to Rangitikei River

The Bulls water network is depicted in Figure 14.

Figure 14: Extent of Bulls Water Scheme



Key issues for Bulls water are:

- Network modelling and data collection to ascertain the condition and performance of pipes and fittings for this scheme is a high priority.
- Highly critical rising mains are located on State Highways. These mains are predominantly AC pipes.
- Removal of some of the older AC pipes in the reticulation system that are now showing signs of weakness.
- Addressing corrosion of metal fittings and domestic water heater elements.
- Reduction of water losses within the water reticulation system.

4.6.1.1 Physical Parameters

The Bulls water network comprises 27.4 km of pressure mains ranging up to 200 mm diameter. Approximately two-thirds of all the pipes are asbestos cement (AC) pipes laid in the late 1960s and 1970s. This material was superceded in the late 1970s by MDPE and PVC, which now account for 30% of the network. There is a small portion of the network built from copper which is known to be in poor condition.

The following table gives background data on the Bulls water scheme.

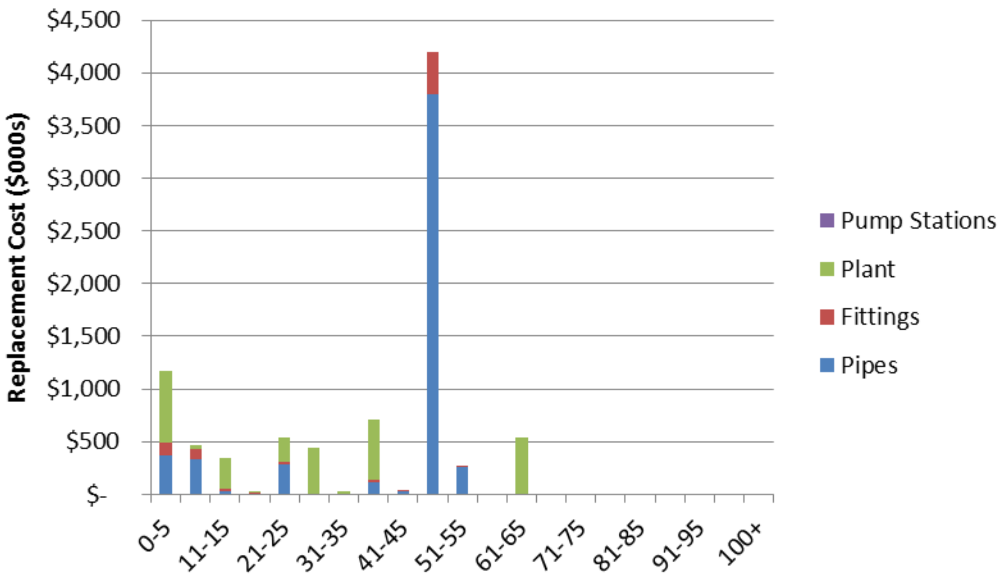
Table 25: Background Data – Bulls Water

Asset Type	Asset Parameters
Water Source	Rangitikei River shallow aquifers, one of which will be redeveloped soon: Well No. 1: 13m deep by 1.8 diameter Bore No. 2: 10m deep by 0.4 diameter Bore No. 3: 15m deep by 0.3 diameter Bore No. 4: 14m deep by 0.3 diameter Bore No. 5: 32m deep by 0.15 diameter Raw water trunk mains: 0.6km various materials and sizes Six bore pumps (Well No. 1 has two low-lift pumps) Raw water electrical and signal cables Raw water flow meters – 5 meters various sizes Raw water trunk fittings: 3 valves
Treatment Plant	Building and control room Components: Chlorination system UV disinfection system Aeration system Rapid sand filters Turbidity and pH monitor Backwash system Switchboard SCADA system
Pumping Stations	Five pumps in pump hall (duty/standby to "mushroom" reservoir, duty/standby to Tricker's Hill reservoir, plus one pump no dedicated line to Riverlands)
Storage	Mushroom reservoir – 227m^3 Tricker's Hill reservoirs – 540m^3 total (two reservoirs, one concrete and one timber) Total storage 767 m^3 (this is roughly one day's storage, given that Riverlands is supplied direct) Rising Main – 2.7km of 150 mm AC pipe to Tricker's Reservoir Falling Main – 0.6km of 200 mm AC pipe from Tricker's Reservoir to Flower Street.

Asset Type	Asset Parameters
Mains	26.6 km total 3.9 km of rising main 0.6 km of trunk main 16.8 km of service mains 5.3 km of rider mains
Fittings	164 valves 104 fire hydrants 3 bulk meters
Connections	2.5 km of service lines 142 tobies 764 meters 5 backflow preventers

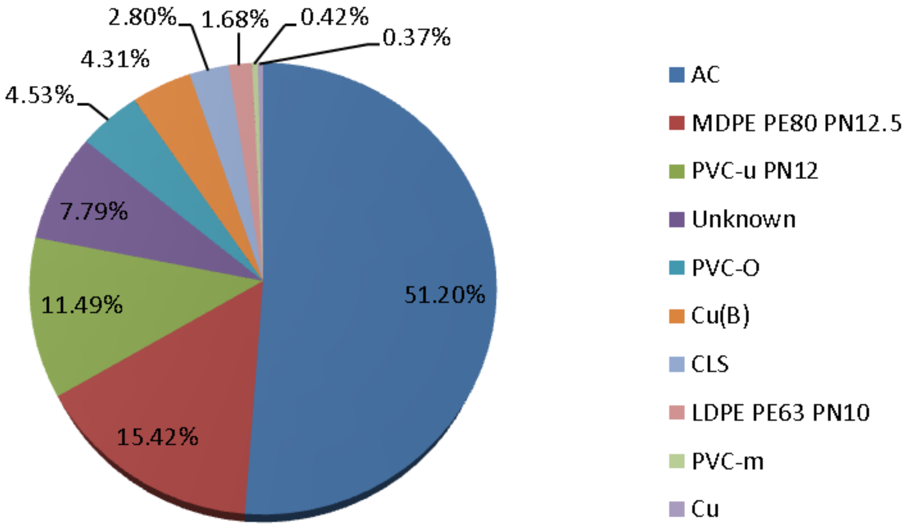
The age profile of water assets in Bulls is shown in Figure 15. Most of the pipe network is around 50 years of age. There are no recorded assets older than 65 years.

Figure 15: Asset Age – Bulls Water



The various pipe materials used for water supply in Bulls are described in Figure 16. Predominantly, the pipes are made from AC. There is a significant amount of plastic pipe within the scheme as well.

Figure 16: Pipe Material – Bulls Water



4.6.1.2 Asset Capacity/Performance

The plant copes with present demand; however the addition of the meat processing plant in Ferry Road highlighted the need for further water storage capacity. This requirement has been deferred by the installation of a direct supply main to the meat processing plant and utilization of their on-site storage facilities. The meat processing plant utilises up to half of the entire town's demand at peak times. Two shallow bores have reduced recharge levels in summer, a Fourth shallow bore commissioned in 2007 has alleviated this risk, with consent to abstract an additional 1125 m^3 per day.

Data on capacity for the Bulls water scheme are given in Table 26.

Table 26: Asset Capacity – Bulls Water

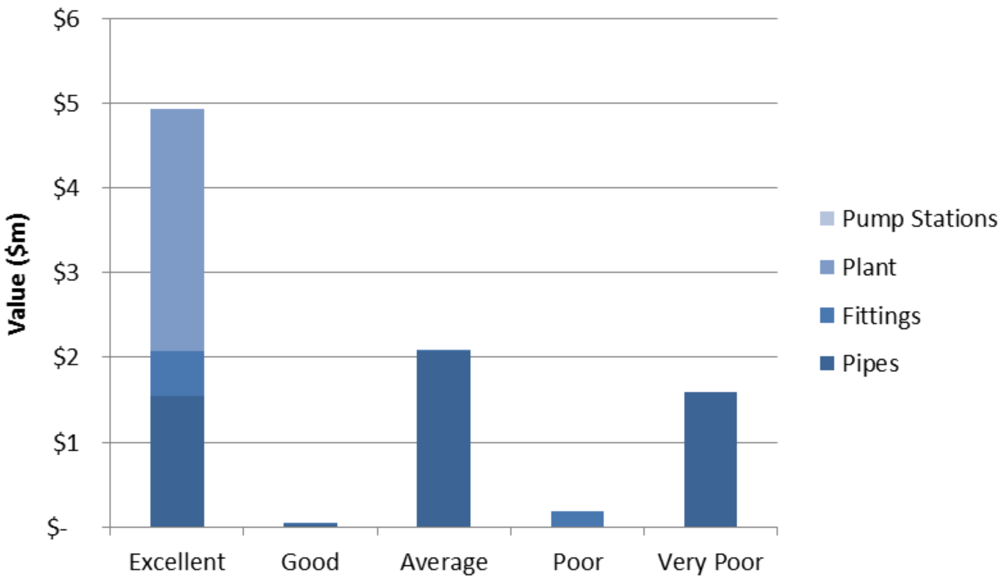
Parameter	Comments	Data
Consumption	Average daily demand, including Riverlands dedicated line (which accounts for some 30% of total)	1400 m^3/day
	Peak daily demand	2100 m^3/day
	Minimum winter demand	400 m^3/day
Treatment Plant	Maximum sustainable production	2400 m^3/day

The slight acidity of the water is causing some problems with corrosion of metal fittings and also with hot water cylinders. It may causes taste problems; customers are notified of acidity and given advice with their bills. There is also a low water pressure problem with the system due to the location and elevation of the storage reservoirs. Pressures are still within the range acceptable by New Zealand Standards, and there are no proposals to increase them.

There has been one significant failure at the treatment plant. This was on one of the pump delivery pipe lines and has been replaced. Failure risks have been mimimised by optimization of the treatment process. Two breaks have occurred on the rising mains highlighting its criticality. The reticulation will benefit from greater flexibility of supply from the two reservoir locations. Minor leaks are dealt with by staff as they are reported. Leaks in service connections are temporarily repaired prior to a complete replacement. Replacements are grouped for efficiencies of scale. Pipe breaks are recorded in GIS, which affect the pipe's historical performance score.

The performance ratings of individual assets in the Bulls water scheme are shown in Figure 17. The pump stations are all rated as being "Excellent" in terms of performance. Pipes, however, vary from "Excellent" to "Very Poor".

Figure 17: Asset Performance – Bulls Water



4.6.1.3 Asset Condition

Bore heads are deemed to be unsecure and require upgrading to protect them from vandalism.

The water mains supplying the treatment plant from the bores were all installed in recent years, with the exception of a short length of asbestos pipe that has recently been reconnected as a cost saving measure during an upgrade. The condition of this pipe was assessed to be good before being re-used. Pipes do however get a large build-up of Manganese Iron and need to be flushed/scoured on an annual basis.

Recent filter upgrading has raised the performance level of much of the plant and further upgrading will be required to meet the new drinking water standards. The current disposal of backwash water has been highlighted by Horizons as not acceptable and will be discharged into the wastewater reticulation in future. The high lift pumps have been replaced during 2001/02 and are fitted with soft start electronics and will be able to exceed the consent limit of 170m^3 in any one hour, and reduce the severity of water hammer in the ageing asbestos reticulation. A UV treatment system was installed in 2004, following recent changes to the NZ Drinking Water Standards this unit now does not meet compliance criteria and will be replaced in 2011. It is possible the old unit can be utilized for treatment of wastewater at Taihape. Direct supply to the meat processing plant has provided savings in power, pump and reticulation wear and tear. Further upgrading of plant pipe work will enable flexibility within the pump configurations.

There are two storage sites, a mushroom reservoir at the Air Force housing and two reservoirs at Tricker's Hill. Monitoring equipment at these sites is connected to the treatment plant SCADA system. A condition assessment of the mushroom tower needs to be carried out in 2013.

Flood damage to the rising main crossing the Tutaenui Stream in 2011 has highlighted the vulnerability and deteriation of this and the falling main. Proposals are in place to replace this section of pipeline with an overhead structure.

The pipe work is in average to good condition. The rising main from the pump station to Tricker's Hill is a critical asset, and will be periodically inspected for its condition. Its current life expectancy is 33 years, but this should be evaluated by site inspection and sampling.

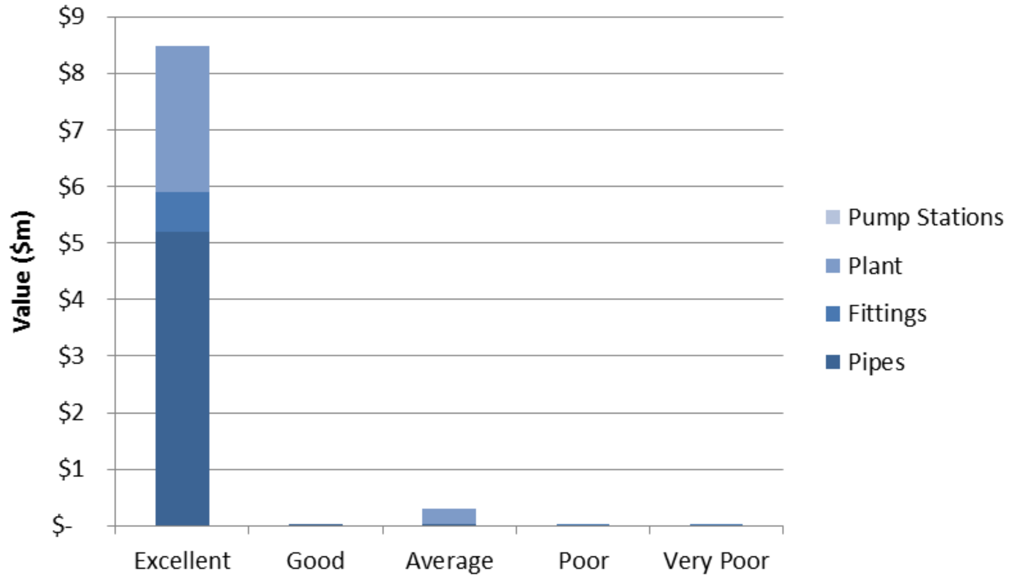
Most service connections were installed with the original contract and this has been taken as the age of all connections for this plan. Many of the copper services have been replaced due to the aggressive nature of the water. Additional rider mains have reduced future maintenance costs.

Isolation, air, drain and control valves are not routinely exercised causing operational issues during planned and unplanned repairs. Condition inspections on critical valves will identify problem valves and prioritise their replacement.

A high proportion of service lines in Bulls are copper or galvanised iron. These materials have deteriorated and contribute to leakage. There is an ongoing programme to replace all copper and galvanised iron service lines in Bulls with plastic. So far, around half of the 600 laterals have been replaced.

Water asset condition for Bulls is illustrated in Figure 18. Almost all the water assets for Bulls have been rated as having "Excellent" condition. It should be kept in mind, however, that substantial quantities of pipes are giving only "Average" to "Very Poor" performance, as shown in Section 4.6.1.2 earlier.

Figure 18: Asset Condition – Bulls Water



4.6.1.4 Asset Valuations

The most recent data for Bulls water is given in Table 27 by asset group.

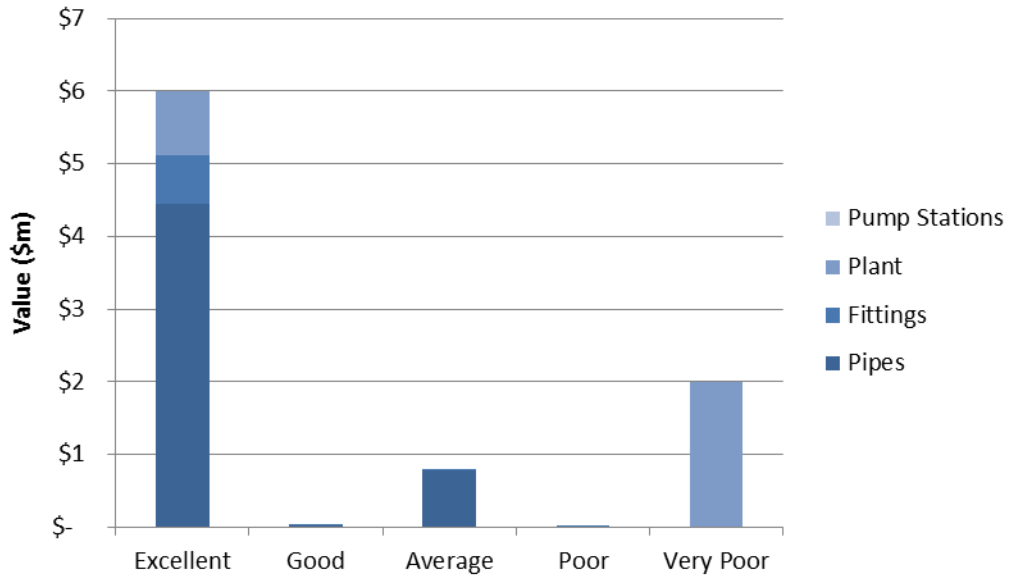
Table 27: Value by Asset Group – Bulls Water (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Reservoirs	1,076,046	525,996
Treatment Plants	1,202,114	295,300
Bores	409,615	90,427
Rising Main	1,149,868	235,995
Trunk Main	162,631	45,391
Service Mains	3,324,623	1,141,741
Rider Mains	419,927	260,011
Service Lines	182,798	90,201
Valves	295,000	103,733
Backflow Preventers	9,451	6,788
Fire Hydrants	187,237	32,961
Bulk Meters	17,215	3,526
Meters	139,138	79,362
Tobies	35,721	33,653

4.6.1.5 Historic Data

Asset information confidence for Bulls water is shown in Figure 19. In general, confidence in the information is high. However, the information on a substantial value of treatment plant assets is "Very Poor" and will need to be addressed. There remain some recently-added treatment plant assets for Bulls that need to be componentised to improve data confidence. The quantity of pipes graded "Average" for data confidence will be mostly old copper laterals for which locations are unknown.

Figure 19: Data Confidence – Bulls Water



4.6.2 Routine Operations and Maintenance Plan

The programmed replacement of copper and galvanised service connections with plastic equivalents on a need to replace basis has provided operational and maintenance savings. This is an ongoing project.

With no proper maintenance programme in place to test the serviceability of isolation valves, several instances of incomplete shutoff have occurred while performing pipe repairs. The consequence of this is having to shut down a much larger catchment area, and postponing repairs outside of normal working hours to lessen the impact on industrial and domestic consumers. Some sections of the network do not have valves to allow a shutoff at all. Some new valves have been installed to alleviate this issue.

The location and asbestos cement material of the rising main between the treatment plant and Tricker's hill storage reservoir is a high failure risk. Severity of failure has been minimized by the installation of service mains between the "Airforce block" and the rest of the urban area in 2011. This will enable effective cross supply from the previously independent zones. Access to the Tricker's Hill reservoirs is via easement over a farm track and can be marginal during adverse weather conditions.

Hazards associated with working near/with water and chemicals are present. There is currently work underway to address Health & Safety issues at the plant.

Due to the presence of iron/manganese and the resulting biofilm, flushing of mains is periodically carried out on this scheme. Currently, this flushing is mostly reactive, in response to issues. When time allows, dead ends of the reticulation are flushed proactively. In the future, a regular flushing programme will be developed.

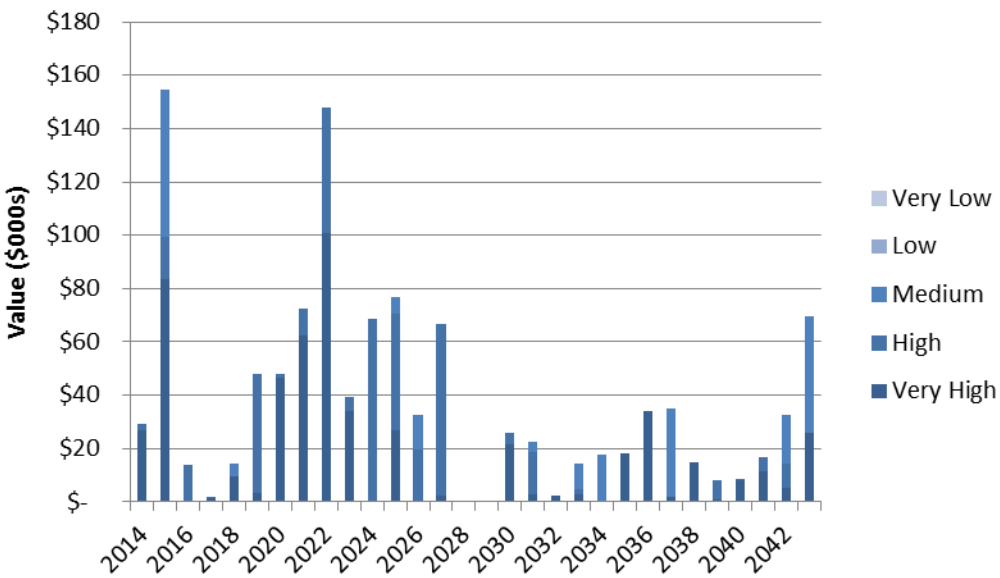
4.6.3 Renewal/Replacement Plan

The only pressing renewals for Bulls are for the Water Treatment Plant. Currently, some renewals are being carried out to address certain Health & Safety issues.

Forecast renewals for Bulls water long-term are shown in Figure 20, by asset criticality. Note that this information has been produced by AssetFinda. Each renewal projected generated in this manner is subject to checking before work is programmed.

There are a number of renewals planned for Bulls in the future, to replace pipes with condition ratings of “3” or “4”.

Figure 20: Renewal Forecast by Criticality – Bulls Water



4.6.4 Creation/Acquisition/Augmentation Plan

The building at the Bulls Water Treatment Plant is being upgraded. Work to offset the effects of a recent fire at the plant has finished. Oxidation trials will be carried out on the bore water. Filter backwash water for the plant will also be diverted to the sewer main, removing the current stream discharge.

4.7 Hunterville Urban Water

4.7.1 Background Data

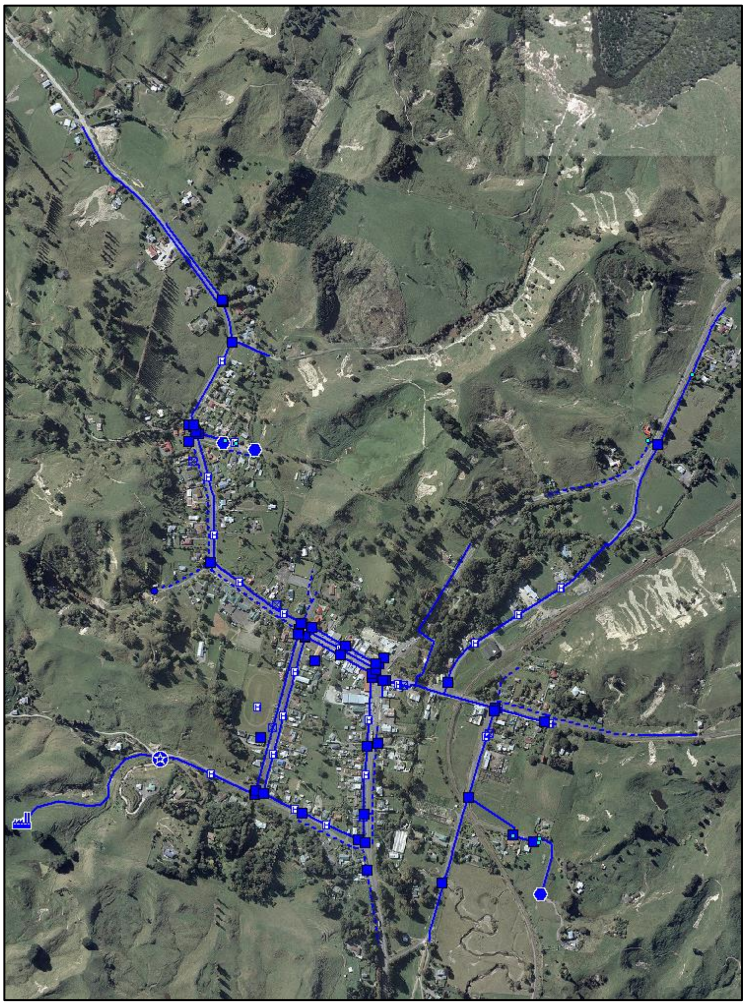
The Hunterville Urban water scheme purchases water from the Hunterville Rural Water Supply scheme. The water is already chlorinated by the Hunterville Rural Water Supply scheme and receives boost chlorination at the water treatment plant. All water is obtained from the rural scheme under Resource Consent 103989 which permits a total river water take of 2500 m^3/day and expires on 1/07/2037. Hunterville Urban water supply allocation is 370 m^3/day. For information on these consents, see Section 4.13 on Hunterville Rural Water below.

An upgrade to the Marshall Road plant carried out in 1997/98 saw the installation of filtration equipment and a secondary chlorine treatment to improve the supplied water quality

There are 245 metered connections supplying a resident population of 400 with up to 370 m^3/day.

Figure 21 shows the extent of the Hunterville Urban scheme.

Figure 21: Extent of Hunterville Urban Water Scheme



Key issues for Hunterville Urban water are:

- Network modelling and data collection to ascertain the condition and performance of pipes and fittings for this scheme is a high priority.
- Proactive maintenance policies are required for this scheme to reduce operational risks and improve efficiency.
- Treatment plant is located on private land and access is via a farm track.
- Access to the treatment plant is difficult during adverse weather conditions and proactive maintenance is required to keep it at a reasonable standard.
- Raw water supply main was designed as a constant flow main. The urban area has a fixed daily allocation from the rural scheme which limits potential development and restricts the effectiveness of conservation measures.

4.7.1.1 Physical Parameters

The Hunterville Water Network comprises 12.2 km of pressure mains and service connections ranging up to 150 mm diameter. The network is relatively new, with no pipes listed as being older than 30 years, and 30% being less than 10 years old.

All known connections are currently metered, although it is suspected there may still be a handful of unmetered connections on the border of the community. Full logging of the supply meters would allow for better leak detection. Water meters were installed in 2003/2004 on both commercial and residential properties.

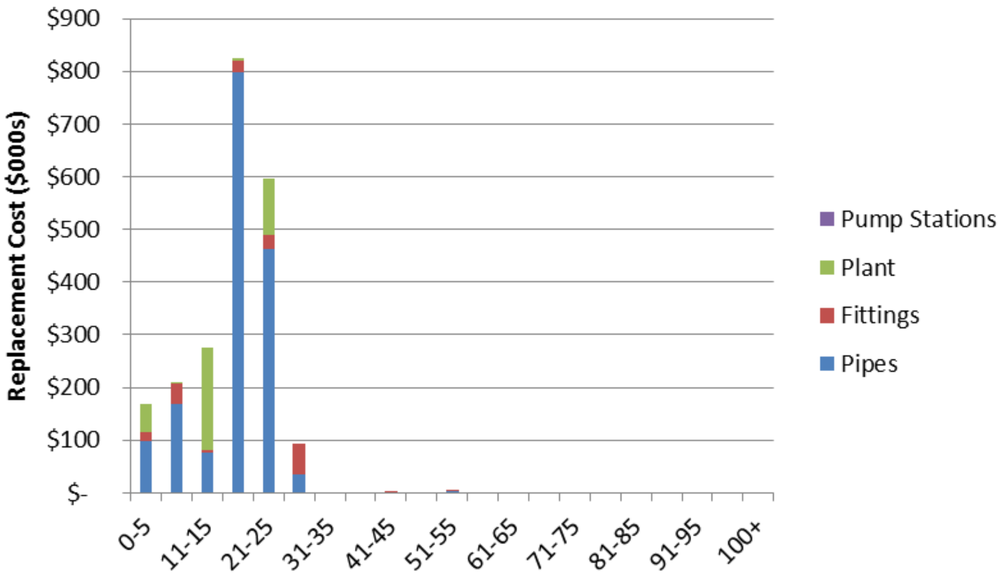
Background data for the scheme is given in Table 28.

Table 28: Background Data – Hunterville Urban Water

Asset Type	Asset Parameters
Water Source	Hunterville Rural Water Supply Scheme – fixed allocation
Treatment Plant	Microfiltration system Pre and post chlorination
Storage	2 Timber stave reservoirs: 150m^3 each
Mains	10.4 km total 7.7 km of service mains 2.7 km of rider mains
Fittings	57 valves 29 fire hydrants 1 bulk meter
Connections	1.7 km of service lines 9 tobies 243 meters

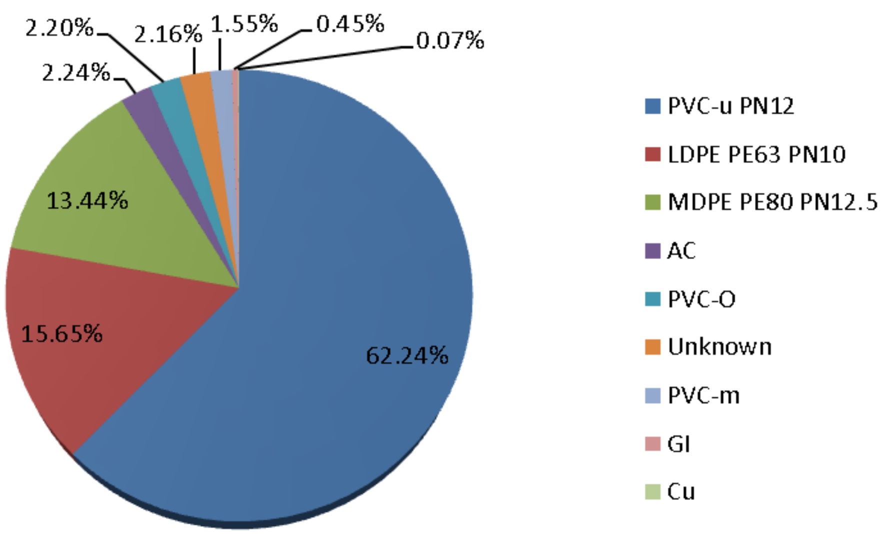
Figure 22 shows the age profile of Hunterville Urban water assets. They are almost all less than 30 years old.

Figure 22: Asset Age – Hunterville Urban Water



Pipe materials in use for Hunterville Urban water are shown in Figure 23. The predominant materials are plastic (PVC or PE), which corresponds to the fact that most pipes were installed in the last 30 years as shown above.

Figure 23: Pipe Material - Hunterville Urban Water



4.7.1.2 Asset Capacity/Performance

Water from the rural water supply is restricted to a maximum of 370 m^3/day. Analysis of domestic consumption meters shows an average of 130 m^3/day. Information on the capacity of the scheme is given in the following table.

Table 29: Asset Capacity - Hunterville Urban Water

Parameter	Comments	Data
Water availability	This is the volume paid for from HRWS	370 m^3/day
Consumption	Average daily demand	140 m^3/day
	Peak daily demand	380 m^3/day
	Minimum winter demand	96 m^3/day
Treatment Plant	Maximum sustainable production	220 m^3/day

A new micro-filtration system was installed in June 1999 to improve the water quality. The recent grading evaluation of Bulls identified operational deficiencies in compliance checking and recording. Corrective actions have been identified and will be implemented across all plants, Hunterville included.

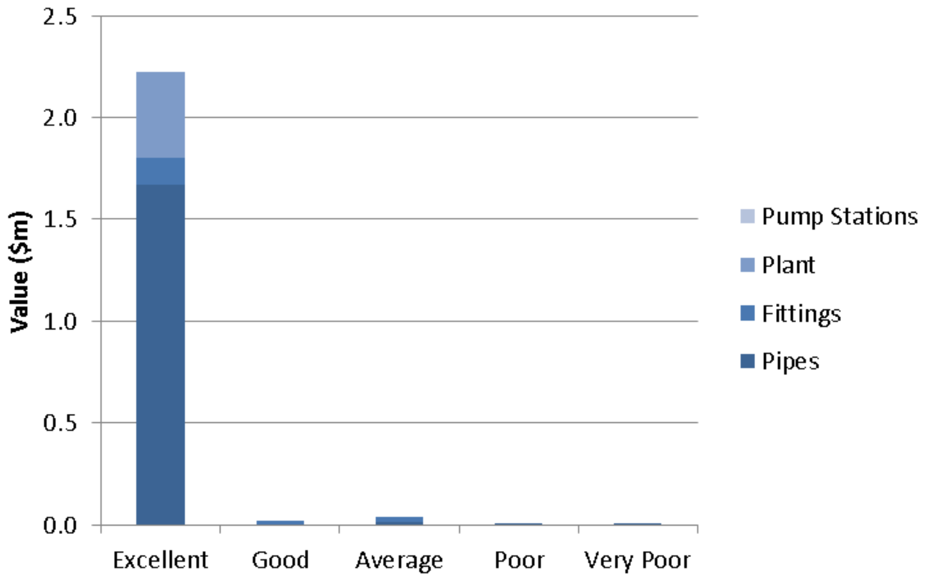
Regular service checks of the valves in town will reduce the numbers of properties affected by planned shutdowns. There have been no major breaks in the mains in the last five years. Most of the uncharted LDPE lines have been rationalised and replaced and it is expected that there will be a minimal quantity of water lost with less than 5% of the reticulation remaining in this material.

There have been no significant failures of the network or treatment plant. This has been achieved by optimization of the treatment process. Minor leaks are dealt with by staff as they are reported. Leaks in service connections are temporarily repaired prior to a complete replacement. Replacements are grouped for efficiencies of scale. Pipe breaks are recorded in GIS, which affect the pipe's historical performance score.

Operational staff are developing a maintenance manual for the treatment plant which specifies the daily, monthly and annual inspections. Full Process and Instrumentation Diagram (P&ID) need to be developed in conjunction with the Water Safety Plan. This will help to ensure maintenance and replacement is undertaken in a timely and appropriate manner.

The performance ratings for Hunterville Urban water assets are depicted in Figure 24. Almost all of the assets still give "Excellent" performance.

Figure 24: Asset Performance - Hunterville Urban Water



4.7.1.3 Asset Condition

The treatment plant is in good condition with the majority of the equipment being installed in 1998 and having between 7 and 20 years remaining useful life. UV treatment will be installed to meet Protozoa compliance.

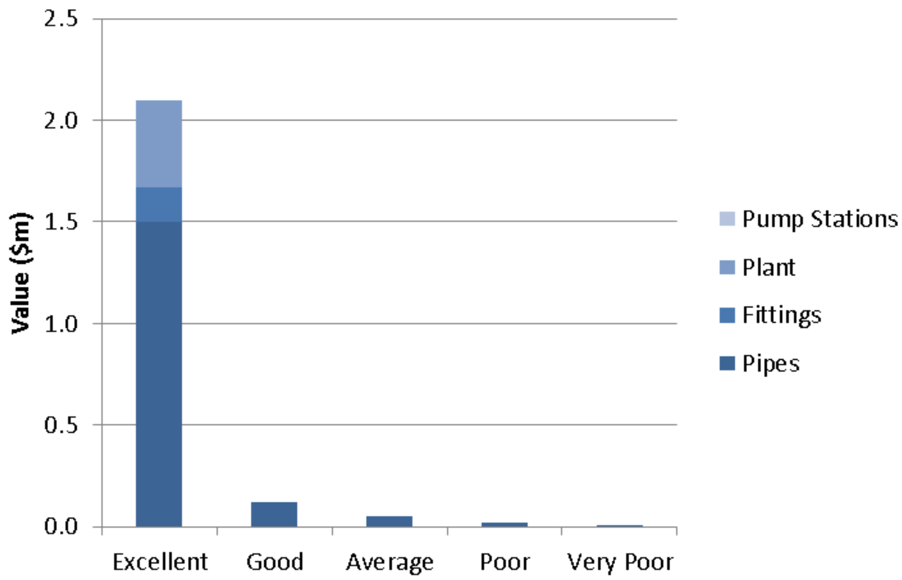
The liner from one of the reservoirs was replaced in 2006 after developing leaks, and it is expected that this will be an occasional maintenance requirement of these reservoirs. Some ladders are in poor condition and these are in the process of being replaced. One of the reservoirs has developed a noticeable lean following the liner replacement, and it should be drained and straightened, or monitored regularly. Better drainage around the base of the tanks would reduce the deterioration of the steel wire ropes and staves.

There are still a number of early LDPE pipes that cause problems, owing to the poor methods adopted when installing them, and the age of the material. Reticulation fittings will be replaced when pipelines are renewed in keeping with Council's policy. In the past these fittings were reused.

Little is known about the service connections. The service connections and meters are not critical to the operation of the reticulation, are of low value and will be replaced on an operational maintenance basis. Other fittings such as hydrants and valves are expected to remain serviceable during the time period covered by this report.

A summary of asset condition data for Hunterville Urban water is given in Figure 25. Most of the assets are in "Excellent" condition.

Figure 25: Asset Condition - Hunterville Urban Water



4.7.1.4 Asset Valuations

The value of assets within the boundaries of the Hunterville Urban scheme are shown in Table 30.

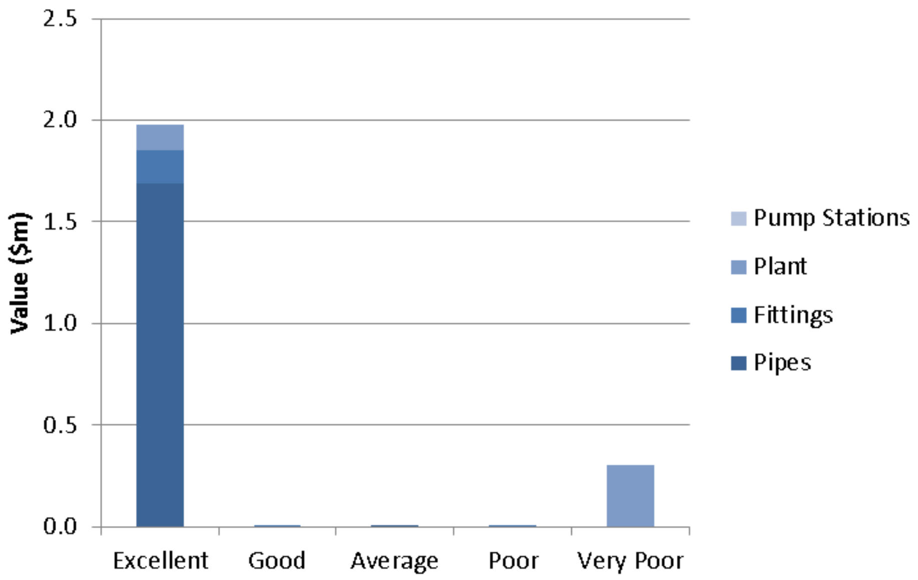
Table 30: Value by Asset Group – Hunterville Urban Water (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Treatment Plant	421,921	239,122
Service Mains	1,261,248	992,393
Rider Mains	303,038	239,335
Service Lines	127,314	109,638
Valves	78,245	31,767
Fire Hydrants	47,689	31,519
Bulk Meters	3,826	337
Meters	36,979	24,149
Tobies	2,200	1,670
Other	4,087	3,270

4.7.1.5 Historic Data

An analysis of the data confidence for this scheme is shown in Figure 26. Mostly, there is “Excellent” confidence in the data held. When it comes to treatment plant assets, however, the bulk of them have information with “Very Poor” confidence. This needs to be improved in order to effectively programme renewals for treatment plant assets. Componentisation of treatment plant assets will need to be carried out for Hunterville as well as other plants, to reflect changes made while upgrading the plant to improve performance against the Drinking Water Standards for New Zealand.

Figure 26: Data Confidence – Hunterville Urban Water



4.7.2 Routine Operations and Maintenance Plan

Renewal works will be planned in conjunction with other utility services or road works in the area to reduce site costs.

There is no all-weather road to the treatment plant so access for maintenance purposes is a problem. Access problems and the absence of lights is also a safety issue. Most pipe laid along the State Highway is located well into the berm allowing good access for repairs and connections.

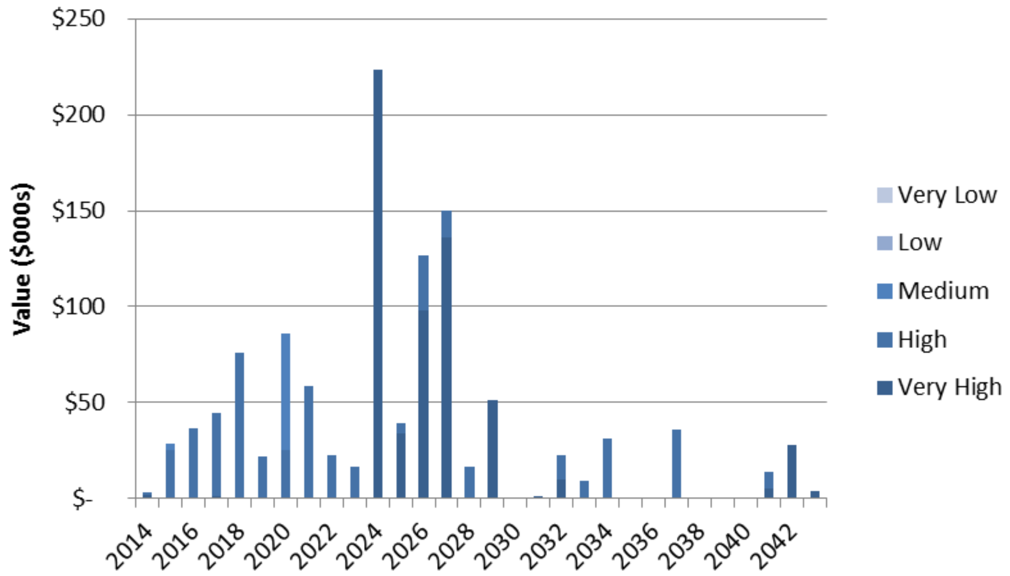
Hazards associated with working near/with water and chemicals are present. Access to tanks is a problem; however access ladders have been installed.

4.7.3 Renewal/Replacement Plan

There are no immediate renewals planned for Hunterville Urban. Specific long-term renewals identified are along Milne Street (three lengths, estimated total $75,000) and Station Road (rider main, costed at $15,000).

The renewals expected to be necessary for Hunterville Urban in the long term are quantified in Figure 27, by asset criticality. Priority should be given to renewing assets that are critical and/or performing poorly. The spike in renewals expenditure predicted for 2024 will potentially need to be managed by smoothing renewals expenditure.

Figure 27: Renewal Forecast by Criticality - Hunterville Urban Water



4.7.4 Creation/Acquisition/Augmentation Plan

There are no identified new works for Hunterville Urban within the scope of this Asset Management Plan.

4.8 Mangaweka Water

4.8.1 Background Data

Mangaweka is situated on an elevated river flat approximately 60 m above the Rangitikei River.

The water is abstracted from a shallow well alongside the river and then lifted vertically 100 m to the treatment plant. Filtration and chlorination occurs and the water is stored in a large roofed reservoir. Gravity feeds from the reservoir service two distinct sections of the community. The primary feed services the town itself to the south, while a smaller feed services an area of pastoral farms and the camping ground to the east.

There are 101 fully metered connections supplying a resident population of 180 with up to 170 m^3/day.

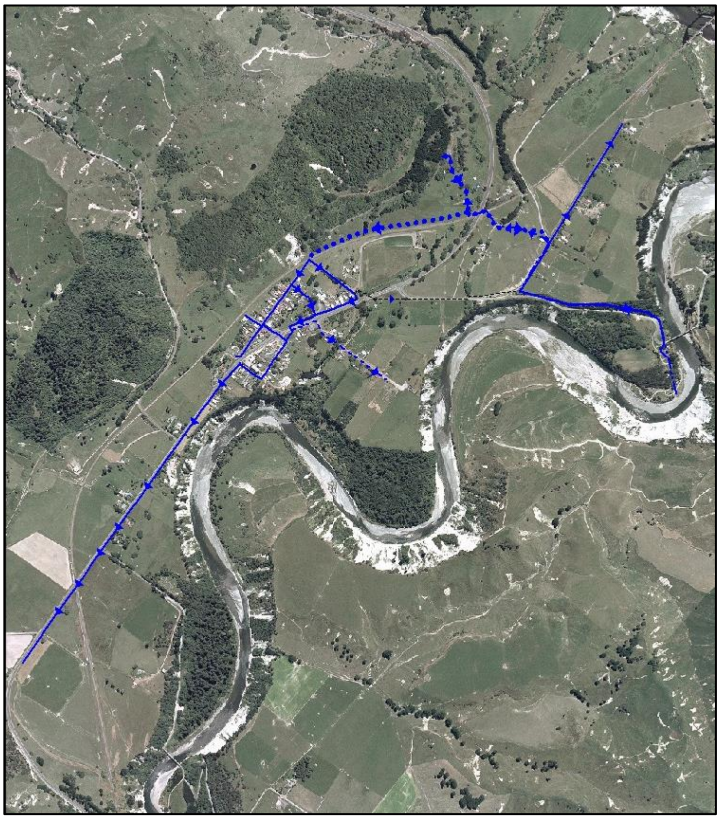
The following table lists the resource consents associated with the Mangaweka Water Supply.

Table 31: Resource Consents – Mangaweka Water

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Abstraction – Rangitikei River	103081	18 Dec 2017	170 m^3/day 33 m^3/h 9.2 L/s	Infiltration gallery at Mangaweka Campground

The layout of the Mangaweka water scheme is shown in Figure 28.

Figure 28: Extent of Mangaweka Water Scheme



The key issues for water supply in Mangaweka are:

- Network modelling and data collection to ascertain the condition and performance of pipes and fittings for this scheme is a high priority.
- Need for firefighting facilities to be maintained.
- Providing ratepayers with good value for their money.

4.8.1.1 Physical Parameters

The Mangaweka water network comprises 10.2 km of pressure mains ranging up to 200 mm diameter. Approximately half of the network was replaced during the 1990s and many service connections renewed as part of the consumption meters installed in the 2000s. Asbestos pipes from the 1960s and original steel pipes from the 1910s make up the remainder of the network.

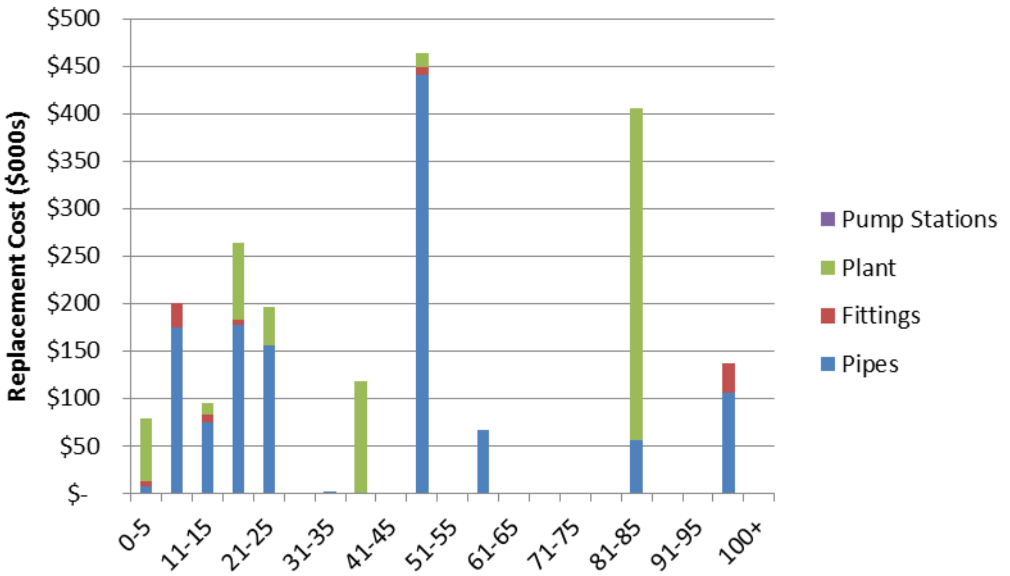
Background data for the Mangaweka water scheme are given in Table 32.

Table 32: Background Data – Mangaweka Water

Asset Type	Asset Parameters
Water Source	Rangitikei River Soakage Well Well: 5m deep by 1.0 diameter Raw water trunk mains: 2km long. Combination of 100mm AC, 100mm Galvanised iron, and 125mm steel pipes Transfer pump Raw water electrical and signal cables Raw water trunk fittings
Treatment Plant	Building and control room Components: Chlorination system Filtration Aeration system Ultra Violet treatment Treated water storage Switchboard SCADA system
Storage	Concrete reservoir: 630 m^3
Mains	9.0 km total 1.8 km of rising main 1.4 km of trunk main 4.5 km of service mains 1.3 km of rider mains
Fittings	14 valves 22 fire hydrants 1 bulk meter
Connections	0.9 km of service lines 4 tobies 101 meters 1 backflow preventer

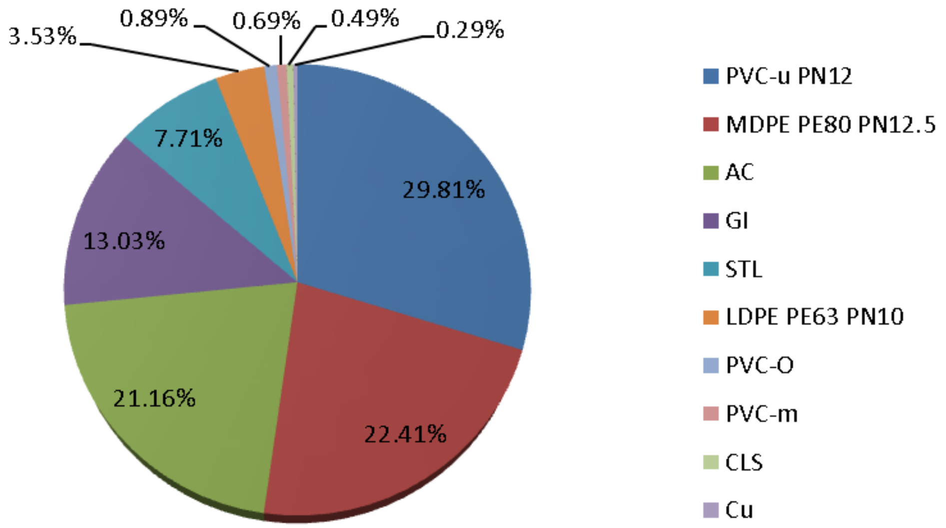
The age profile of water assets in Mangaweka is given in Figure 29. Mangaweka water assets range from new to almost 100 years old, with most pipes around 50 years old, and most treatment plant assets 81-85 years old.

Figure 29: Asset Age – Mangaweka Water



Water pipe materials used in Mangaweka are shown in Figure 30. As can be seen, most of the pipes in use are plastic (either PVC or PE). AC pipes are the next most common.

Figure 30: Pipe Material – Mangaweka Water



4.8.1.2 Asset Capacity/Performance

There is adequate water capacity from the Rangitikei River and an oversized reservoir for the size of the community. A new resource consent was sought in 2005 as it was found the previous consent was being exceeded. A comparison of the town flow meter with the domestic consumption meters in 2007 indicated a significant leakage, or possible illegal connections which should be investigated. The supply would benefit from a demand management programme if it was economic to implement.

Capacity information for the Mangaweka water scheme is given in Table 33.

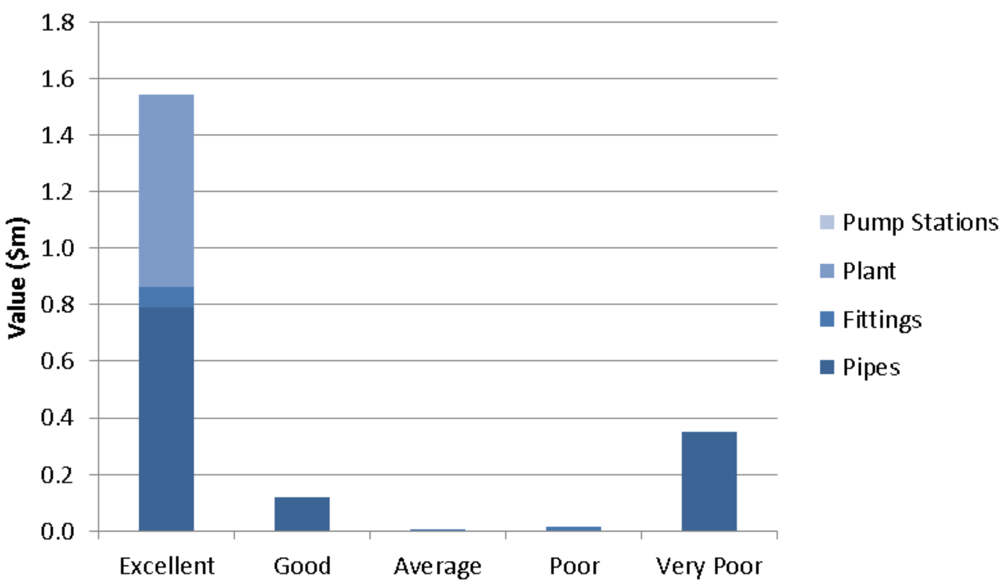
Table 33: Asset Capacity – Mangaweka Water

Parameter	Comments	Data
Consumption	Average daily demand	85 m^3/day
	Peak daily demand	120 m^3/day
	Minimum winter demand	70 m^3/day
Treatment Plant	Maximum sustainable production	800 m^3/day

There have been no significant failures of the network or treatment plant. This has been achieved by optimisation of the treatment process. Minor leaks are dealt with by staff as they are reported. Leaks in service connections are temporarily repaired prior to a complete replacement. Replacements are grouped for efficiencies of scale. Pipe breaks are recorded in GIS, which affect the pipe's historical performance score.

The performance ratings for individual water assets in Mangaweka are displayed in Figure 31. Most assets have been rated as having "Excellent" performance. However, some of the pipes have been assessed as "Very Poor" in this regard.

Figure 31: Asset Performance - Mangaweka Water



4.8.1.3 Asset Condition

The original rising main has now been replaced except for 55 m remaining in 125 mm steel pipe. The only other concern in this main is the existence of galvanised iron where the pipe passes through the railway corridor. It would be desirable to replace this with a more acceptable material, such as ABS.

The treatment plant underwent extensive upgrades in 2010/2011 as a result of a successful application for MoH capital assistance funding. Filtration, chemical treatment, site security and backwash water disposal were upgraded and UV treatment added for Protozoal compliance.

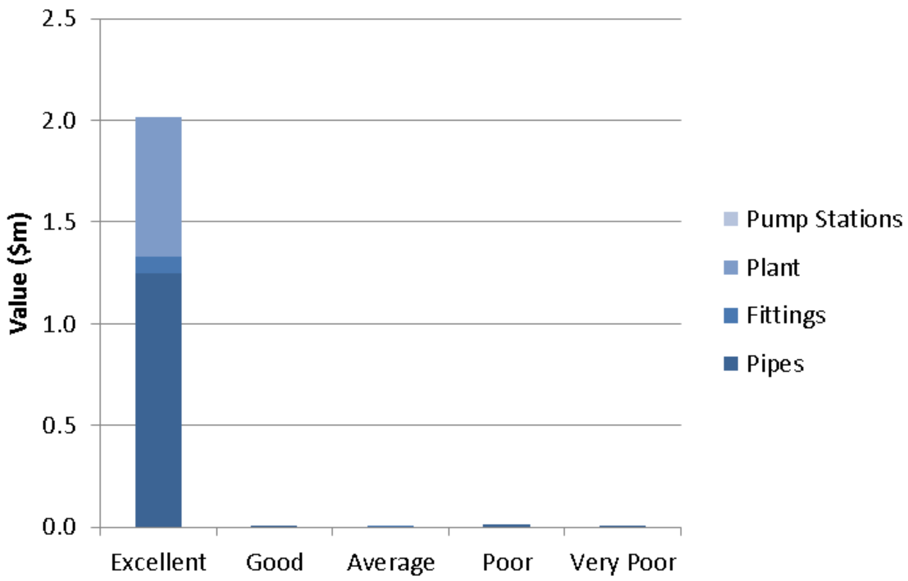
The reservoir building is old. The replacement of the roof in 2003 has extended the useful life until 2033, and the main structure is also expected to last until 2020.

Generally the pipe work is assumed to not be in very good condition with 16% of the network requiring replacement by 2015 and 40% by 2020 based on age. This is based on assumptions that the original steel mains laid circa 1915 are in poor condition. The remaining pipe details have been derived from as built plans of the reticulation where available. Some of the data from around 1965 has been assumed as the plans have proven to be of questionable accuracy, but work undertaken since then is considered more reliable. Better maintenance records and pipe samples are required to verify the condition of this network.

Little is known about the service connections except for recent repairs carried out. The position of service meters were recorded when they were installed in 2003-2004.

Asset condition for Mangaweka water is summarised in Figure 32. Almost all assets have been assigned “Excellent” condition.

Figure 32: Asset Condition - Mangaweka Water



4.8.1.4 Asset Valuations

The value of our water assets at Mangaweka is as follows.

Table 34: Value by Asset Group – Mangaweka Water (29 Jan 2015)

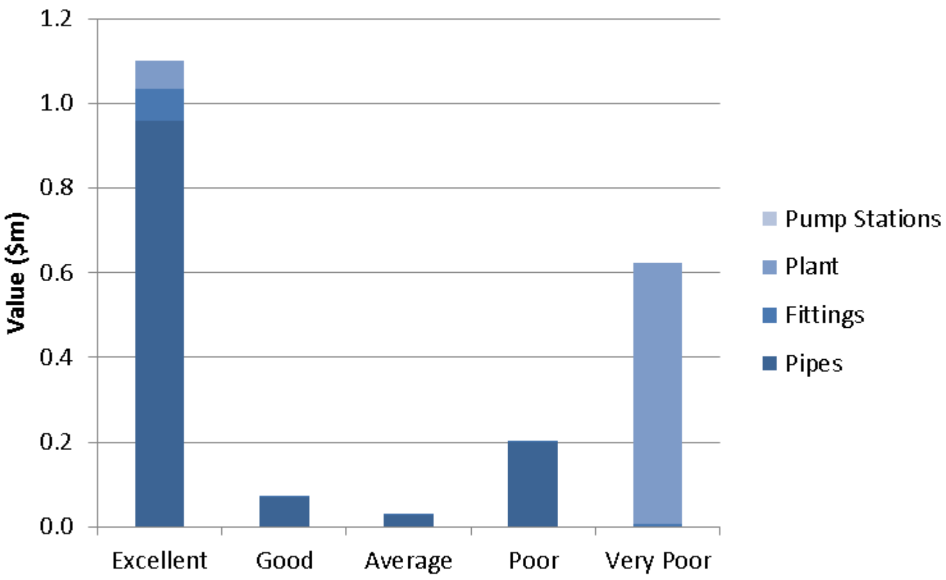
Asset Group	Replacement Cost ($)	Written Down Value ($)
Intake	133,479	3,560
Treatment Plant	548,407	100,813

Asset Group	Replacement Cost ($)	Written Down Value ($)
Rising Main	211,842	127,961
Trunk Mains	178,054	134,051
Service Mains	686,840	245,352
Rider Mains	108,316	10,007
Service Lines	75,005	64,347
Valves	25,306	6,979
Backflow Preventers	2,597	2,300
Fire Hydrants	36,584	11,231
Bulk Meters	150	100
Meters	17,074	11,926
Tobies	978	423

4.8.1.5 Historic Data

Data confidence for most Mangaweka water assets is “Excellent” as shown in Figure 33. Information on most treatment plant assets has been rated “Very Poor”, however. This is due again to new treatment plant assets that have not been broken down to component level. The assets with data confidence ranging from “Good” through “Average” to “Poor” are in certain areas of Mangaweka where information is uncertain. These areas of uncertainty have come about as the town has decreased in size and old assets have been left in place without being decommissioned. Road work done for the Mangaweka deviation has left some assets buried. In some cases, they could now be buried up to 5 m deep, making it difficult to obtain reliable information on them.

Figure 33: Data Confidence – Mangaweka Water



4.8.2 Routine Operations and Maintenance Plan

Some pipes in the Mangaweka system are Imperial sizes and require special fittings to connect to metric sizes; this causes some difficulty and means that a replacement pipe/pipe section will not be of the exact same size.

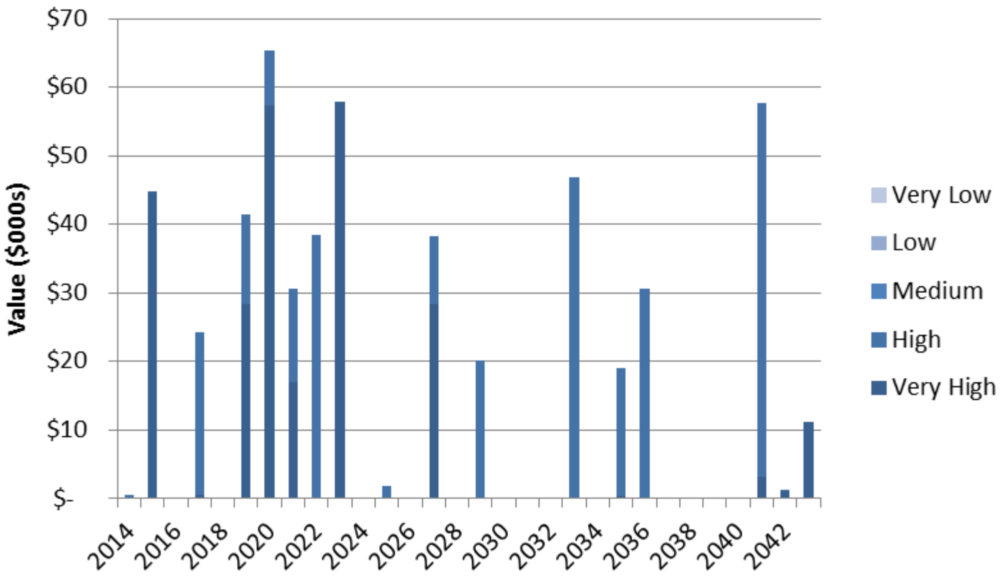
Hazards associated with working near/with water and chemicals are present. The treatment site is not secure and hence is open to vandalism. Currently its isolation provides for a measure of protection.

4.8.3 Renewal/Replacement Plan

There are two medium-priority renewals planned for Mangaweka water. These are for the mains on Kawakawa Street (Broadway to State Highway 1) and Raumaewa Road (No. 4 to Broadway).

Anticipated long-term renewals for the Mangaweka water scheme are shown in Figure 34. Renewal expenditure is not projected to exceed $65,000 in any one year up until at least 2044.

Figure 34: Renewal Forecast by Criticality - Mangaweka Water



4.8.4 Creation/Acquisition/Augmentation Plan

The only new work programmed for Mangaweka water is a wastewater disposal system for the Water Treatment Plant. Wastewater from the plant will be stored in a tank on site before being pumped to a disposal area.

4.9 Marton Water

4.9.1 Background Data

Marton is situated on mildly rolling terrain, which gradually slopes away from the source water, impoundment dams, treatment plant and urban area.

The primary water source is a 14.5 km^2 catchment area that includes pastoral farmland runoff, feeding two impoundment dams. This water is treated before entering a 5.3 km bulk main to the town boundary.

Currently supply augmentation is from untreated bore water from a site at Calico Line. This is pumped into the system to supplement flows during peak demand. Treatment at the source is restricted to disinfection by chlorine. Adverse water chemicals and hardness are not treated. This source will be retired and retained as an emergency supply only when the new bore at Tutaenui Road is commissioned. The Tutaenui Road bore will pump to the impoundment dams to ensure adequate mixing of bore water with the source water enhancing overall water quality.

Urban pressures are regulated to minimize the fluctuation range over a 24 hour period, yet maintain a nominal pressure range of between 40m and 70m head for consumers.

There are 2261 metered and unmetered connections supplying a resident population of 3750 with a water consumption of up to 5500 m^3/day.

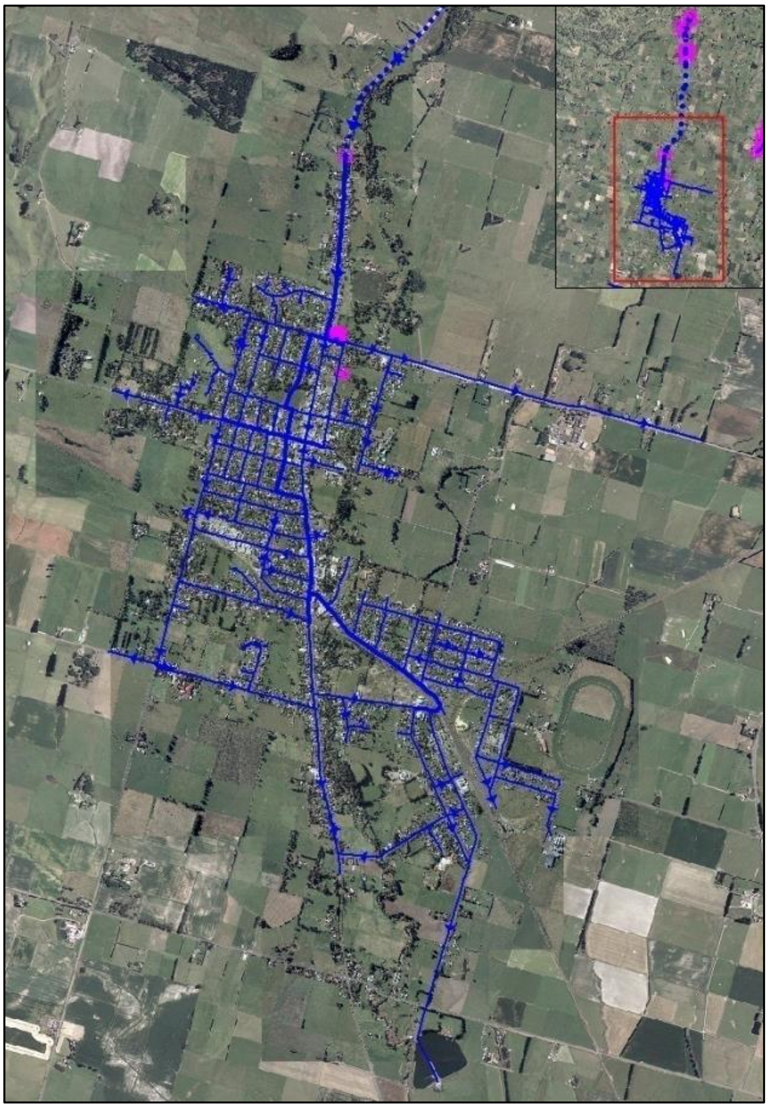
The following table list the resource consents associated with the Marton Water Supply.

Table 35: Resource Consents – Marton Water

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Abstraction - Bores	4901	11 Jul 2012 (existing use rights in effect)	120 m^3/h Bore 1 60 m^3/h Bore 2	Bore 1 at Calico Line, Bore 2 at Totara St under normal conditions
			4,000 m^3/day 120 m^3/h Bore 1 60 m^3/h Bore 2	While maintenance carried out, for no more than 30 days
			Lesser of 1200 m^3/day or 25% of Marton demand	During periods of low rainfall for no more than six months per year
Abstraction - Calico Line Bore	106300	Application on hold	TBA	On hold since April 2012. For emergency supply.
Abstraction – Tutaenui Stream	6929	11 Jul 2032	6,500 m^3/day	From “C” Dam and “B” Dam
Abstraction – Well 303029 (Tutaenui Bore)	106125	1 Jul 2027	3,500 m^3/day	Located within road reserve on Tutaenui Rd
Discharge	6853	14 Nov 2016	140 m^3/day	Discharge alum sludge and filter backwash to “B” Dam

The extent of the water scheme is shown in the following diagram.

Figure 35: Extent of Marton Water Scheme



The key issues for Marton water are:

- Network modelling and data collection to ascertain the condition and performance of pipes and fittings for this scheme is a high priority.
- Bore water in the area is moderately hard with iron and manganese at levels that require treatment before consumption.
- There are several dead-end sections of water main. These require a proactive flushing programme to avoid dirty water and odour and taste issues. The current lack of storage prevents this occurring on a regular basis.
- Residual iron and manganese levels in the reticulation can affect both the condition of the pipes and the water quality. This residual cannot be eliminated without pipe replacement, but can be minimised by pressure control and regular flushing.
- Inadequate treated water storage reservoir capacity reduces the ability to flush lines or perform significant reticulation work. It also increases risk of undesirable aesthetic effects during summer.

4.9.1.1 Physical Parameters

The Marton water network comprises 55.1 km of pressure mains ranging up to 375 mm diameter. Approximately a third of all the pipes are asbestos cement pipes laid in the late 1960s and 1970s. This was superseded in the late 1970s by MDPE and PVC which account for 40% of the network. There are no records of any substantial quantities of pipes older than 60 years in the Marton reticulation.

Background data for the Marton water supply are given in the following table.

Table 36: Background Data – Marton Water

Asset Type	Asset Parameters
Water Source	Tutaenui Stream Dams: Two concrete faced earth impoundment dams totalling 917,000m^3 Bores: Calico Line - 300mm diameter bore approximately 270m deep; pump level at 190m Totara Street - 300mm diameter bore approximately 250m deep (not commissioned) Tutaenui Road - 300mm diameter bore 200m deep Raw water trunk mains: Mixture of lead jointed concrete pipes and concrete lined steel pipes; approx. 850 m long
Treatment Plant	Building and laboratory Components: Coagulation/Flocculation system Sedimentation system Rapid sand filtration system Sludge disposal system Pre and post pH control options Pre and post chlorination options Potassium permanganate dosing for taste and odour control Manganese analysis Standby generator SCADA system UV disinfection
Storage	Two reservoirs: One new concrete reservoir, 6000 m^3 volume One older reservoir, 750 m^3 volume

Asset Type	Asset Parameters
Mains	52.4 km total 7.4 km of trunk mains 39.3 km of service mains 5.7 km of rider mains
Fittings	389 valves 1 PRV 391 fire hydrants
Connections	7.1 km of service lines 2,091 tobies 212 meters 6 backflow preventers

The age distribution of water assets in Marton is shown in Figure 36. Almost all assets are less than 70 years old. Most assets are 41-45 years old, with more than half of these assets at the treatment plant.

Figure 36: Asset Age – Marton Water

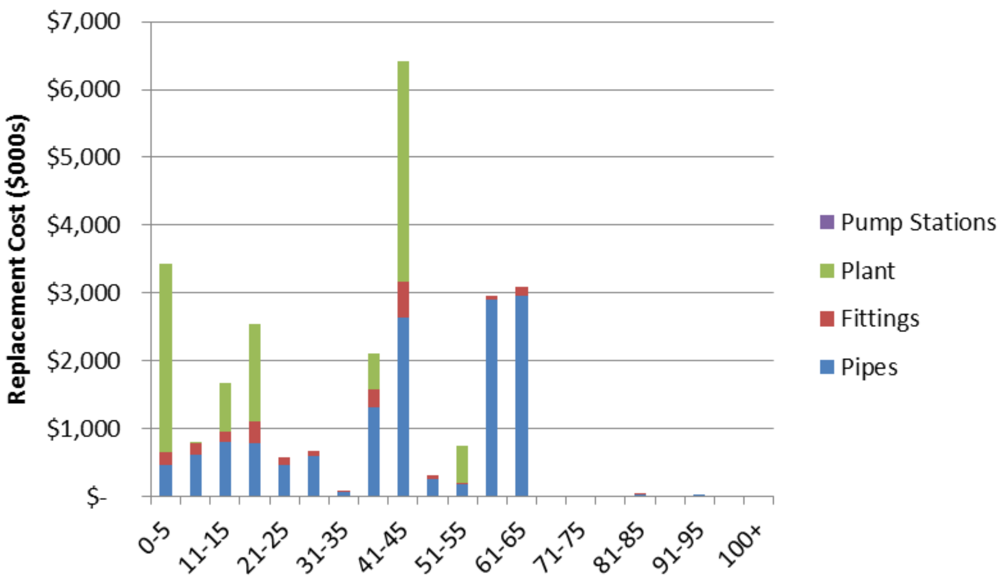
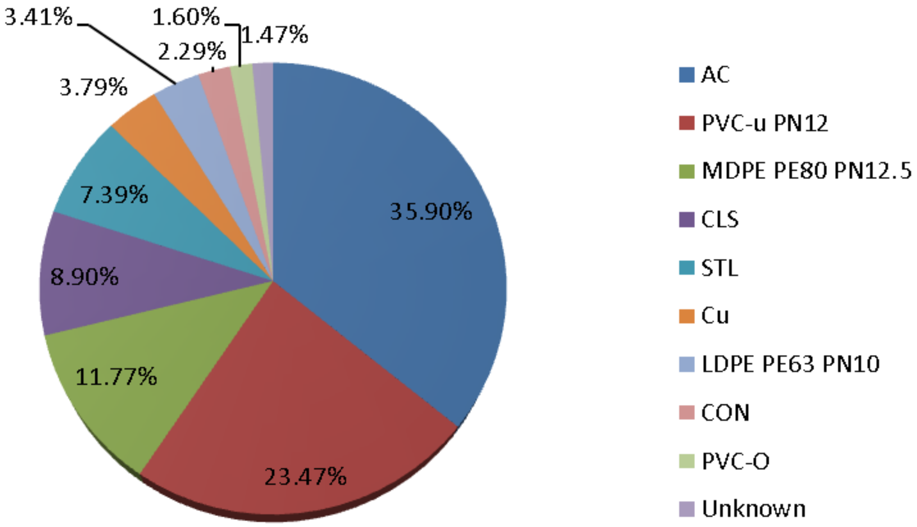


Figure 37 shows the pipe materials used for water supply in Marton. There is a fairly even distribution of materials, with the largest proportion being AC. The next largest proportion of pipes are plastic (PVC or PE).

Figure 37: Pipe Material – Marton Water



4.9.1.2 Asset Capacity/Performance

In past years, the performance of that Marton supply with respect to water quality has been poor with the use of Calico Line bore water to supplement supply. Manganese drops out of the pipes turning the water a dark brown colour. Although residual chlorine levels are maintained at safe levels at all times, the aesthetic qualities of the water lead to complaints by the public and businesses, and poorer satisfaction levels.

There have historically been issues with manganese and algae at the Marton water supply dams. The manganese issue has been controlled to a large extent by regular scouring of the dam. Algae is kept under control by management of the dam catchment.

The scheme operates with marginal capacity to supply the peak demands made at present. There is insufficient treated water storage should there be a major fire in the town. The construction of a new reservoir will mitigate this problem. The current upgrades will allow the plant to cope well with future demand forecasts.

Supply augmentation will be provided by the new Tutaenui Road bore via the existing impoundment dams. The chemical constituents of the bore water, restricts direct supply to the treatment plant to a mix ratio of less than 10%. This is not efficient from a capacity perspective.

Data on capacity in the Marton system is given in Table 106.

Table 37: Asset Capacity – Marton Water

Parameter	Comments	Data
Consumption	Average daily demand	3500 m^3/day
	Peak daily demand	5500 m^3/day
	Minimum winter demand	2500 m^3/day

Parameter	Comments	Data
Treatment Plant:	Maximum sustainable production – current	4500 m^3/day
	Maximum sustainable production – future, after upsizing clarifier inlet pipes	8000 m^3/day

Installation of inclined tube settlers in the sedimentation tanks and increased treated water storage enables optimization of the treatment process. This will enable the plant to be operated at a constant rate of flow throughout the 24-hour period with resultant savings in chemicals, energy consumption and wear and tear. Use of power at off-peak rates is also possible.

Failures recorded in the last eight years have been predominantly within the AC and concrete mains. Over 75% of the present AC is programmed to be replaced in the next 20 years. Much of the original steel mains had been replaced by 2000 and 80% of all remaining steel will replaced by 2028. A significant number of these failures have been adjacent to fittings and strongly suggest they are stress failures. During this period an average of 5 to 6 major mains breaks occurred each summer. For the last two years pressure management has been implemented to reduce the range of pressure fluctuations during any 24-hour period. An additional benefit of pressure management is the reduction in overall consumption due to removing excessive water pressure throughout the whole urban area.

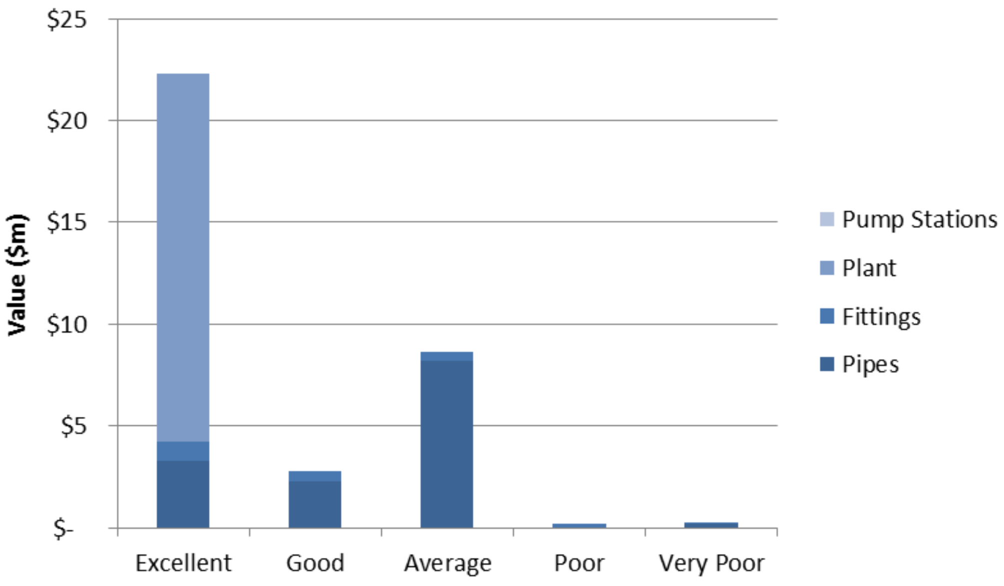
Marton consumers have not been subject to water restrictions since 2002 while surrounding Districts have struggled with meeting demands even with restrictions in place. However, the ability to maintain supply in the event of a plant equipment failure is limited to the treated water storage capacity. Currently providing between 3-5 hours supply in summer, this will be increased to 36 hours with commissioning of the new reservoir.

Full Process and Instrumentation Diagram (P&ID) need to be developed in conjunction with the Water Safety Plan for the plant. This will help to ensure maintenance and replacement is undertaken in a timely and appropriate manner.

Nationally promoted targets for daily water consumption volumes per head of population will have a significant adverse effect on the urban water supplies in Rangitikei. Population numbers served by the Marton supply are small and therefore the apparent volume consumed is high. Water consumed by an individual is only a portion of the water supplied compared to other uses such as commercial, industrial, non-personal, lifestyle and rural/agricultural. No allowance appears to be made for the non-personal use of water (eg property maintenance or gardening component), water volumes required by the treatment process (eg backwashing, control and compliance sampling) or the reticulation maintenance (eg dead end main flushing, fire hydrant flow testing). Figures need to be established to determine a "head of population equivalent" for these activities before daily water consumption volumes are implemented. Annual flushing and hydrant.

Information on the performance ratings given to individual assets is given in Figure 38. Most Marton water assets have been assessed as having "Excellent" performance, however there are several million dollars worth of assets that exhibit only "Average" performance.

Figure 38: Asset Performance – Marton Water



4.9.1.3 Asset Condition

A successful structural inspection has been undertaken on both B and C Dams. No remedial work was required other than minor vegetation control which is included as part of the impoundment management works.

Removal of overgrown and inappropriate vegetation from the banks of both dams combined with selective removal of the mature plantation trees is enhancing the water quality. This is an ongoing project and combined with suitable riparian replanting will continue to raise the quality of the water as well as the immediate environment.

The pipeline between B Dam and the raw water trunk main is currently out of service but functional. A 60 m exposed section crossing C Dam is badly corroded and requires replacement. This is the town's back up supply should C dam or its intake system fail or require a temporary shutdown, it is intended to replace this section within the next three years.

C dam is a relatively modern structure built in the 1950s, with the intake system having been modified in 2009 to optimize the level at which water is drawn from and provide for easy maintenance and water quality sampling. This asset is performing well with no significant defects. The trunk main from the junction of B and C dam supply lines to the treatment plant is operating well. The only recorded problems with this main are with movement of the lead joints and compression of the natural rubber joining rings. These problems would appear to be a result of age. Both joint types are being repaired as they fail, but due to the high criticality of this pipe, it will be inspected annually and possibly replaced by 2020.

The treatment plant was initially constructed in the early 1920s. All that remains of this original plant in use today are the two older reservoirs and a portion of the building. The original building whilst adequate has some performance issues related to fire and earthquake hazards.

The process plant has received upgrades in the 1950s and 1990s, which has resulted in high quality water being produced. Optimization of filter performance and trial dosing of potassium permanganate during the last two years has been successful in removing odour and taste from the source water.

Process upgrades undertaken in 2010-2011were in response to consumer complaints of aesthetics and changing drinking water standards. Installation of UV disinfection will achieve Protozoa compliance.

There are three clear water reservoirs, which are in an average to poor condition. They were cleaned out in 2002 and have found to have some visual defects in a more recent inspection. Total clear water capacity is approximately 5 hrs during summer peak demand, giving a poor performance according to the NZWWA condition grading guidelines. This has significant effects on the operation of the network and its ability to cope with routine flushing maintenance and repairs or a major fire event.

A large portion of the reticulation is AC. This material was first used in the early 1950’s and has a life expectancy of 60 years. As the age of these pipes is now approaching their life expectancy we would expect the failure rate to increase. Replacement of pipes is based on repair history where available. A spate of sudden AC 150 mm diameter mains breaks in Marton between 2006 to the 2008 has given credence to this lower than expected lifespan for this material.

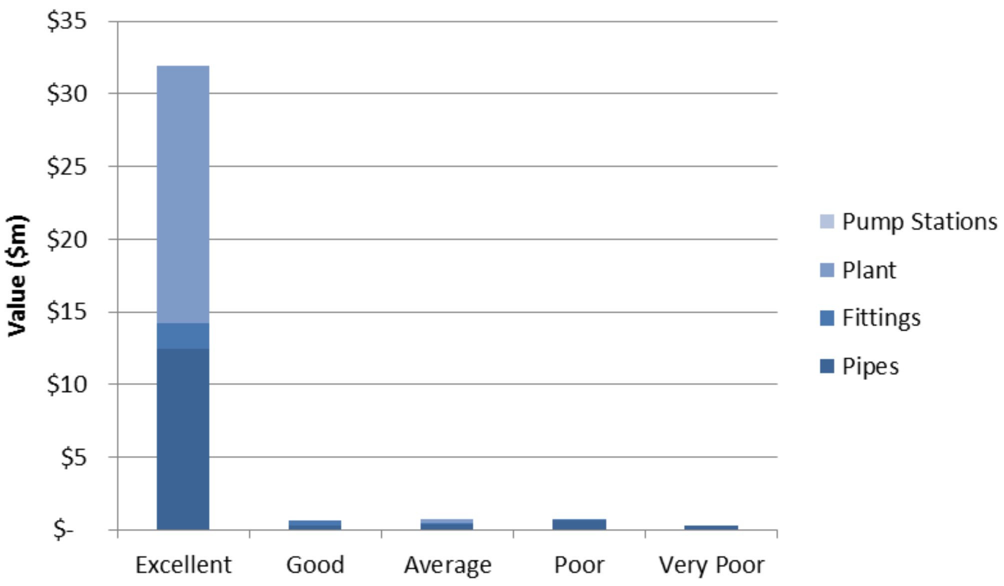
The local fire brigade annually tests, cleans and marks hydrants. At the end of this exercise a list of hydrants requiring maintenance is passed to the Council for action.

The revised water bylaw of 2008 required the installation of backflow preventers on high risk properties, these were installed over a two year period and require the implementation of a service schedule to check the operation of these devices on an annual basis, starting in 2011.

Isolation, air, drain and control valves are not routinely exercised causing operational issues during planned and unplanned repairs. Condition inspections on critical valves should identify problem valves and prioritise their replacement.

Asset condition for Marton water is shown in Figure 39 by value and asset group. Almost all assets have been assessed as in “Excellent” condition.

Figure 39: Asset Condition – Marton Water



4.9.1.4 Asset Valuations

The value of water assets for key Marton asset groups is shown in Table 38.

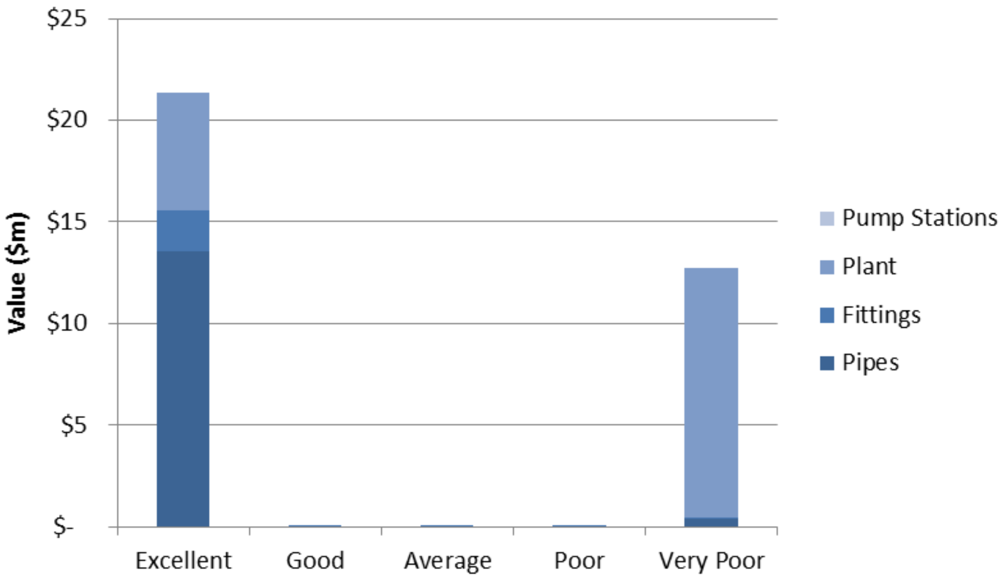
Table 38: Value by Asset Group – Marton Water (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Dam B	1,087,721	1,081,277
Dam C	5,967,023	5,903,510
Treatment Plant	7,584,857	4,249,428
Bores	1,746,260	1,342,732
Trunk Mains	4,050,510	1,324,993
Service Mains	6,501,751	2,971,224
Rider Mains	486,164	366,351
Service Lines	595,215	402,308
Valves	790,329	261,684
Backflow Preventers	9,950	8,527
PRVs	4,750	3,506
Fire Hydrants	695,801	289,483
Meters	40,977	25,350
Tobies	515,556	284,886

4.9.1.5 Historic Data

Data confidence for Marton water assets is shown in Figure 40. Data on most assets has been rated "Excellent", but there are more than $10 million worth of assets for which data is "Very Poor". The bulk of these assets are related to the treatment plant. These are assets associated with recent plant upgrades that have had their total value recorded in the asset register, but have not been componentised (broken down to detailed asset by asset level) as yet.

Figure 40: Data Confidence – Marton Water



4.9.2 Routine Operations and Maintenance Plan

Early engineering practices in the Marton Borough saw the laying of water mains in the carriageway with the main servicing properties both sides of the road. A problem caused by this is that failures occurring under the sealed road result in higher repair costs and reduce the quality of the road surface. Current policy dictates that where feasible all new mains are to be laid in the berm and rider mains are to be installed in the berm on the opposite side of the street. Some pipes in the Marton system are Imperial sizes and require special fittings to connect to Metric sizes; this causes some difficulty and means that a replacement pipe/pipe section will not be of the exact same size.

Hazards associated with working near/with water and chemicals are present. The caustic soda, carbon and Potassium permanganate storage and handling facilities require upgrading and are included in the treatment plant upgrades.

Due to the presence of iron/manganese and the resulting biofilm, flushing of mains is periodically carried out on this scheme. Currently, this flushing is mostly reactive, in response to issues. When time allows, dead ends of the reticulation are flushed proactively. In the future, a regular flushing programme will be developed.

There is an O&M project for Marton to install isolation valves on the pipe bridges crossing the Tutaenui Stream, and to carry out any necessary maintenance on these bridges.

4.9.3 Renewal/Replacement Plan

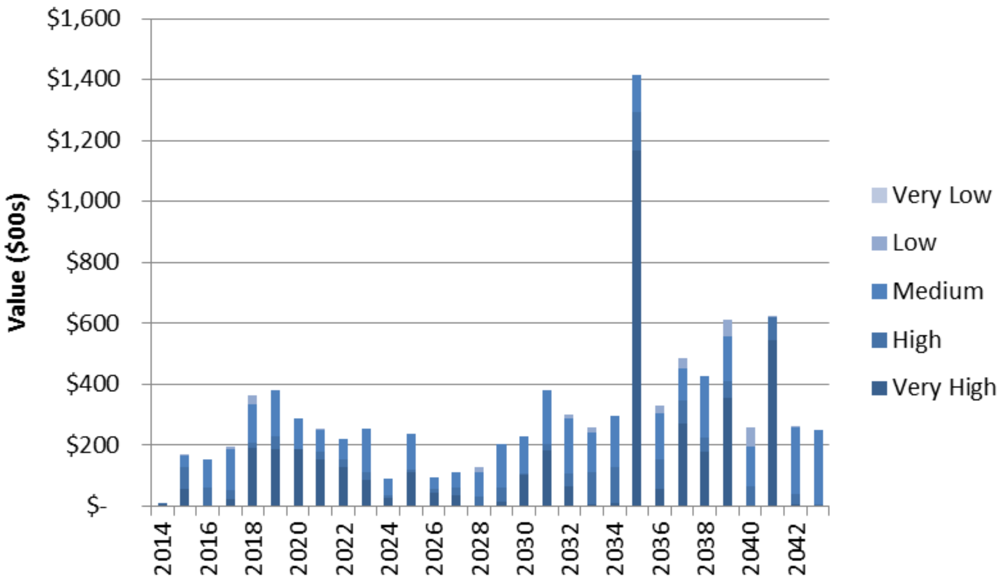
The most significant renewal programmed for Marton water is the renewal of the Tutaenui Road trunk main, from the Water Treatment Plant to Jeffersons Lane. This project is estimated to cost some $800,000. It is currently in the process of being re-tendered after changes to the type and size of pipe to be installed. It is anticipated that the work will begin this financial year.

The valves at the intersection of Wanganui Road and Skerman Line are being renewed and relocated to avoid damage from heavy traffic.

On the treatment side, there is upgrade work at the plant classed as renewals that is almost complete. The WTP site was recently levelled, and the sludge pump is being replaced.

The long-term renewal forecast for Marton water is shown in Figure 41. Renewals coming up include the Grey Street water main, a stretch of Wellington Road (No. 532 to 552), plus some work on Fergusson Street and Main Street.

Figure 41: Renewal Forecast by Criticality – Marton Water



4.9.4 Creation/Acquisition/Augmentation Plan

New works underway for Marton include links for the Dunsinane Place/Blennerville Close and Hereford Street/Bredin's Lane water mains. A water main link at Canteen Street has recently been completed.

In the near future, the bore work at Marton WTP will be completed with the installation of automation and a new PLC. Pipe bridges in Marton township across the Tutaenui Stream will have isolation valves installed as necessary.

Commissioning of the Tutaenui Rd bore and completion of the rising main from the bore is planned for 2015-2016, at a cost of $70,000.

4.10 Ratana Water

4.10.1 Background Data

Ratana is situated on mildly rolling terrain, which gradually slopes away from the treated water storage tanks, resulting in a fairly static head throughout the village.

Source water is abstracted from shallow (80 m) bores and treated before being lifted a further 20 m to a tank farm. The tanks then release on demand down to the village reticulation.

When the system was installed it was not intended for human consumption, except as a supplementary supply to the individual household rainwater systems. In 1972 an upgrade was carried out with chlorination equipment, a large pump, new reservoirs, bore relining, and a fire main being installed. This upgrade was carried out with the intention of providing a fire fighting supply in the town. It is still considered a supplementary supply with only six residents and the school totally relying on the supply for drinking water.

There are 120 unmetered connections supplying a resident population of 450 with up to 130 m^3/day.

The following table lists the resource consent information associated with the Ratana Water Supply.

Table 39: Resource Consents – Ratana Water

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Abstraction - Bore	6350	6 Dec 2020	130 m^3/day 14 m^3/h	Two bores at Kiatere St
			300 m^3/day 14 m^3/h	For several days during Ratana Religious Festival
	APP-2014200014.00	1 Jul 2034	307 m^3/day 14 L/s	February to December
			613 m^3/day 14 L/s	January (for Ratana religious festival)
			111,200 m^3/yr	From 1 Jul – 30 Jun annually starting 18 Feb 2015

The Ratana water scheme is shown in Figure 42.

Figure 42: Extent of Ratana Water Scheme

The key issues in Ratana with respect to water are:

- Supply is not accepted by the community as prime source of potable water.
- Poor quality of source water and associated treatment requirements required to meet NZ Drinking Water standards are uneconomic for this community.
- Network modelling and data collection to ascertain the condition and performance of pipes and fittings for this scheme is a high priority.
- High levels of iron, manganese and hardness in the source water and limited capacity for a regular flushing programme.
- Short duration high peak demands during holiday periods.
- Increased volume of water storage required to provide system supply security during summer months.
- High risk of delivery failure with only one booster pump installed.
- The annual (January) festival in Ratana puts a strain on the system as the population increases from approx. 500 people to several thousands. Extra water is tankered in to cope.

A major upgrade to the Ratana Water Treatment Plant is underway. Funding has been obtained from the Ministry of Health through the CAP programme to assist with this work. The expiry date for the CAP funding is 31 August 2015, so work is planned for completion in the 2014-2015 financial year. The final CAP reporting milestone is 30 June 2015.

4.10.1.1 Physical Parameters

The Ratana Water Network comprises 5.2 km of pressure mains ranging up to 150 mm diameter. More than half of all the pipes are asbestos cement pipes laid in the late 1970s. The network was progressively extended in the 1980s-1990s with MDPE and PVC, accounting for 43% of the network.

Background data for Ratana water are given in Table 40.

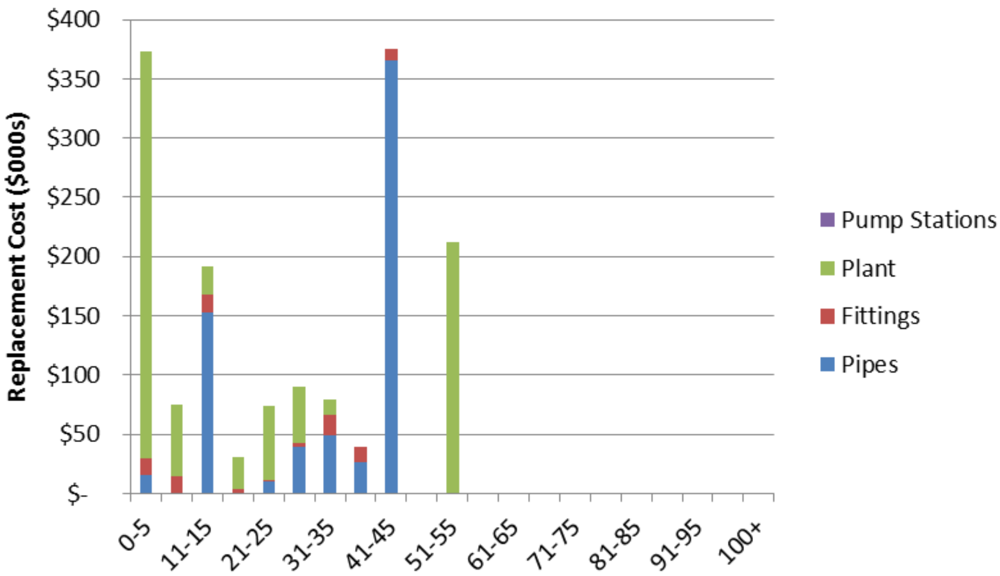
Table 40: Background Data - Ratana Water

Asset Type	Asset Parameters
Water Source	Shallow aquifers
	Bore No. 1: 80m deep by 0.15 diameter
	Bore No. 2: 80m deep by 0.15 diameter
	Two bore pumps
Treatment Plant	Building and control room
	Components:
	Chlorination system
	Aeration system
	Rapid sand filters – dual media
	Turbidity and pH monitor
	Backwash system
	Switchboard
	SCADA system
Storage	9 Concrete reservoirs: 18-25m^3 each - total 225m^3
Mains	5.3 km total 0.6 km of rising main 0.6 km of trunk main 2.4 km of service mains 1.7 km of rider mains

Asset Type	Asset Parameters
Fittings	24 valves 13 fire hydrants 3 bulk meters
Connections	0.2 km of service lines 98 tobies 18 meters

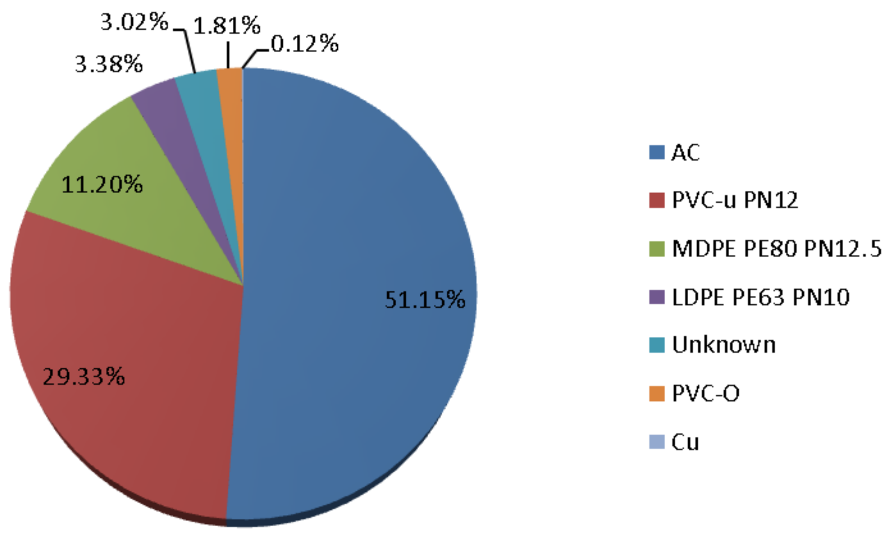
The age of water assets in Ratana can be seen in Figure 43. The assets are all less than 55 years old, with most of the pipes aged between 41 and 45 years.

Figure 43: Asset Age - Ratana Water



Much of the water reticulation in Ratana consists of AC pipes, as shown in Figure 44. There is also a substantial amount of plastic pipe, whether it is PVC or PE.

Figure 44: Pipe Material - Ratana Water



4.10.1.2 Asset Capacity/Performance

The system struggles to meet daily demands and cannot cope with the additional demand created during the annual Ratana festival. This places a strain on the treatment plant.

The capacity of the Ratana water system is shown in Table 41.

Table 41: Asset Capacity - Ratana Water

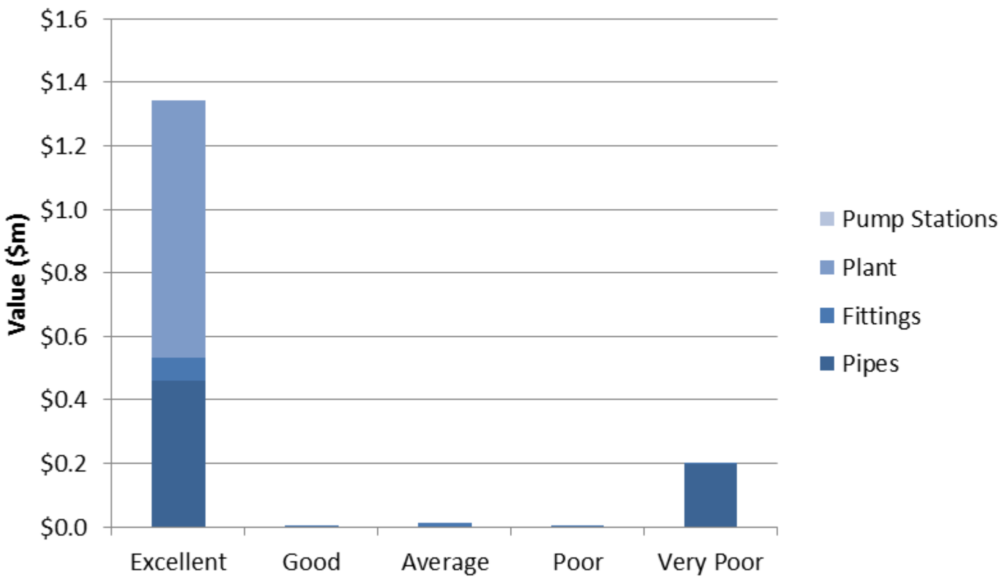
Parameter	Comments	Data
Consumption	Average daily demand	130 m³/day
	Peak daily demand – excludes festival period	165 m³/day
	Minimum winter demand	90 m³/day
Treatment Plant	Maximum sustainable production	180 m³/day

The water is very difficult to treat owing to high quantities of manganese, iron and hardness. The iron and manganese is not fully removed during the treatment process and this is still settling out during the storage period. The reservoirs act as a sedimentation stage, which is acceptable, provided regular cleaning is carried out. This process also continues to a lesser degree in the reticulation and regular scouring is essential to maintain an acceptable standard.

The treatment plant is beyond its useful life and does not meet the current NZ Drinking Water standards.

Asset performance across Ratana water is shown in Figure 45. Most of the assets give “Excellent” performance, but there is around $200,000 worth of pipes that have been rated as “Very Poor”.

Figure 45: Asset Performance - Ratana Water



The Ratana water supply is in the process of a major upgrade. As well as improving the quality of water for Ratana, this upgrade will provide enough water for the town, as well as the proposed 60-lot Waipu Trust subdivision. The treatment plant will be designed in such a way that it can expanded should the Waipu Trust subdivision eventually reach its maximum of 120 lots. The water supply should cater for both normal demand periods, and increased demand during the annual Ratana festival.

4.10.1.3 Asset Condition

Bore No.1 was reconditioned in 1972. Bore pipework tends to erode rapidly and needs to be monitored. The electrical cable for Bore No. was renewed in 2003. Development of the new bore will make the existing bores superfluous to requirements for the supply of potable water.

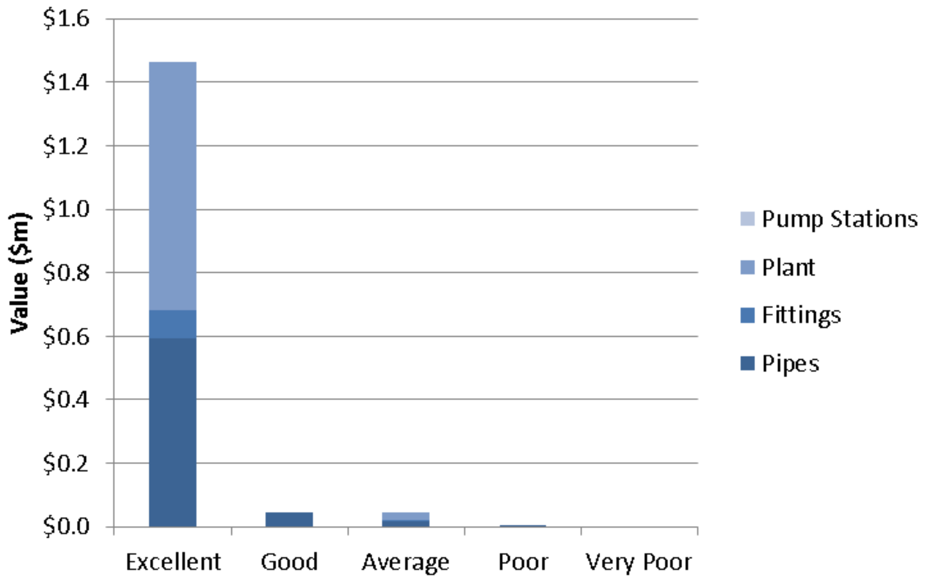
The existing treatment plant is old and beyond its useful life, most items of plant need replacing (eg chlorine dosing system). Major upgrades would be required to meet NZ Drinking Water standards.

The storage facilities are in poor to average condition and inadequate in capacity.

The pipe work is generally in good condition but of insufficient size or coverage to provide fire fighting capability.

Figure 46 shows the information held in our asset register on condition for Ratana water. Most of the assets are listed as being in “Excellent” condition.

Figure 46: Asset Condition - Ratana Water



4.10.1.4 Asset Valuations

The Ratana water asset values are given in Table 42.

Table 42: Value by Asset Group – Ratana Water (29 Jan 2015)

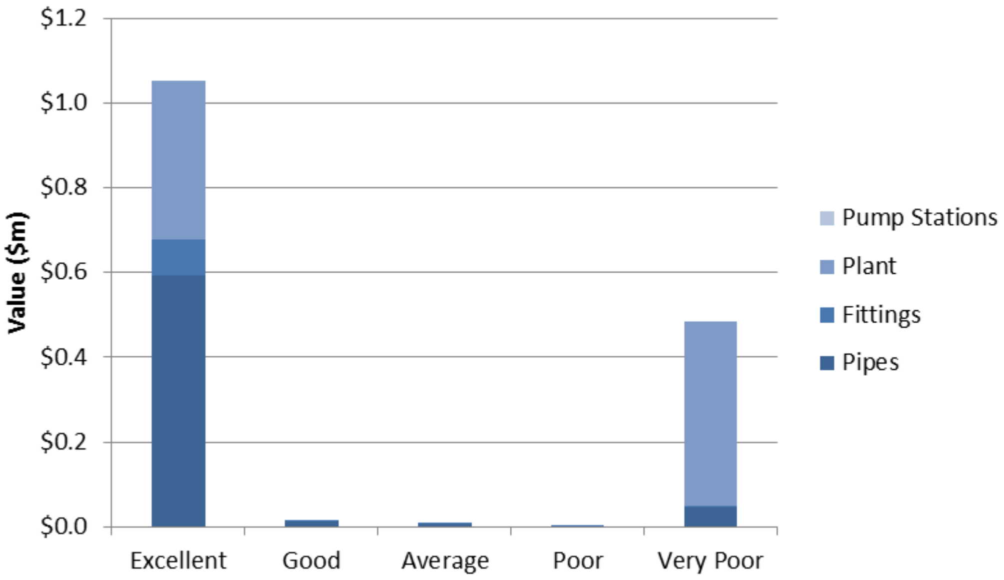
Asset Group	Replacement Cost ($)	Written Down Value ($)
Bores	464,723	223,196
Treatment Plant	284,065	186,419
Rising Main	11,716	2,321
Reservoirs	47,971	21,107
Trunk Mains	61,190	18,191
Service Mains	413,158	219,258
Rider Mains	161,604	99,683
Service Lines	10,655	7,024
Valves	29,310	12,783
Fire Hydrants	25,421	12,259
Bulk Meters	3,483	88
Meters	3,710	2,711
Tobies	23,959	17,535

Asset Group	Replacement Cost ($)	Written Down Value ($)
Other	12,261	7,765

4.10.1.5 Historic Data

Data confidence for Ratana water is generally "Excellent" as shown in Figure 47. There is a significant amount of assets for which data confidence is "Very Poor", though. Assets with this low confidence are mostly treatment plant assets. Collecting or verifying information on treatment plant assets should be more straightforward than for buried assets such as pipes. A large proportion of the assets rated "Very Poor" have been added as part of the work done to upgrade the town's bore. This work has been capitalised each year, although the bore upgrade has been an ongoing project.

Figure 47: Data Confidence – Ratana Water



4.10.2 Routine Operations and Maintenance Plan

The valves in Ratana are affected by sediment settling in the seats making the valves inoperable. This necessitates the shutting down of larger numbers of consumers than is usually required when working on the system. Regular exercising of fittings and replacement with resilient seated valves would rectify this problem.

Sediment settling, as stated above, occurs in the pipelines and they require scouring every month.

Hazards associated with working near/with water and chemicals are present.

The following deficiencies would, if corrected, provide operational and maintenance savings;

- The screen does not effectively prevent the entry of fine sediments and organic matter into the pipe network. This material causes blockage of flow restrictors and restriction of pipe capacity.

- The pressure alarm telemetry solar power source requires boost charging during periods of overcast weather.
- More pressure alarms would help to detect leaks; currently there is only one.

Operational staff will develop a maintenance manual for the scheme which specifies the daily, monthly and annual inspections. Full Process and Instrumentation Diagram (P&ID) need to be developed in conjunction with the Water Safety Plan for the plant. This will help to ensure maintenance and replacement is undertaken in a timely and appropriate manner.

There are the following safety issues:

- The access to and over the pipe bridge is extremely hazardous.
- The area is remote and there are few areas of cell phone coverage.

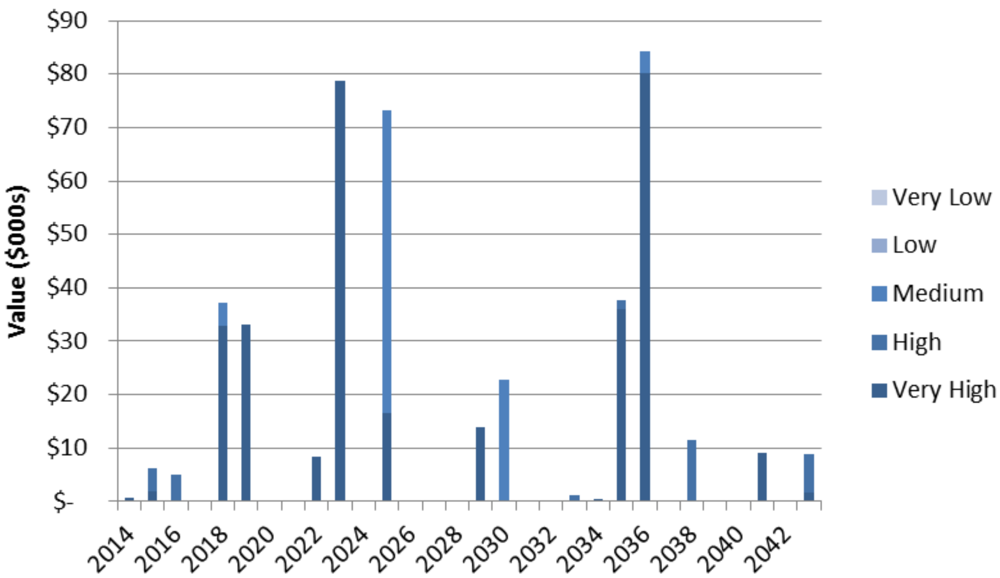
Due to the presence of iron/manganese and the resulting biofilm, flushing of mains is periodically carried out on this scheme. Currently, this flushing is mostly reactive, in response to issues. When time allows, dead ends of the reticulation are flushed proactively. In the future, a regular flushing programme will be developed.

4.10.3 Renewal/Replacement Plan

The only water renewals identified for Ratana are for the long term. These include replacement of the water mains on Tamariki Lane and Waipounamu Street.

The long-term renewal expenditure forecast for Ratana water is shown in Figure 48.

Figure 48: Renewal Forecast by Criticality - Ratana Water



4.10.4 Creation/Acquisition/Augmentation Plan

There is major work planned to upgrade the Ratana Water Treatment Plant for Drinking Water Standards compliance. CAP funding has been obtained from the Ministry of Health for this work, which is programmed for completion by mid 2015.

The upgrade of the Water Treatment Plant will include a capacity upgrade, so that the town water supply can cope with the additional demand from the proposed 60-lot subdivision.

The other new work to be carried out in town is a water main link on Rangatahi Road between Waipounamu Street and Seamer Street. This link will take out a dead end in the reticulation.

4.11 Taihape Water

4.11.1 Background Data

Taihape is nestled on the slopes of the District's hill country, straddling State Highway 1 and the North Island Main Trunk railway. Water is sourced 11.5 km away from the Hautapu River. From there it is piped to the treatment station under gravity. Post-treatment it is delivered to two main zones located on alternate sides of the highway.

Due to the terrain there are pressure control valves to moderate the high pressures that can occur in some parts of the reticulation. The pressure ranges are significant and additional pressure management is required to minimise the loss of water from storage and associated property damage should a mains break occur.

There are 860 unmetered and metered connections supplying a resident population of 2200 with a water consumption of up to 2100 m^3/day.

The following table list the resource consent associated with the Taihape Water Supply.

Table 43: Resource Consents – Taihape Water

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Abstraction – Hautapu River	101722	31 May 2020	2,900 m^3/day 126 m^3/h 35 L/s	When Hautapu River flow at Alabasters > 0.69 m^3/s
			2,225 m^3/day 93 m^3/h 26 L/s	When Hautapu River flow at Alabasters ≤ 0.69 m^3/s

Key issues for Taihape water are:

- Network modelling and data collection to ascertain the condition and performance of pipes and fittings for this scheme is a high priority.
- Access to the intake pipeline and structures is difficult and proactive maintenance is preferable to a fixit when it breaks option.
- The potentially restrictive and negative financial effect of the Emissons Trading Scheme (as detailed by the Climate Change Response Act 2002) on removal of problem trees and inappropriately planted plantation forests from the Treatment Plant environs.

- The older steel mains are causing problems and will require replacement within the next five years. Implementation of Pressure Management may defer these renewals in the short term.

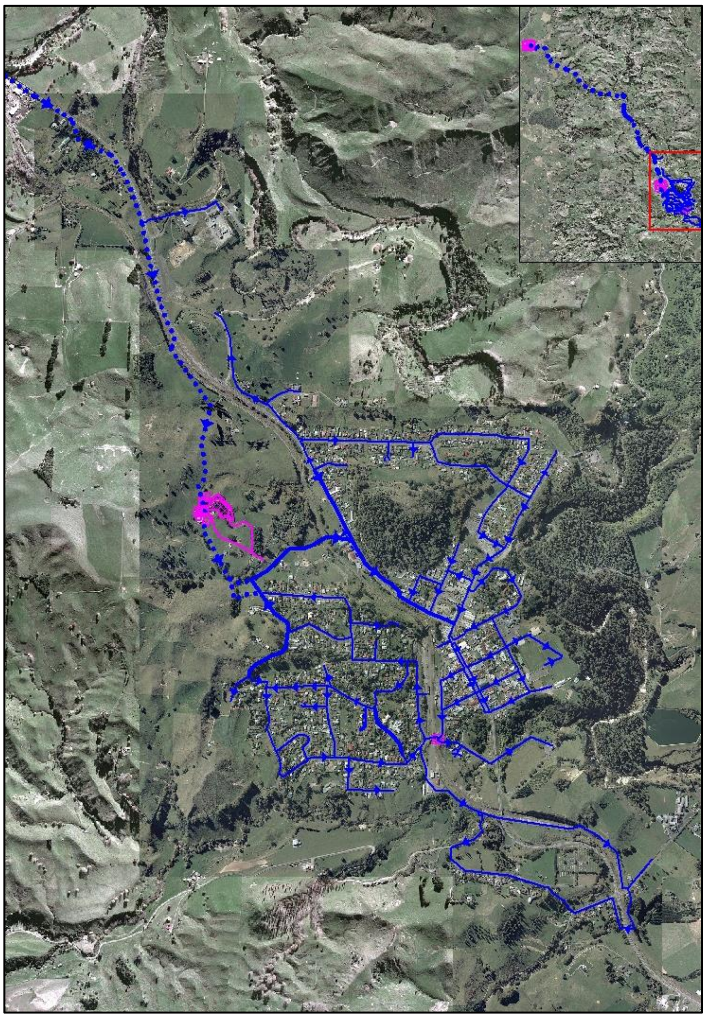
- The catchment feeding the intake has a contamination risk.

- Connections to and water consumption from the raw water supply main are unknown. These need to be identified and quantified for Resource Consent purposes.

- Raw water supply main was designed as a constant flow main. Resource consent requirements to minimise flow during dry conditions will lead to hydraulic damage in high pressure sections if fully enforced.

The extent of the system for Taihape water is shown in Figure 49.

Figure 49: Extent of Taihape Water Scheme



4.11.1.1 Physical Parameters

The Taihape Water Network comprises 21.9 km of pressure mains ranging up to 375 mm diameter. Approximately a half of all pipes are the original steel mains lad from 1910 to 1960. The current treatment plant dates from 1950 with minor upgrades over the years to keep pace with changing water quality standards.

The following table gives important background data for the Taihape scheme.

Table 44: Background Data – Taihape Water

Asset Type	Asset Parameters
Water Source	Hautapu River Raw water intake gallery concrete, weir and settling maze built 1926. Raw water trunk mains: mixture of materials 11.5 km long (original steel, PVC, ductile iron, one PE road crossing) Raw water trunk main fittings: 15 Air, 18 Scour, 6 Isolation valves 3 pipe bridges
Treatment Plant	Building and laboratory Components: Coagulation/Flocculation/Sedimentation via an upflow clarifier system Sedimentation system Rapid sand filtration system Sludge disposal system Pre and post PH control options Pre and post chlorination options Standby generator SCADA system
Storage	One 4500m^3 reinforced concrete reservoir c. 1956
Mains	Two pressure reducing zones 30.6 km total 11.0 km of trunk main 18.6 km of service mains 1.0 km of rider mains
Fittings	189 valves 4 PRVs 173 fire hydrants 1 bulk meter
Connections	2.5 km of service lines 722 tobies 84 meters 10 backflow preventers

Information on the age of water assets in Taihape is given in Figure 50. There are approximately $2 million worth of water pipes that are greater than 100 years old.

Figure 50: Asset Age – Taihape Water

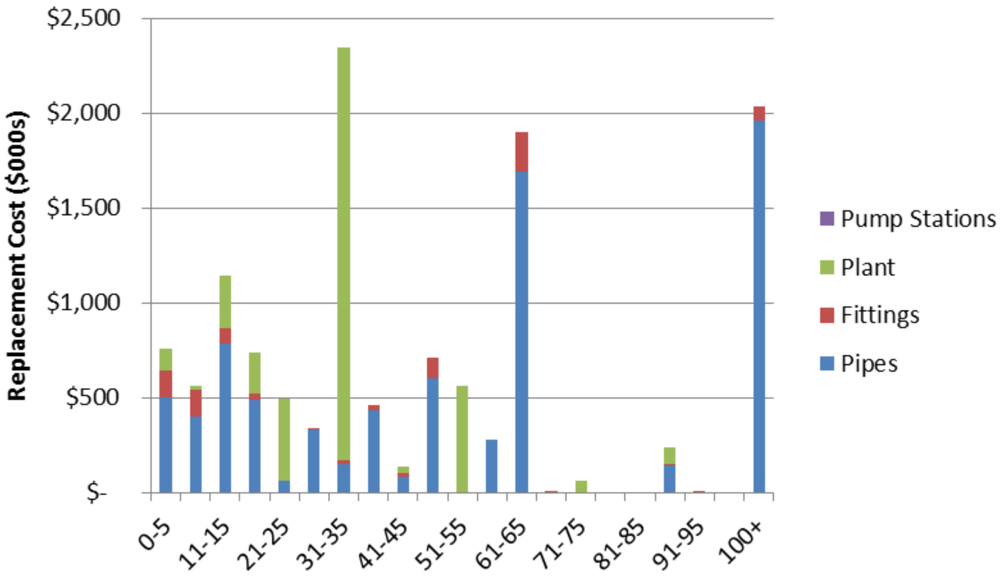
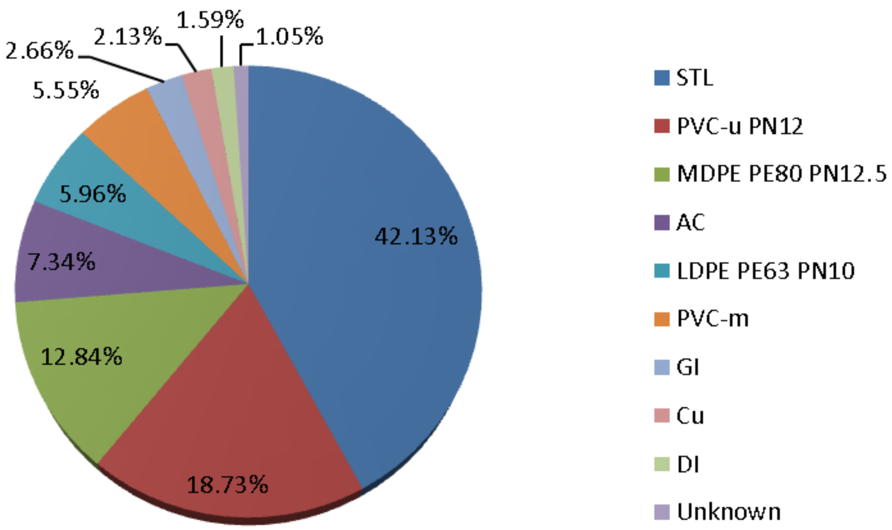


Figure 51 shows the distribution of pipe materials in the Taihape water network. Almost half the pipes are constructed from steel, which is consistent with the age profile shown above.

Figure 51: Pipe Material – Taihape Water



4.11.1.2 Asset Capacity/Performance

The raw water supply pipeline is laid in an area that posses significant hydraulic challenges. This pipeline is designed as a constant flow line with any surplus water not required by the treatment plant being bypassed to the adjacent valley and returned to the Hautapu River via the urban stormwater system. Ground contours along the line affect the pressures in the pipe. These range from atmospheric on the high points to greater than 120 m head in low points.

Should the supply valve be closed at the treatment plant, 2.5 km of pipeline would be subject to pressure in excess of 160 m head. The intake pipeline is a high risk component of the supply and regular inspections and proactive renewals are required to minimize this.

In general the Taihape supply has high pressures associated with the steep elevation in the supply area.

The reservoir has capacity for 3 days storage. See Table 45 for more information.

Table 45: Asset Capacity – Taihape Water

Parameter	Comments	Data
Consumption	Average daily demand	1800 m^3/day
	Peak daily demand	2100 m^3/day
	Minimum winter demand	1000 m^3/day
Treatment Plant	Maximum sustainable production	2616 m^3/day

Raw water quality is consistent with abstraction from a natural river source. However there is the potential of contamination from road spills in the Hihitahi Bluffs area.

The two rural subdivisions that lie of the outskirts of Taihape are currently supplied by way of low-pressure systems feeding into tank supplies. It is possible to supply them with high-pressure water but this will be expensive. The community will decide whether they are willing to pay for this or not.

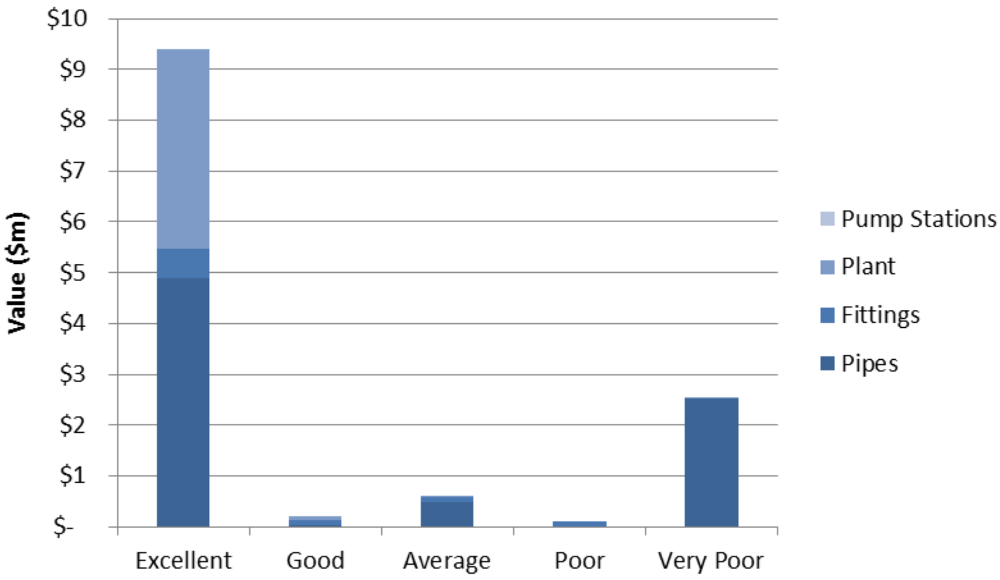
Installation of additional isolation valves on major service mains has improved the ability to limit water shutdowns while carrying out maintenance on sections of the reticulation.

There have been no significant failures of the treatment plant. This has been achieved by optimization of the treatment process.

There have been a number of failures in the reticulation. The reticulation would benefit from optimised pressure management. Minor leaks are dealt with by staff as they are reported. Leaks in service connections are temporarily repaired prior to a complete replacement. Replacements are grouped for efficiencies of scale. Pipe breaks are recorded in GIS, which affect the pipe's historical performance score.

The performance ratings of water assets in Taihape are shown in Figure 52. Although most assets have an “Excellent” rating, there is around $2.5 million worth of assets that are performing very poorly. These assets are entirely pipes.

Figure 52: Asset Performance – Taihape Water



There are currently issues with over-abstraction at the Taihape intake, owing to the hydraulic grade line of the raw water main. The setup is such that under certain conditions, the pipe becomes airlocked. This problem is under investigation at the moment. Through discussions with Horizons Regional Council, we hope to undertake works at the intake to ensure that over-abstraction does not occur, and air is not entrained in the main. These proposed works have been approved by Horizons, and will be carried out in the near future.

4.11.1.3 Asset Condition

The weir is in a satisfactory condition requiring little routine maintenance other than the yearly cleanout.

Over-pressure protection on the intake pipeline consists of extremely old pressure relief valves. The reliability of these valves needs to be checked during routine inspection and servicing programmes.

Some renewals of the pipe bridges have been undertaken in 2004, but need to be part of routine inspections. Vegetation should be regularly cleared from these crossings.

Also of concern are several areas where the intake pipe crosses farm tracks and the pipe is exposed with no form of protection. The condition of these sections of pipe is poor.

The plant was originally built in the 1960s. New sand filters were commissioned in 2008 and UV protection and process sludge disposal to the wastewater reticulation was installed in 2011. Structural inspections are due in 2012 on the clarifier and reservoir to ascertain any defects and their remaining life.

Storage facilities are in a reasonable condition.

A large portion of the town reticulation is aged steel nearing the end of its economic life. This is starting to show with the incidence of failures increasing in recent years resulting in an increased maintenance budget. Some of the original pipe work (which dates back to 1911) is still in place. This pipe work is in very poor condition and difficult to repair. Replacement of sections are more economic to undertake than spot repairs. It requires attention in the short term.

Knowledge of the condition of the rest of the reticulation is limited and this will be addressed in network modelling program.

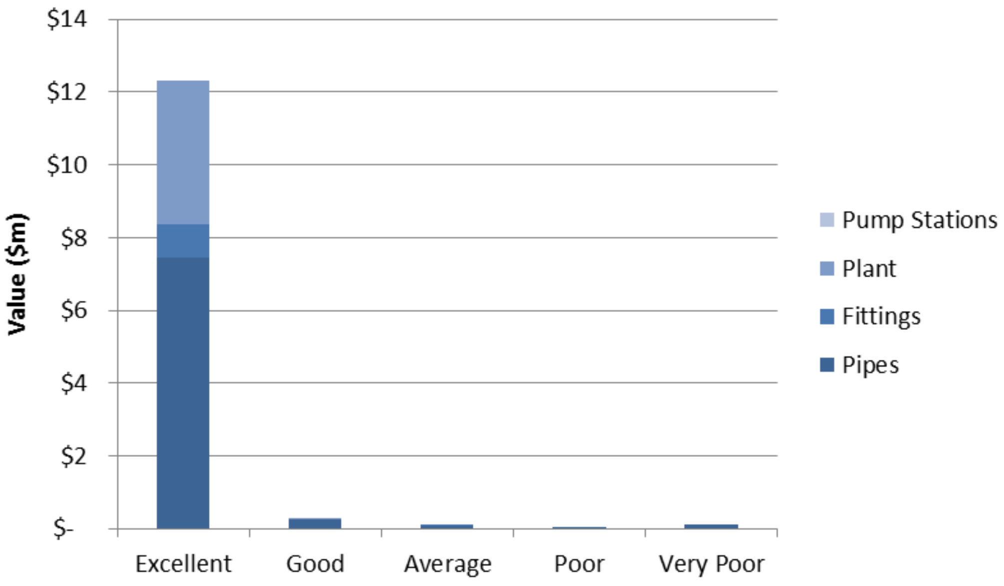
The range of reticulation pressures is excessive varying from nearly atmospheric to in excess of 100m head. This is a contributing factor in mains failures. Currently the reticulation has two pressure zones (west and east of the railway line respectively). To implement more appropriate pressure zones network modeling needs to be undertaken. The reticulation will benefit from the implementation of Pressure Management. Implementation of Pressure Management in Marton has shown gains in pipe life expectancy as well as reductions in mains breaks and associated disruptions of service to consumers.

All fire hydrants in Taihape are the screw-down type that meet with current standards. The valuation data suggests that over half are beyond their base life expectancy and will require renewal by 2011/12. Flow testing is needed to confirm this assumption. Traditionally the Fire Service have undertaken this work. The Pressure reducing valves are in good condition but require a regular inspection and calibration programme.

Isolation, air, drain and control valves are not routinely exercised causing operational issues during planned and unplanned repairs. Condition inspections on critical valves will identify problem valves and prioritise their replacement.

The condition rating of water assets in Taihape is summarised in Figure 53. The graph shows that almost all assets are in “Excellent” condition. However, this information should be analysed in conjunction with the performance data given earlier. It is possible for an asset to be in good condition, but performing poorly in terms of service delivery.

Figure 53: Asset Condition – Taihape Water



4.11.1.4 Asset Valuations

The value of the assets contained within the Taihape water scheme is shown in Table 46.

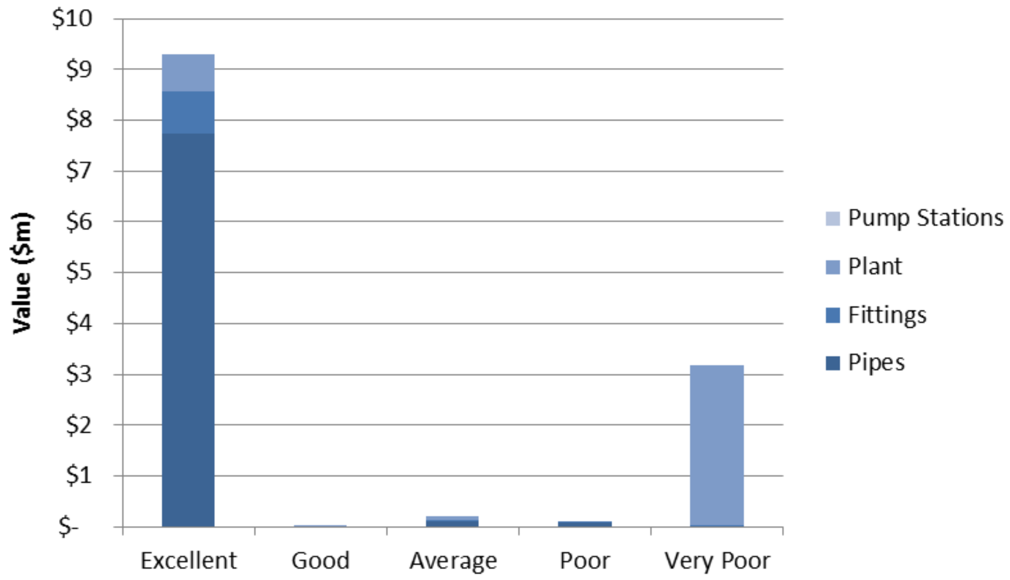
Table 46: Value by Asset Group – Taihape Water (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Intake	100,414	11,227
Pipe Bridges	75,012	48,552
Treatment Plant	3,263,241	1,165,047
Trunk Mains	3,833,538	1,501,671
Service Mains	3,011,536	1,202,293
Rider Mains	74,997	55,209
Service Lines	192,634	147,434
Valves	334,156	155,610
Backflow Preventers	14,706	11,716
PRVs	11,495	4,247
Fire Hydrants	302,971	86,136
Bulk Meters	150	78
Meters	33,837	23,276
Tobies	177,404	83,341

4.11.1.5 Historic Data

The confidence in the information we hold on Taihape water assets is displayed in Figure 54. Most of the information is rated as “Excellent”, but a substantial value of treatment plant assets have been assessed as “Very Poor”. Similarly to Marton, this latter value of assets is for treatment plant upgrades (carried out over the previous 8 or so years) that have been valued, but not componentised. Data on them therefore shows up as “Very Poor” as it is limited.

Figure 54: Data Confidence – Taihape Water



4.11.2 Routine Operations and Maintenance Plan

When implemented, the following would provide operational and maintenance savings:

- Minimise fluctuations of flow through the pipeline, install pressure reducing devices at strategic points along the pipeline, check the operation of air and scour valves on a regular basis.

- Locate and meter all connections along the supply main. This has been signaled as a requirement from Horizons and will also indicate any non-compliance with the original easement conditions.

System-wide flow modeling would assist in confirming appropriate main sizes and identify if upgrading is required.

Some pipes in the Taihape system are Imperial sizes and require special fittings to connect to metric sizes; this causes some difficulty and means that a replacement pipe/pipe section will not be of the exact same size. Some maintenance problems exist such as large areas on slip zones subject to ground movements, causing pipe breakages and the unexpected occurrence of springs. These areas need additional isolation valves and flow limiting devices to minimize the effects of mains breaks due to land movement.

Hazards associated with working near/with water and chemicals are present.

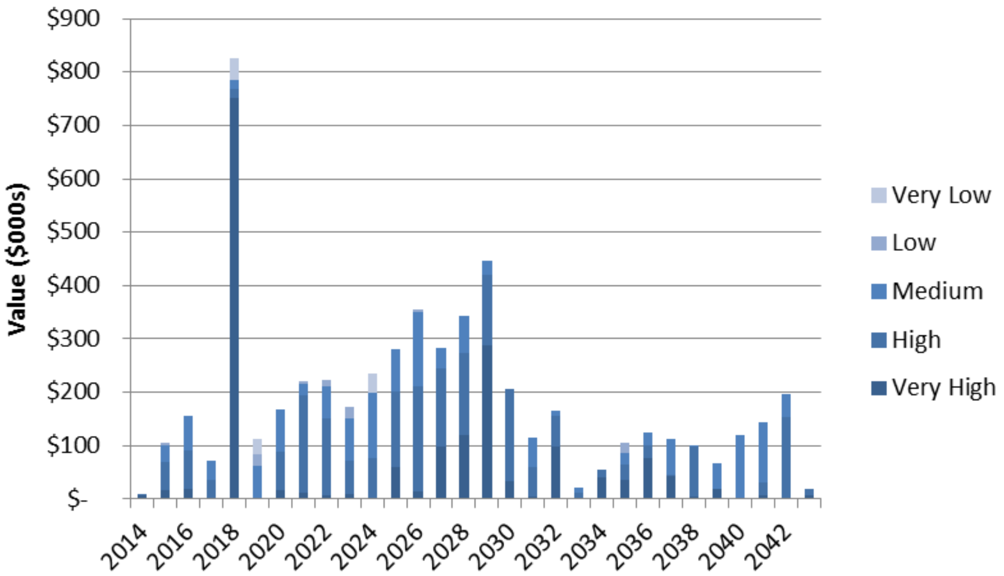
4.11.3 Renewal/Replacement Plan

There are a number of high priority renewals for Taihape that are underway or will soon commence. The falling main from the plant needs renewal. This must be done during January and February 2015 as part of access agreements with the landowner. The Ruru Road water main needs upgrading. This work will be staged. Stage 2 (estimated cost $180,000) is in progress, and the design for Stage 3 ($165,000) is underway.

There are minor renewals required at the treatment plant, including replacement of the reservoir outlet chamber and reservoir spouting.

The long-term renewal forecast for Taihape water assets is shown in Figure 55, by criticality of assets. In the near future, renewals are programmed for the water mains on Kaka Street (Thrush Street to Wren Street) and Thrush Street (Kiwi Road to Missile Street).

Figure 55: Renewal Forecast by Criticality – Taihape Water



4.11.4 Creation/Acquisition/Augmentation Plan

The only upcoming new work for Taihape is the completion and commissioning of the UV system at the Water Treatment Plant.

4.12 Erewhon Rural Water

4.12.1 Background Data

Oversight of this Rural Water Supply is by a Sub-Committee of Council, with representatives from the farmers on the scheme.

The rural water scheme is designed to deliver supply to each property at a constant flow rate 24 hours a day. To achieve this, the supply is delivered through a 'maric' restrictor, which is sized to maintain the required constant flow over a range of water pressures.

Erewhon is a gravity system. Working pressures in sections of pipe network are high (up to 600m head) due to changes in elevation. This necessitates the use of a significant quantity of steel pipe where the working pressures are typically in the range of 200-300m. Pipes and fittings need to be appropirately rated for pressure, and maintained in good condition, for reliable operation. The scheme traverses steep variable terrain.

There are 54 supply tanks servicing 28 farms with up to 1776 m^3/day.

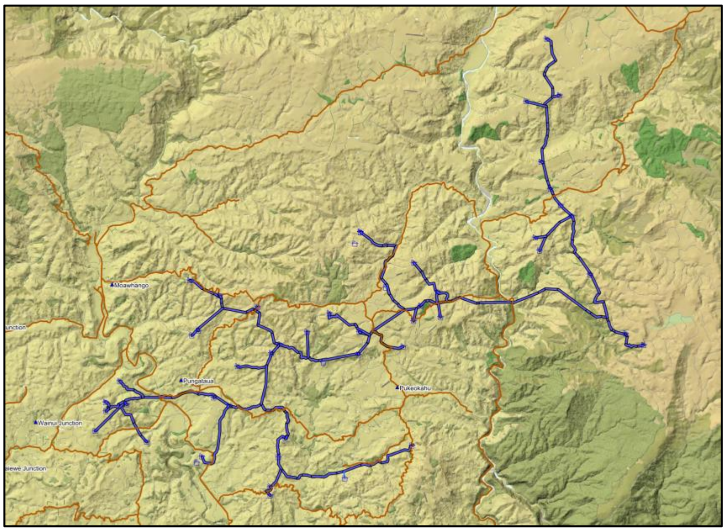
The following table lists the resource consents associated with the Erewhon Rural water supply.

Table 47: Resource Consents – Erewhon Rural water

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Abstraction – Reporoa Stream	103986	1 Jul 2027	1,800 m^3/day 21 L/s	East of Matawhero Rd
Abstraction - Dam	103987			Consent to dam stream using weir

This scheme is administered by Council for the scheme committee. All aspects of the scheme from revenue setting, maintenance and renewal expenditure are directed by the committee. The extent of the scheme is shown in Figure 56.

Figure 56: Extent of Erewhon Rural Water Scheme



Key issues in the Erewhon rural water scheme include:

- Affordability of the scheme, with increasing operation, maintenance and renewal commitments.
- Corrosion of steel pipes (which make up 28% of the total reticulation).
- Reduced flow capacity.
- Changing land-use in the scheme increasing water demand.
- Maintenance of flow restrictors.
- Identification of pipeline locations.

Increasing the main storage tank to 1000 m^3 to use reduced rate electricity on the pumps and use more efficient high lift pumps was considered by the Committee. This was discounted due to the capital cost to the scheme. However the Committee has directed that all consumers must have at least 48 hours storage on site to allow for breakages and programmed repairs. Most consumers already have this storage capacity on site.

Most of the reticulation is laid in rural farm land, although sections do run alongside rail or road corridors. Renewals in these corridors should be programmed in conjunction with other works to reduce costs.

Erewhon is a co-operative scheme run by the farmers and established in 1980. The financial and strategic planning oversight is handled by Council staff at the committee's direction.

The Erewhon rural water network and treatment facilities are managed day to day by contractors based in Taihape. Contractors perform routine maintenance and monitoring, attending to customer requests for service. Major repairs or capital work is undertaken by the contractors.

4.12.1.1 Physical Parameters

The Erewhon rural water network comprises 65.1 km of constant flow pressure mains ranging up to 200 mm diameter. Originally constructed from asbestos cement and steel pipes with PVC used in the smaller diameters in the 1980s, the original steel pipe has shown over the years that it is susceptible to corrosion. An investment to replace this material with suitable pressure rated plastic alternatives means there is only 16% steel remaining. Over 12 km of pipeline was replaced in the 2000s.

Background data for this rural supply are given in Table 48.

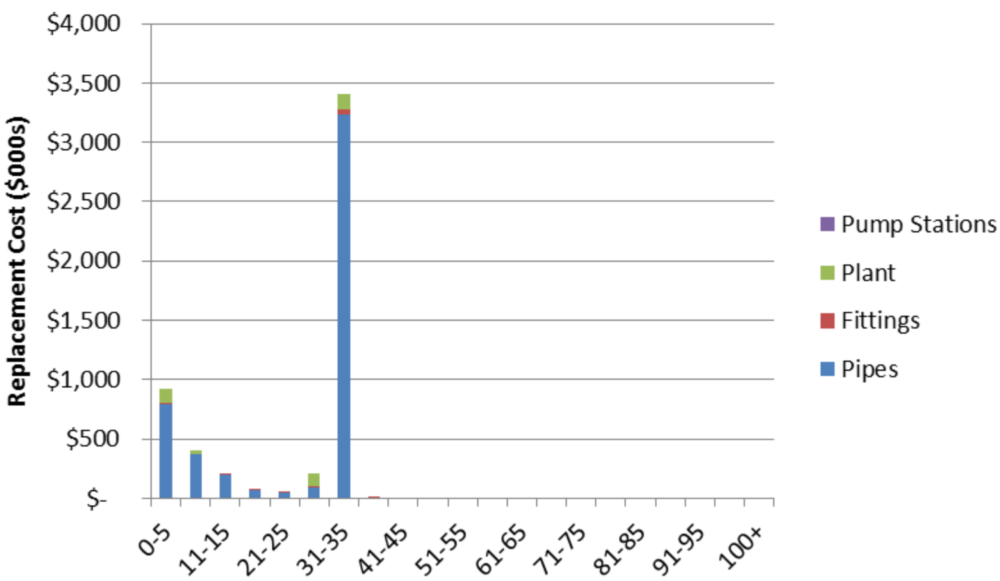
Table 48: Background Data - Erewhon Rural Water

Asset Type	Asset Parameters
Water Source	Reporoa Stream/Reporoa Bog Concrete dam/weir Screen: Stainless steel contra shear, taking water directly 300mm below the surface of the dam at the intake weir. Filtration: 1.5-2.0 mm wide slots in the screen
Treatment Plant	None
Storage	A Reservoir: Material: Concrete Capacity: 23m^3 B Reservoir: Material: Concrete Capacity: 28m^3 Total 51m^3
Mains	85.5 km of service mains

Asset Type	Asset Parameters
Fittings	29 valves 47 air valves 1 PRV 9 bulk meters
Connections	0.4 km of service lines 54 tanks
Structures	Pipe bridge (Rangitikei river): 2 span steel truss (supporting 100mm spiral welded pipe); Total length 40m. Height 20m above river Discharge structure
Monitoring/control equipment	Low/high pressure alarms: Needle pressure gauge Communication: radio telephone system- 12 volt battery/solar panels

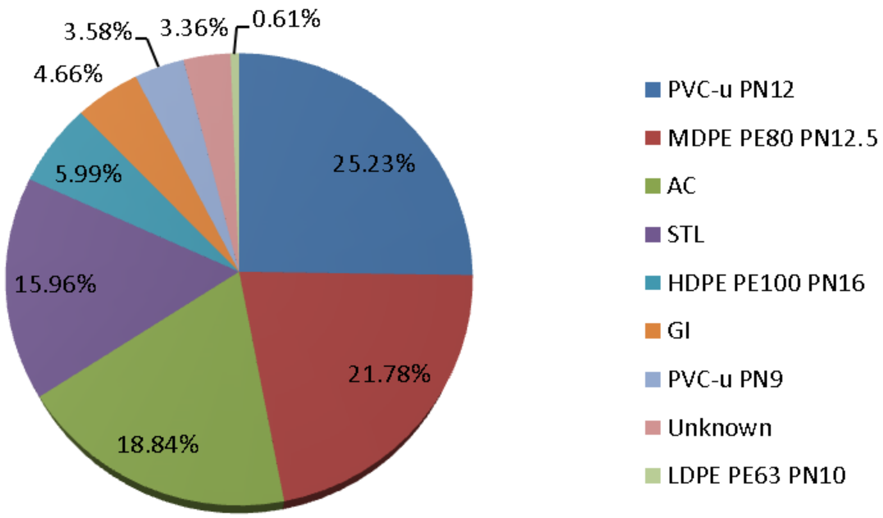
The age of assets on this scheme is shown in Figure 57. The assets are predominantly less than 35 years old. Most of the pipework falls between 31 and 35 years old.

Figure 57: Asset Age - Erewhon Rural Water



Most of the water pipes on the Erewhon scheme are made from plastic (PVC or PE), as seen in Figure 58. There are a number of AC pipes and steel pipes as well.

Figure 58: Pipe Material – Erewhon Rural Water



4.12.1.2 Asset Capacity/Performance

The scheme is currently operating at 90% of the original design capacity the inefficiency being due to increased pipe friction caused by:

- Rust scale and encrustation along the interior of the steel pipe.
- A build up of fine sediment along all pipe linings formed as scum layer. The pipes might be cleaned with a cleaning pig on a regular basis, which would restore the system capacity.

There has been a major problem with leaks, which is being addressed as part of the leak reduction program.

- Although there is no immediate design remedy to reinstate original design flows, the situation will be improved with programmed replacement of steel pipe sections.
- The capacity of the Erewhon rural water supply is described in Table 49.

Table 49: Asset Capacity - Erewhon Rural Water

Parameter	Data
Consumption	Daily demand 1776 m^3/day (not yet verified by flow meters)

Water quality, based on the analysis of one-off samples taken on 5 September 1995, show that the water supplied is not suitable for domestic supply without the installation of treatment and filtration processes. The capital and operating costs of doing this are beyond the scheme's ability to fund and there is no intention to upgrade to provide a domestic supply.

- Although the Reporoa Stream generally runs clear, in periods of heavy rainfall the water can be discoloured due to a fine sediment loam. The entry of fine sediments into the pipe reticulation affects water quality, as does the entry of organic matter that grows in the streambed.

There are the following issues with reliability:

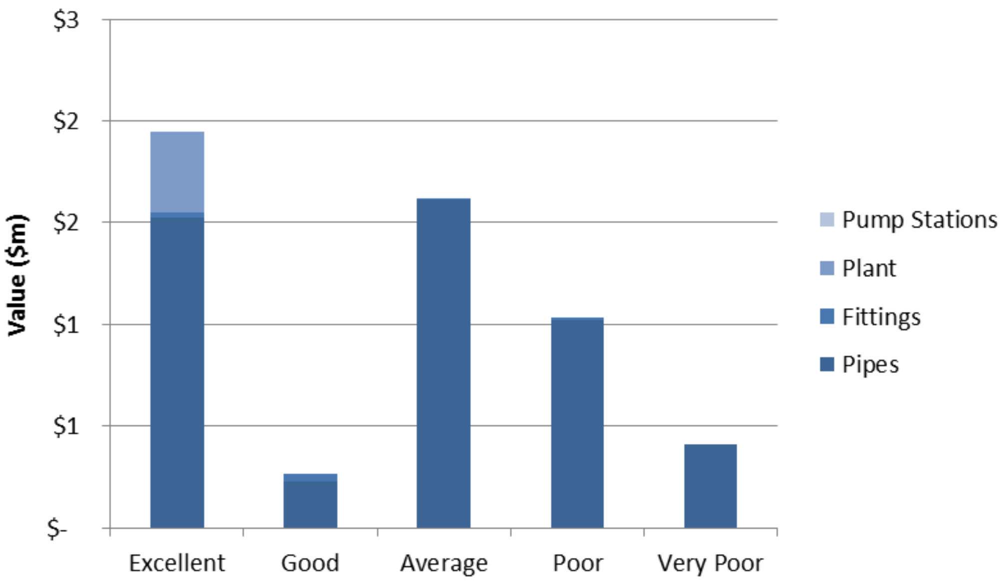
- The flow meters and restrictor valves regularly become blocked or jammed with organic material, which needs to be cleared.

- The weir is in a very remote location and difficult to access. Any problems that may arise would be difficult to fix immediately.

There have been no significant failures of the network or treatment plant. This has been achieved by optimization of the treatment process. Minor leaks are dealt with by staff as they are reported. Leaks in service connections are temporarily repaired prior to a complete replacement. Replacements are grouped for efficiencies of scale. Pipe breaks are recorded on the GIS plans, which affect the pipe's historical performance score.

The performance ratings recorded against water assets for Erewhon are shown in Figure 59.

Figure 59: Asset Performance - Erewhon Rural Water



4.12.1.3 Asset Condition

Headworks are generally in good condition, but need to be regularly inspected and cleaned, as they are open to the elements and accessible by a track.

Mangaohone A Tank is in very good structural condition, however the inlet, outlet and overflow pipes and overflow channels need to be modified to reduce exposure to damage. Mangaohone B Tank is in good structural condition at present.

High maintenance costs are being incurred for the repair of leaks mainly within the lengths of buried steel pipe. The proactive renewal programme is addressing these issues.

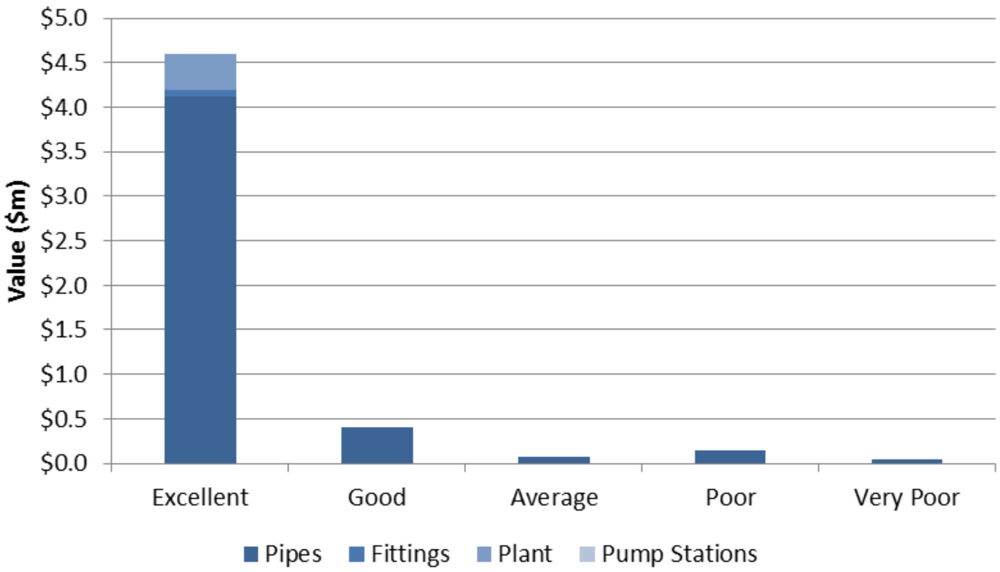
There are ongoing maintenance needs associated with protecting pipelines from cattle damage and erosion at a number of locations. There is a planned renewal program in place.

The stream crossings are currently in a satisfactory condition but require regular monitoring.

The pipe bridge crossing the Rangitikei River Gorge is generally in sound structural condition with paintwork in good condition. Scrub lying on the end abutments needs clearing from the steelwork to avoid premature rusting.

Figure 60 shows the condition of assets on the Erewhon rural water scheme. Most of the assets are listed as being in "Excellent" condition.

Figure 60: Asset Condition - Erewhon Rural Water



4.12.1.4 Asset Valuations

The value of assets for the Erewhon scheme, including the small reservoirs (tanks) at each connection point, are given in Table 50.

Table 50: Value by Asset Group – Erewhon Rural Water (29 Jan 2015)

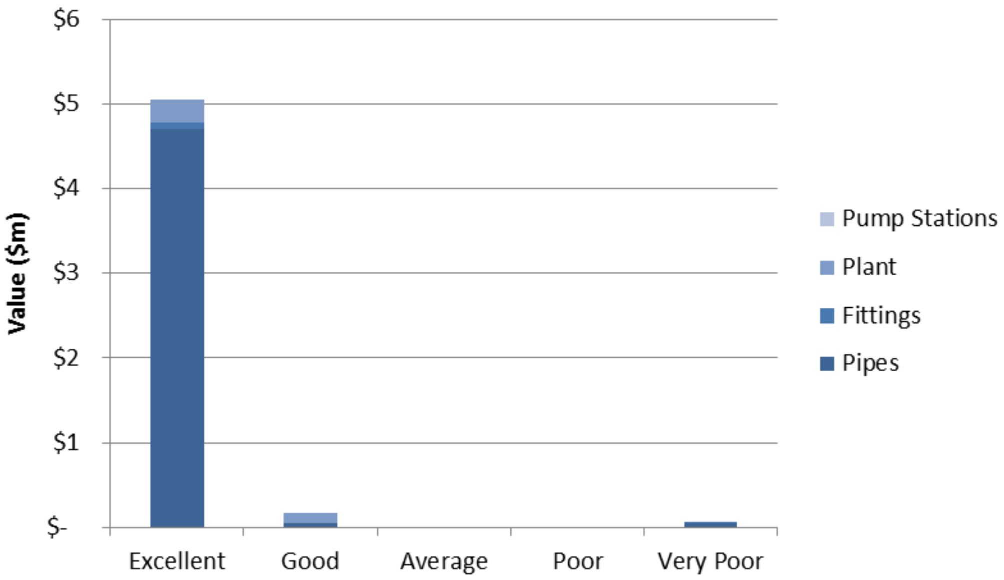
Asset Group	Replacement Cost ($)	Written Down Value ($)
Intake	222,503	180,927
Service Mains	4,794,168	3,007,268
Service Lines	8,387	7,138
Valves	35,633	14,525
Air Valves	26,959	9,039
PRVs	1,117	335

Asset Group	Replacement Cost ($)	Written Down Value ($)
Bulk Meters	12,068	1,620
Tanks	176,428	80,736

4.12.1.5 Historic Data

Figure 61 shows that there is high confidence in the asset data for Erewhon, with most rated "Excellent". Knowledge of the Erewhon rural water supply assets is good, as some staff who were involved with the inception of the scheme are still with Council. As with all our rural schemes, maintenance staff are involved in an ongoing process of data collection for Erewhon. When maintenance is carried out, information is recorded on attributes such as pipe diameter and material, in order to continuously improve our records.

Figure 61: Data Confidence – Erewhon rural water



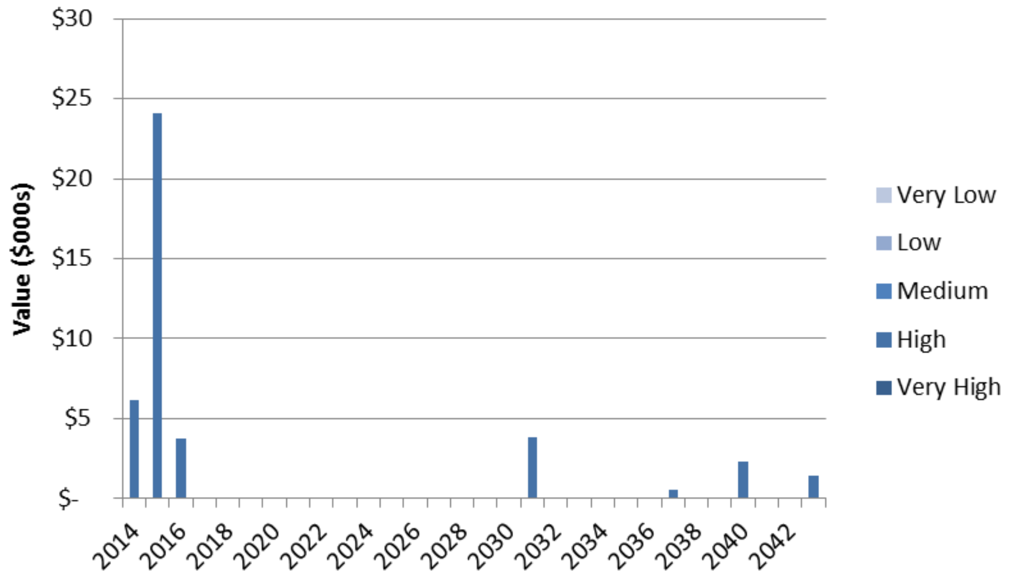
4.12.2 Routine Operations and Maintenance Plan

Maintenance on the Erewhon rural scheme is contracted privately to Taihape Plumbing Ltd. The tank service connections are checked regularly to ensure correct operation and condition.

4.12.3 Renewal/Replacement Plan

The forecast renewal expenditure required for Erewhon over the long term is shown in Figure 62. Projects are decided on a case-by-case basis in conjunction with the Rural Water Supply Committee. Depreciation on rural water supplies is a book entry only, and is not funded. Renewals are loan-funded.

Figure 62: Renewal Forecast by Criticality - Erewhon rural water



4.12.4 Creation/Acquisition/Augmentation Plan

There are no new works programmed for Erewhon over the life of this Plan. Current Council policy is to maintain the scheme as a stock water supply only, and no treatment is likely to be required within the planning period.

4.13 Hunterville Rural Water

4.13.1 Background Data

The Hunterville Rural Water Scheme (HRWS) was built in the 1980s to provide farms in the region with a reliable stock water system. The biggest consumer on the scheme is the township of Hunterville, which takes about 14% of the demand. There are more than 160 farms connected as well as supply to Rata, Otairi and Ohingaiti.

Water is abstracted from the Rangitikei River and pumped a height of 330 m in three lifts to the main reservoir.

The water is chlorinated as it is intended as a stock water supply. Consumers are regularly reminded that this is considered a non-potable supply and additional treatment is required for residential consumers.

There are 160 connections on flow restricted supply. In summer the system can deliver 2500 m^3/day.

The following table lists the resource consents associated with the Hunterville Water Supply.

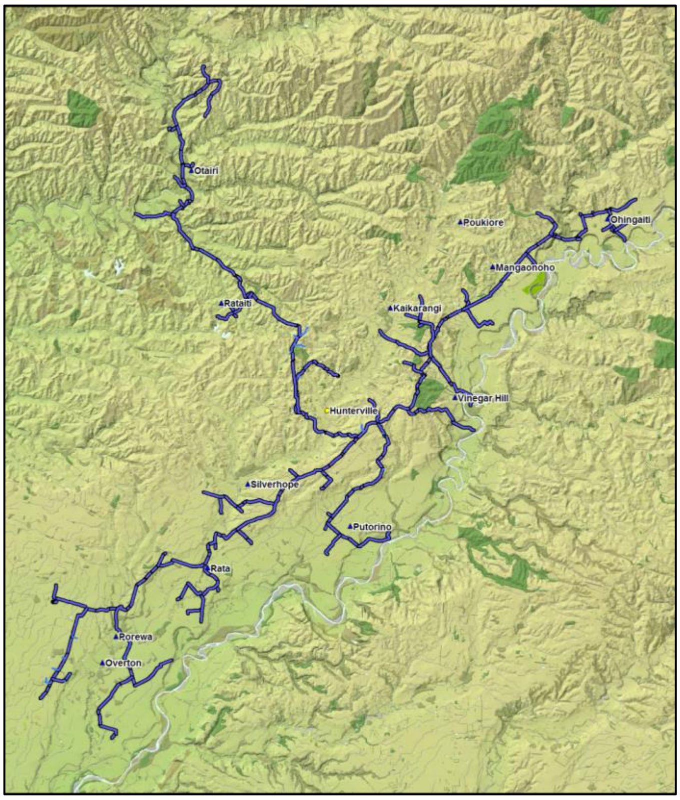
Table 51: Resource Consents – Hunterville Rural Water

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Abstraction – Rangitikei River	103989	1 Jul 2037	2,500 m^3/day 28.9 L/s	Riparian take (infiltration gallery)
Dam	RTK800737	6 Jan 2026	N/A	Consent to dam unnamed tributary of Porewa Stream
Disturb and Divert	106903, 106904	1 Jul 2037	≤ 25% of river flow diverted Gravel depth ≤ 200 mm over adjoining beaches	Disturb bed and divert water for maintenance of infiltration gallery

This scheme is administered by Council for the scheme committee. All aspects of the scheme from revenue setting, maintenance and renewal expenditure are directed by the committee.

The extent of the Hunterville rural scheme is shown by Figure 63.

Figure 63: Extent of Hunterville Rural Water Scheme



Key issues for the Hunterville Rural water scheme are:

- Gallery intake is unable to meet peak demand as degradation of the Rangitikei River bed has reduced the driving head over the gallery.

- The water collection needs augmentation from surface pumping during summer and periods of low-river flow. This augmentation increases silt and algae loadings and a stilling and separation tank has been installed prior to the wet well.

- Power costs are a significant part of the budget. Reliability of power supply is also a concern with frequent "brown outs" resulting in callouts and higher than normal maintenance costs.

- More proactive maintenance is needed on 'flow' restrictors, valves and storage tanks.

- The water is stock water only and consumers are now required to have a minimum of 48 hour storage capacity on site.

- Faulty or tampering of flow restrictors to individual consumers are increasing the system demand and restricting flow to downstream consumers. This is more evident during dry periods.

The HRWS water network and treatment facilities are managed day to day by Council staff; performing routine maintenance, monitoring compliance with resource consents, attending to customer requests for service. Major repairs or capital work are undertaken following approval from the Committee.

4.13.1.1 Physical Parameters

The HRWS water network comprises 110 km of pressure mains ranging up to 150 mm diameter and 41 km of service connections. Nearly the entire scheme was constructed in 1985 from PVC pressure pipe. Some growth of the system occurred in early 2000. Replacement of pipelines has been initiated by mains breaks or land slippage. Extent of replacement has been minimized to only that required to resolve the issue.

Background data for Hunterville rural are given in Table 52.

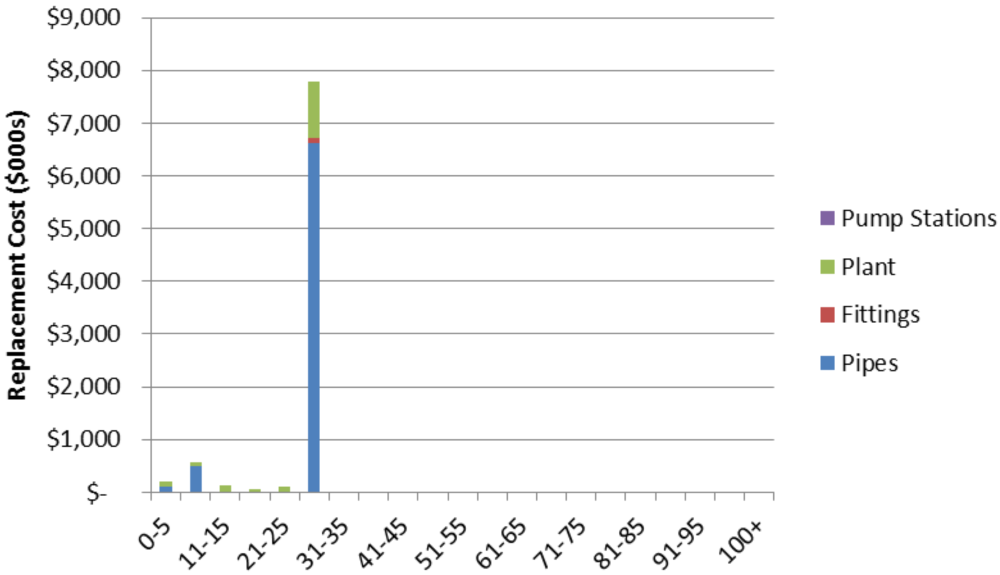
Table 52: Background Data - Hunterville Rural Water

Asset Type	Asset Parameters
Water Source	Rangitikei River Infiltration gallery Well
Treatment Plant	Chlorination
Pumping Stations	3 Lift stations Control and telemetry equipment Fittings

Asset Type	Asset Parameters
Storage	7 Timber stave reservoirs (Break pressure tanks) 4 Concrete reservoirs Main Reservoir 360m^3
Mains	137.2 km of service mains
Fittings	58 valves 31 air valves 9 PRVs 7 bulk meters
Connections	3.8 km of service lines 159 tanks
Structures	Otowhiti aerial crossing

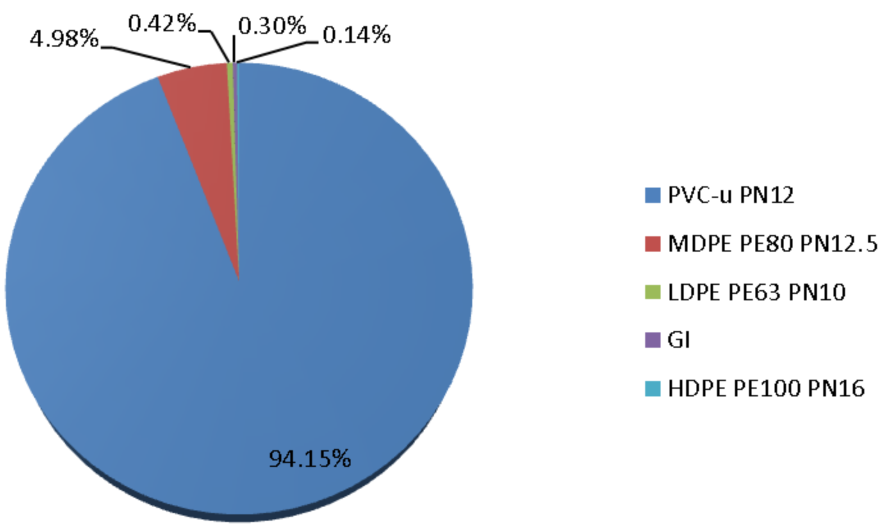
Figure 64 shows that water assets on the Hunterville rural scheme are predominantly 26-30 years old. The implications of this are that they may all require renewal at roughly the same time. This means that performance should be monitored, and criticality well understood, so that renewals can be smoothed to avoid spikes in expenditure.

Figure 64: Asset Age - Hunterville Rural Water



Pipes on the Hunterville rural scheme are almost entirely PVC, as shown in Figure 65.

Figure 65: Pipe Material - Hunterville Rural Water



4.13.1.2 Asset Capacity/Performance

The infiltration gallery is causing problems with the collection of water. Augmentation of surface pumped water is required during dry periods and low river flows. Hunterville, like many schemes drawing water from the Rangitikei River, has difficulty extracting water during low river flow periods.

The water is stock water only. The capital and operating costs of making it a drinking water supply are not feasible and there is no intention of making this a domestic supply.

The infiltration gallery has been the cause of problems over several years. The course of the river naturally bypasses the gallery and may change course with each fresh. The channel needs to be reopened frequently to restore the water supply. The alarm systems in place ensure a rapid response in case of problems. The lack of storage capacity of the main reservoir means water shortage risks are medium-high however this is mitigated by the requirement of consumers to maintain 48 hours on site storage.

Information on the capacity of the Huterville rural scheme is given in Table 53.

Table 53: Asset Capacity - Hunterville Rural Water

Parameter	Comments	Data
Consumption	Average daily demand	1350 m^3/day
	Peak daily demand	2123 m^3/day
	Minimum winter demand	952 m^3/day
Treatment Plant	Maximum sustainable production	2500 m^3/day

There are two bridge crossings where flexible pipes and joints have been used with inadequate anchorage. These will need routine inspections to monitor risk of failure.

There have been no significant failures of the network or treatment plant. This has been achieved by optimization of the treatment process. Minor leaks are dealt with by staff as they are reported. Leaks in service connections are temporarily repaired prior to a complete replacement. Replacements are grouped for efficiencies of scale. Pipe breaks are recorded on the GIS plans, which affect the pipe's historical performance score.

Rangitikei District Council and the Ministry for Primary Industries have jointly funded a strategic water assessment for the District. This assessment included the Hunterville Scheme Review with the purpose of:

- Identifying opportunities to improve the effectiveness and efficiency of the scheme.
- Assessing what potential exists to increase the area serviced by the scheme, and/or to utilise the scheme for irrigation purposes.

The review found that in general the scheme is realising its purpose. However, the review also identified the following weaknesses:

- The intake structure in the Rangitikei River.
- Costs associated with lifting water from the Rangitikei River to the scheme's high point.
- A considerable operating deficit, and the costs of future programmed new and replacement capital works.
- Other issues - the rural/Hunterville pricing differential, infrastructure replacement, landowner awareness of assets, unit allocation.

The review generated the following recommendations:

- Intake – upgrade and regular maintenance.
- Pump costs:
  - Increase storage.
  - Reduce leakage.
  - Develop alternate sources.
- Operating deficit:
  - Develop an equitable charging system.
  - Identify opportunities to reduce operating costs.
  - Progressively increase water use charges to reduce the current deficit.
  - Explore opportunities for greater general rate contributions.
  - Develop a capital works programme to cover new and replacement infrastructure and identify best means to pay for these.

- Other issues:
  - Address pricing differential between rural and Hunterville water costs.
  - Implement an infrastructure replacement programme.
  - Explore options to increase landowner awareness of scheme assets.
  - Review the unit allocation and transfer process.
  - Undertake and economic assessment of the scheme.
- Decentralise the scheme:
  - Investigate and develop alternate water sources.

These recommendations will help to guide the future management and operation of the Hunterville Rural Water Supply.

4.13.1.3 Asset Condition

The infiltration gallery is showing reduced performance. Temporary surface pumping has been used to augment supply. The well is in good condition in line with its age.

The building and chlorination equipment are in good condition.

All storage tanks are in good condition. The main reservoir liner was replaced in 2011.

The computer systems and wiring were replaced in 2003 due in part to a lightning strike on the telemetry cable. ACME Pumps installed in 2005 along with planned refurbishment of the other high lift pumps should enable service until 2025.

Some AC pipe was used in the construction, and lengths in slip prone areas have failed. These lengths have been replaced with more flexible HDPE materials.

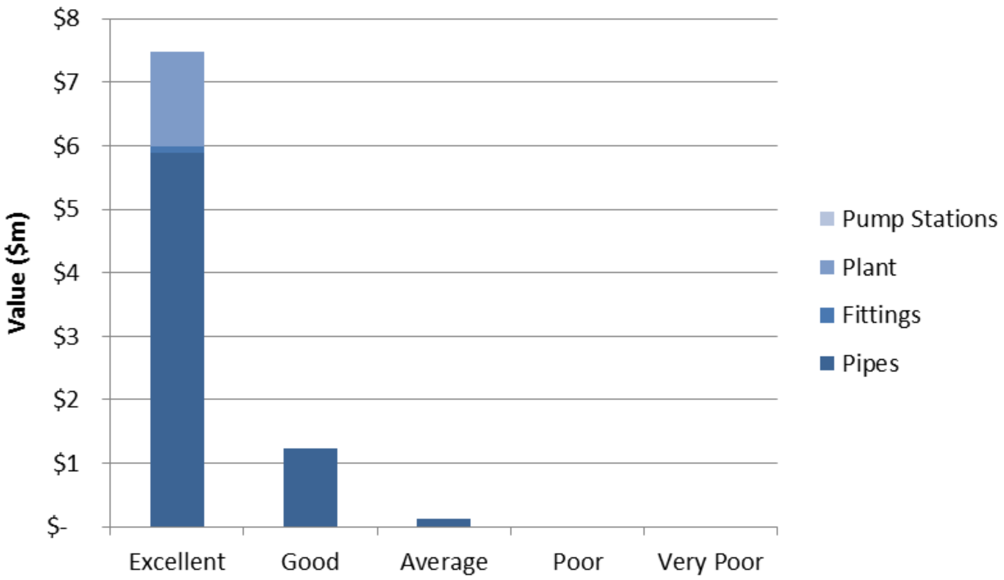
The scheme administration includes responsibility for the pipework up to and including ball cocks in farm tanks. These are replaced as needed.

Pressure relief valves were causing problems and have been replaced. These will be subject to an improved maintenance programme to extend the life of the new valves. The other control valves operate well.

The aerial crossing is of unusual design and will not be an easy task to repair when it fails. An emergency plan needs to be developed for the failure of this crossing.

Figure 66 shows the condition of assets on the Hunterville rural scheme. Most have been rated as “Excellent”. None of the assets have been assessed as less than “Average” condition.

Figure 66: Asset Condition – Hunterville Rural Water



4.13.1.4 Asset Valuations

The value of assets on the Hunterville rural water supply (which excludes the Hunterville urban area) are given in Table 54.

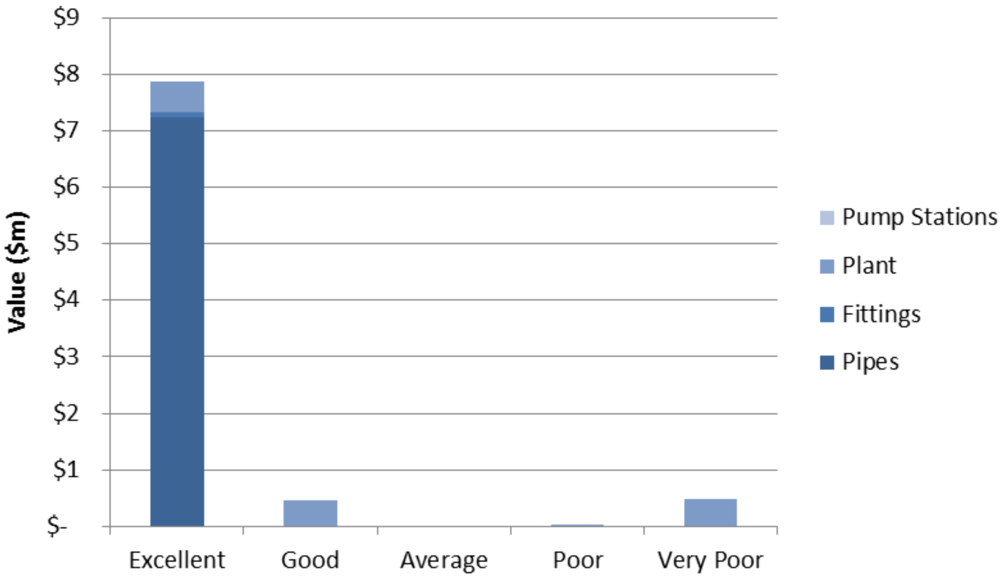
Table 54: Value by Asset Group – Hunterville Rural Water (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Intake	58,836	23,500
Pump Stations	345,824	108,538
Treatment Plant	389,565	145,177
Reservoirs	81,475	34,219
Service Mains	7,153,268	5,062,035
Service Lines	84,821	72,861
Valves	60,739	17,931
Air Valves	16,957	2,692
PRVs	8,828	2,342
Bulk Meters	9,746	3,606
Tanks	607,773	291,898

4.13.1.5 Historic Data

The confidence placed in asset information for Hunterville rural water is shown in Figure 67. In general, confidence is “Excellent”. Existing information for the Hunterville rural scheme is good. When digitisation of data occurred in 1998-1999, most scheme assets had their GPS locations recorded. Maintenance workers record asset information on this scheme routinely, so that it can be uploaded to our asset register.

Figure 67: Data Confidence – Hunterville Rural Water



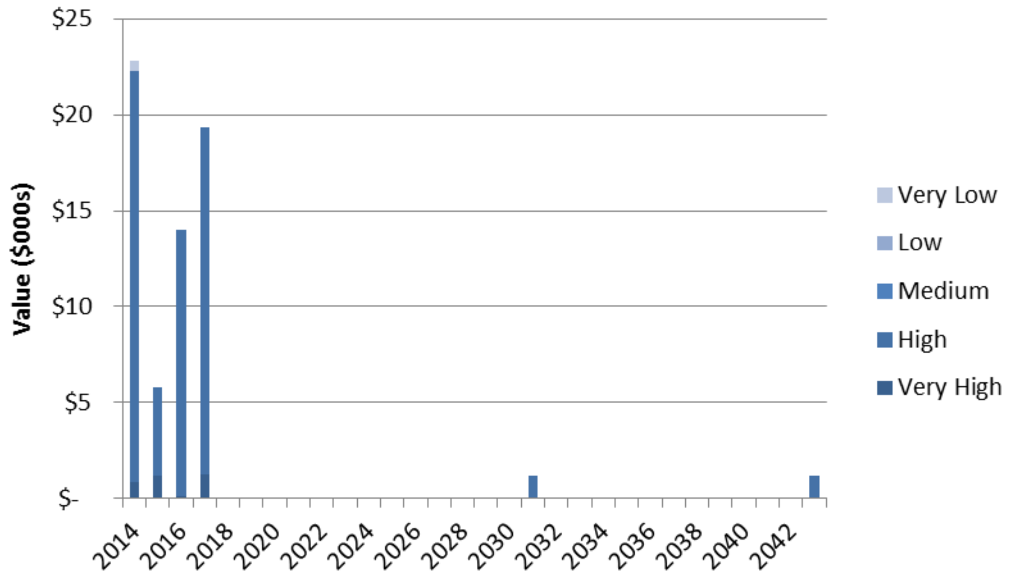
4.13.2 Routine Operations and Maintenance Plan

Rangitikei District Council staff perform maintenance on the Hunterville rural water supply. This is charged back to the scheme on a cost-recovery basis.

4.13.3 Renewal/Replacement Plan

Forecast expenditure on long-term renewals for Hunterville rural is shown in Figure 68. This shows that a reasonable amount of expenditure is forecast to be necessary on the scheme over the next four years. This will be reviewed and confirmed before work takes place. Depreciation on rural water supplies is a book entry only, and is not funded. Renewals are loan-funded.

Figure 68: Renewal Forecast by Criticality – Hunterville Rural Water



4.13.4 Creation/Acquisition/Augmentation Plan

There are no new works planned for the Hunterville Rural scheme at this stage. Shortly, a review will be carried out into the capacity of the system to cope with transferring of unallocated units to different locations. It is possible that this review will generate capital works to be carried out on the reticulation to enable such transfers.

There has also been a strategic project from the Catalyst Group that investigated, among other things, extending the Hunterville Rural Water Supply, and potentially tapping into new water sources.

4.14 Omatane Rural Water

4.14.1 Background Data

The Council has a stewardship role in the management of two smaller water schemes. The Omatane and Putorino schemes are operated by the users, with Council providing some managerial and financial support.

The Omatane RWS is a rural water supply. The scheme is limited to a set number of water units, and as such does not allow for growth. It gathers water from a tributary of the Makino River by means of a weir and flow diversion pipe. This scheme was constructed in the 1980s. The water is intended for stock consumption and is not treated in any way. It supplies a small rural community of six farms by way of pipes of undetermined sized and length.

Omatane is in remote rural hill country with poor or no telephone reception available.

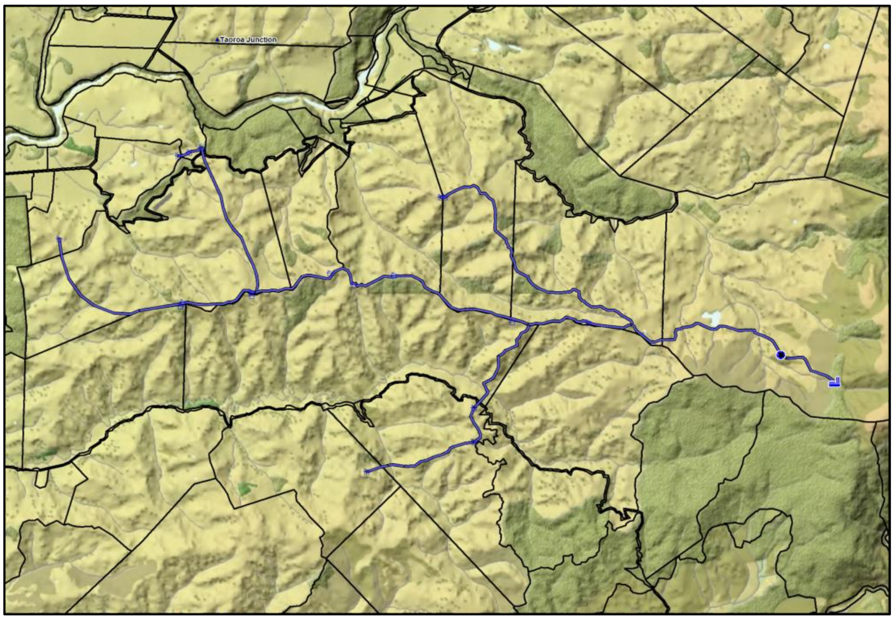
The following table describes the resource consent associated with the Omatane Water Supply.

Table 55: Resource Consents – Omatanae Rural Water

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Abstraction	103988	1 Jul 2027	300 m^3/day 3.5 L/s	Unnamed tributary of Makino Stream at Makino Rd

The extent of the Omatane scheme is shown in Figure 69.

Figure 69: Extent Of Omatane Rural Water Scheme



The Omatane Water network is managed by the farm owners it supplies. Council staff provide a management role only; this includes performing monitoring compliance for resource consents, and advising the farmers as required.

4.14.1.1 Physical Parameters

The Omatane Water Network comprises 21 km of pressure mains ranging up to 80 mm diameter. Construction in the 1980s was almost entirely of PVC, with some service connections being made of steel.

Background data for the scheme is shown in Table 56.

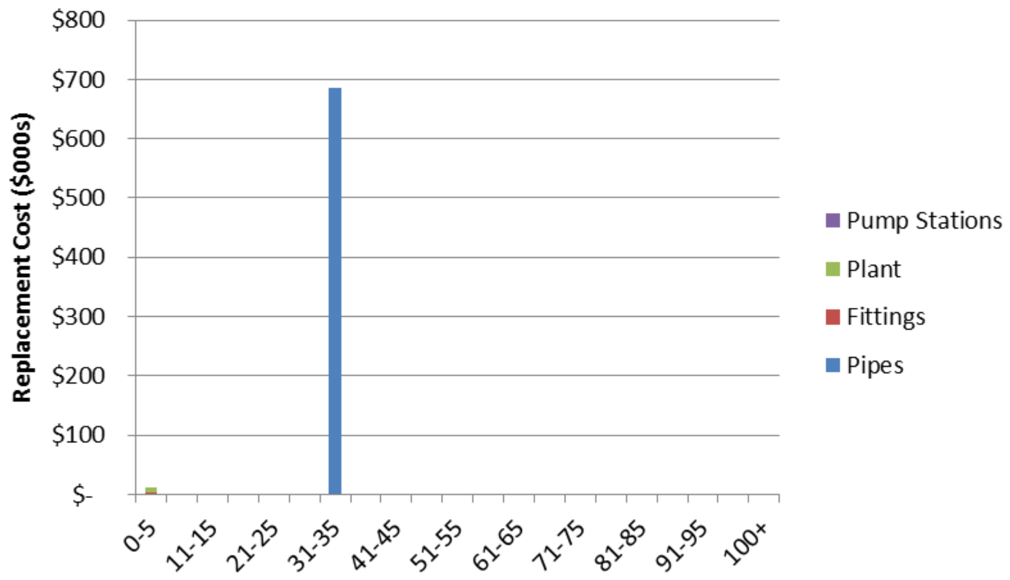
Table 56: Background Data - Omatane Rural Water

Asset Type	Asset Parameters
Water Source	Tributary of the Makino Stream
Treatment Plant	Stock supply only, no treatment plant

Asset Type	Asset Parameters
Storage	Concrete reservoir at intake, 20 m^3 volume
Reticulation	Pipelines: Total length 21.1 km
Service Connections	11 properties connected
Fittings	Flow restrictors ('maric' valves)
	Sluice valves
	Pressure reducing valve (pressure relief system)
	Pressure relief valve (pressure relief system)
	Air valves
	Flow meters
Structures	One stream crossing
Monitoring/control equipment	Telemetry flow data to Regional Council

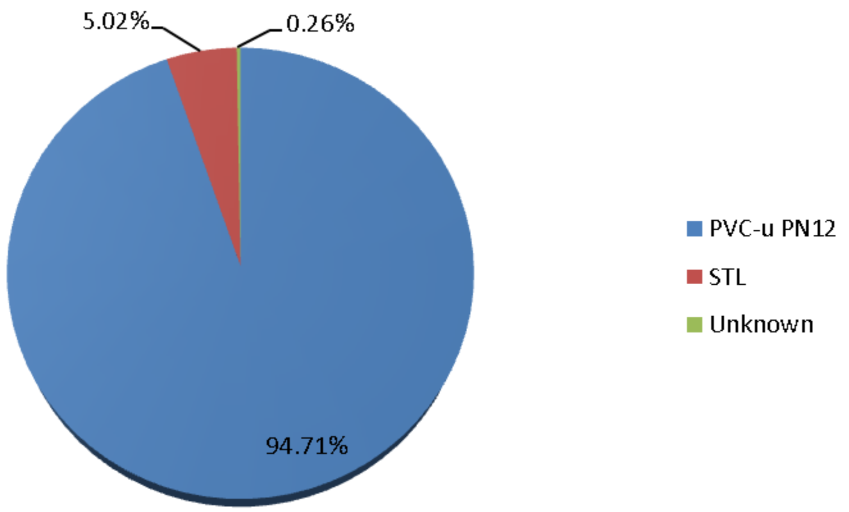
The age profile for Omatane scheme assets is given in Figure 70. Assets are almost entirely aged between 31 and 35 years.

Figure 70: Asset Age - Omatane Rural Water



Pipe material used on the Omatane scheme is 95% PVC, as seen in Figure 71. The remainder is mostly steel.

Figure 71: Pipe Material - Omatane Rural Water



4.14.1.2 Asset Capacity/Performance

There are no recorded issues with regard to availability of the water supply for this scheme.

There have been no reported failures of the network. Minor leaks are dealt with by users. Replacements are grouped for efficiencies of scale. Without reports to Council on pipe breaks, it is not possible to determine a remaining life based on condition.

The scheme is designed for stock water only and is not intended for domestic consumption.

4.14.1.3 Asset Condition

There is no treatment plant for the Omatance Rural water scheme.

Tank sites are deemed to be the responsibility of the end user. Scheme demarcation of responsibility ends at the maric valve.

Without any maintenance history, the expected remaining life of the reticulation can only be gauged from the standard design life for each material type. Condition is assumed to be good in lieu of any other data.

4.14.1.4 Asset Valuations

Assets on the Omatane rural water supply are not included in Council's asset register.

4.14.1.5 Historic Data

The Omatane rural water supply is managed by the farmers who are users of the scheme. Council has had some involvement with the scheme over the years, but does not keep extensive information related to the assets. No renewals have been carried out on the scheme by Council since its inception, and does not perform maintenance on the scheme.

4.14.2 Routine Operations and Maintenance Plan

Omatane is a private supply. As such, Council has nothing to do with the maintenance of the water assets within the scheme.

4.14.3 Renewal/Replacement Plan

The Omatane Rural Water Scheme services a small number of farms and receives minimal operational or planning support for resource consents and limited funding for repairs. There is no provision for renewals as the pipeline ages, and no depreciation is rated for in the annual plan.

Depreciation on rural water supplies is a book entry only, and is not funded. There is no funding for depreciation; any capital renewals or upgrades must be loan-funded by the scheme users. The users are provided with annual reports advising of upcoming costs.

Renewals of the supply are not forecast within the timeframe of this Asset Management Plan.

4.14.4 Creation/Acquisition/Augmentation Plan

The Omatane scheme currently operates in a satisfactory manner, and will continue to do so until there is an uneconomic failure in the system. It is expected that farms reliant on these sources may take over ownership of the scheme, or find alternative water sources before the pipeline ceases to function effectively.

There are consequently no new works planned for Omatane at this stage.

4.15 Putorino Rural Water

4.15.1 Background Data

The Putorino Rural water supply scheme gathers water from a tributary of the Rangitikei River by means of a weir and flow diversion pipe. This scheme was constructed in the 1910s. The water is gravity fed to the dam about 1100 m away. The water is intended for stock consumption and is not treated in any way. It supplies a small rural community of six farms by way of pipes of undetermined sized and length.

The scheme is managed by the Putorino Farm Settlement Water Supply Committee, which is not a Sub-committee of Council like the other Rural Water Supply Committees.

There are currently no plans for the Putorino scheme held at the council offices, and the data contained herein is based on staff knowledge only. It is expected that more information can be obtained from the farm managers and this should be a priority for this scheme.

The scheme is now more than 90 years old, but is working adequately.

Council may receive application from Rural Water Scheme bodies to privatise the water supply. This is possible subject to meeting the conditions under Sections 131 and 135 of the Local Government Act 2002.

Specific management issues related to privatisation of public supplies include but are not limited to:

- Ensuring compliance with the Health Act and the DWSNZ.

- Designated properties – procedure to terminate/transfer.
- Public utilities on private properties have a measure of protection under the LGA 2002. Private utilities may require easements or formal agreements.
- Service Level Agreement to manage, regulate and protect private infrastructure (replacing the Council Bylaw).
- Ownership and associated responsibilities.

The following table describes the resource consent associated with the Putorino Water Supply.

Table 57: Resource Consents – Putorino Rural Water

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Abstraction	105370	1 Jul 2027	80 m^3/day 29,200 m^3/yr	Unnamed tributary of Rangitikei River off Rangatira Rd. Consent held by Putorino Farm Settlement Water Supply Committee.

This consent is held by the Putorino Farm Settlement Water Supply Committee, and so Rangitikei District Council is not the organisation monitored for compliance.

4.15.1.1 Physical Parameters

The water is diverted at the headworks by a weir from a small stream, which eventually joins the Rangitikei River south of Putorino.

The primary dam is estimated to hold 5600 m^3 (from aerial photo measurements).

The falling main is 100 mm AC. All other reticulation is of unknown material and size.

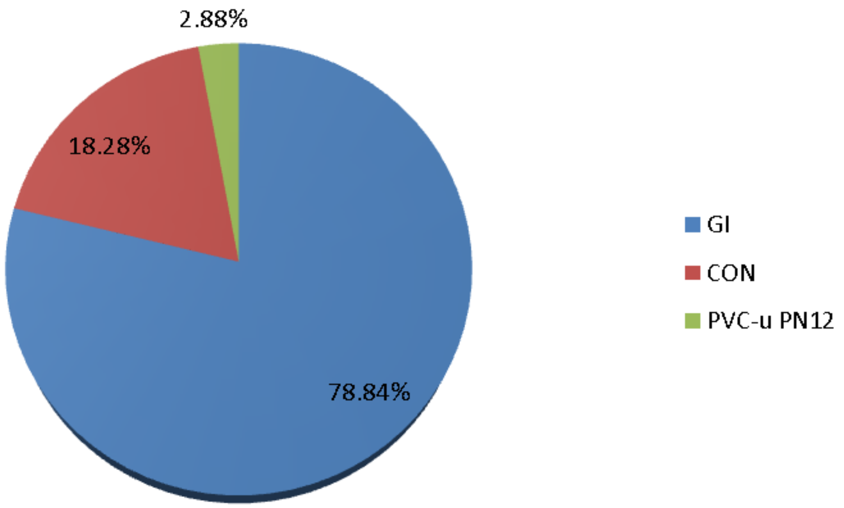
Six farms are connected to this scheme, of which three are believed to also hold connections to the HRWS.

The scheme was established in the 1910s and is managed by the farm owners. Council contributes a small maintenance fund for breakages and repairs. There is no depreciation charged on the system, and there are no plans to renew it in the future. All farms using the scheme can connect to the HRWS, or in some cases have already done so.

Some asset information for the Putorino scheme has been collected over the past 5 years. However, in general data for the scheme is not very complete.

Pipe material in Putorino is mostly galvanised iron, since the mains are of small diameter (see Table 58). This is distinct from all other Rangitikei District Council water supplies, in which the mains are larger and constructed from different materials.

Table 58: Pipe Material – Putorino Water



4.15.1.2 Asset Capacity/Performance

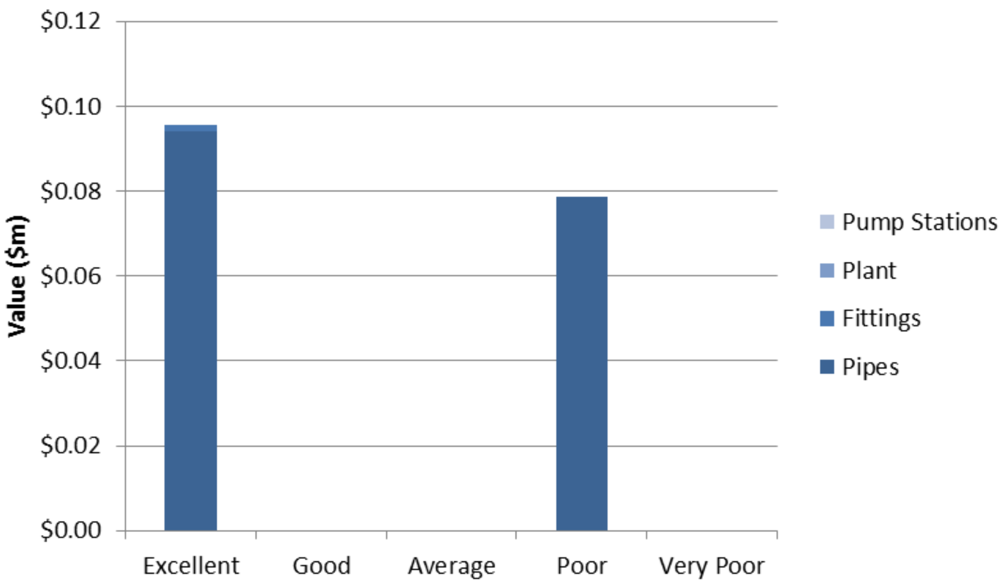
There are no performance issues regarding this scheme. Occasional repairs are made as necessary.

The Putorino scheme currently operates in a satisfactory manner, and will continue to do so until there is an uneconomical failure in the system. It is expected that farms reliant on these sources may take over ownership of the schemes, or find alternative water sources before the pipeline ceases to function effectively.

4.15.1.3 Asset Condition

Just over half of the water assets for Putorino are in "Excellent" condition. The remainder are in "Poor" condition (see Figure 72).

Figure 72: Asset Condition – Putorino Water



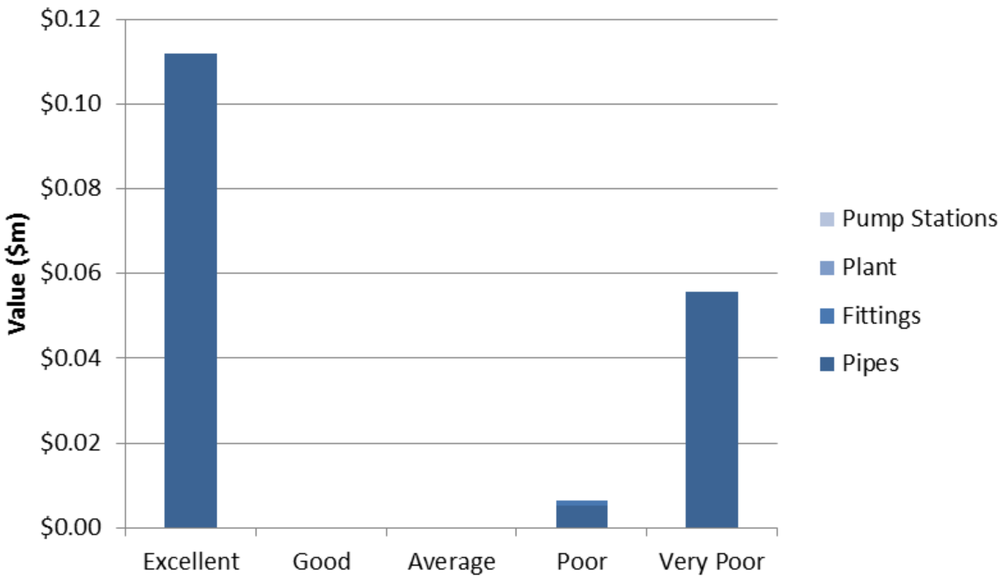
4.15.1.4 Asset Valuations

The figures contained throughout this document do not account for the value of this scheme as there are currently no asset register details.

4.15.1.5 Historic Data

The confidence in data for Putorino is mostly "Excellent", as shown in Figure 73. However, some $60,000 worth of pipes have data with "Very Poor" confidence attached to it. Similarly to Omatane, the Putorino scheme is operated by the local farming community, and Council does not hold extensive information on it.

Figure 73: Data Confidence – Putorino Water



4.15.2 Routine Operations and Maintenance Plan

Putorino, like Omatane, is a private scheme which Council is not involved in maintaining.

4.15.3 Renewal/Replacement Plan

There is no provision for renewals as the pipeline ages, and no depreciation is rated for in the annual plan. Depreciation on rural water supplies is a book entry only, and is not funded.

4.15.4 Creation/Acquisition/Augmentation Plan

There are no new works planned for Putorino Rural.

4.16 Bulls Wastewater

4.16.1 Background Data

The Bulls wastewater scheme was installed in three stages from 1974 to overcome concerns for groundwater pollution caused by septic tank discharges. The Council has also inherited sewer drains installed by the Ministry of Defense for an Air Force housing block.

The Bulls sewer network serves a population of 1800 with 767 connections.

The scheme operates primarily by gravity with one small lift pump station required on a lower river terrace.

The entire community is serviced including a small industrial area including food processing. The town's abattoir runs and maintains its own oxidation pond system. Negotiations are well under way to integrate this system with the public system in the near future. A Bulls wastewater feasibility assessment has been undertaken. The key findings of the assessment were:

- Reduced costs to the community through shared funding of the upgrade and future operating costs.
- Combined scheme is more sustainable long-term with a larger rating base.
- Higher level of risk associated with operating a plant serving two different users with different wastewater characteristics.

The form of upgrading of the Bulls oxidation ponds likely to be required need to be able to reduce the suspended solids concentration, bacteria concentration, ammonia concentration, phosphorous concentration and preferably the total soluble inorganic concentration (SIN).

A full study on the effect of the Bulls wastewater treatment on the water quality of the Rangitikei River was undertaken in March 2011.

The following table describes the resource consent associated with the Bulls Wastewater system.

Table 59: Resource Consents – Bulls Wastewater

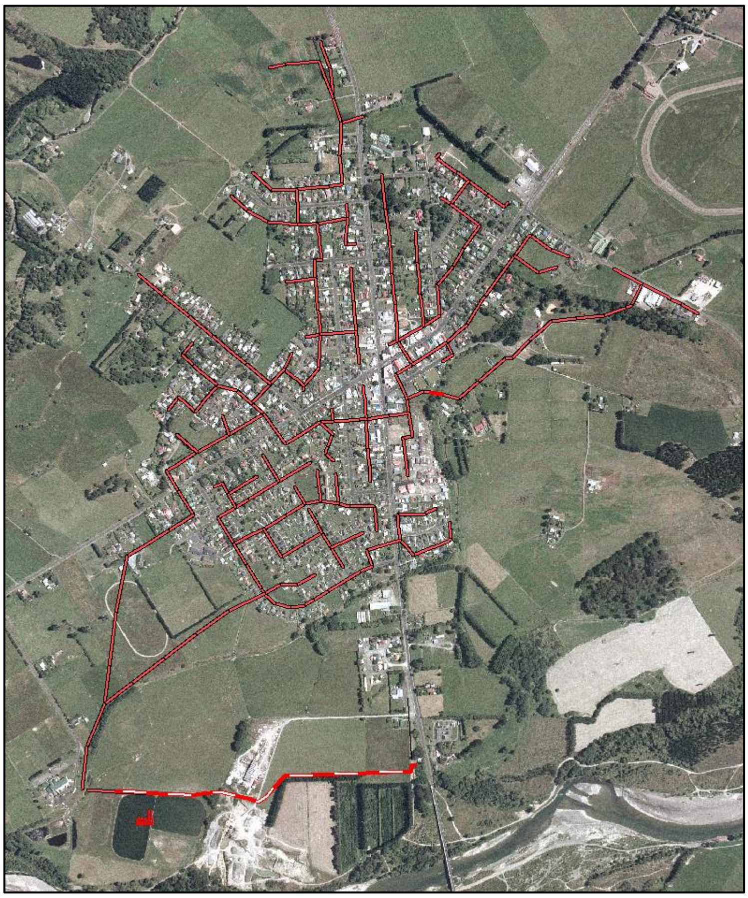
Consent	Consent Number	Expiry Date	Consent Limit	Comments
Discharge	6406	7 Oct 2006	515 m^3/day NH4N < 30 g/m^3 CBOD5 < 12 g/m^3 TSS < 120 g/m^3 *Enterococci* < 2000/100 mL DRP < 10 g/m^3	Discharge from Bulls oxidation pond to Rangitikei River; shall not give rise to negative effects on receiving environment as detailed in consent

There is only one resource consent associated with the Bulls wastewater system and this consent expired during 2006. Prior to expiry of the consent Council applied for renewal of the consent. The discharge from the Bulls oxidation ponds generally has only minor effects after reasonable mixing in the receiving waters of the Rangitikei River and is unlikely to contravene the water quality criteria. However, options to include Ohakea and Sanson into the consent application were considered at the time and complicated the consent process.

Currently the Bulls wastewater treatment plant discharges under existing use rights. The option to include the Ohakea and Sanson systems into the consenting process are no longer considered and the Bulls consent renewal is expected to progress in th near future. Conditions of the new consent is expected to include risk mitigation measures to prevent damage to the Bulls wastewater treatment plant during a flood (1:50 year or greater). Consultation with Regional Council is ongoing, and renewal of the resource consent is in progress. Council is working through consent issues with Horizons, with the New Zealand Defence Force at Ohakea, and with Manawatu District Council. The future of the Bulls wastewater treatment plant, and the extent of any upgrades required, depends on whether wastewater from Ohakea or Sanson is diverted to Bulls for treatment. Either of these scenarios would require upgrades to the Bulls WWTP to maintain the level of treatment currently in place, which would mean collecting financial contributions from the NZDF or MDC. It is anticipated that a consent application will be made before the end of 2014.

The extent of the Bulls scheme can be seen in Figure 74.

Figure 74: Extent of Bulls Wastewater Scheme



Key issues include:

- Improved grazing and weed control around the oxidation ponds is required, especially the outfall.

- The ponds are oversized for the current population. There is an opportunity for a trade waste agreement with Riverlands Meat Processors to accept pre-treated effluent from their adjacent oxidation ponds.
- Large portions of the network are laid across private property causing issues around maintenance access and property subdivision development.
- The pump station is subject to faults that allow overflows to occur.

4.16.1.1 Physical Parameters

The Bulls wastewater network comprises some 16.6 km of pipeline ranging from 100 to 375 mm in diameter. The scheme is relatively young with an age of less than 40 years. The majority pipe material is asbestos cement, which has exhibited accelerated deterioration in other communities. However there is very little industrial waste in the township and the expected remaining life for this material is expected to be longer than elsewhere.

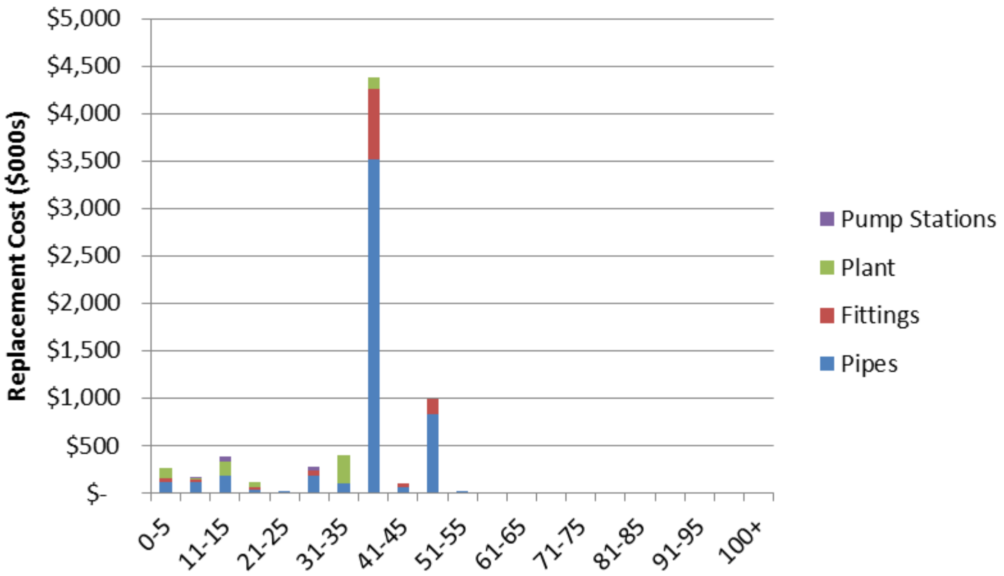
Background data relating to the Bulls wastewater scheme are given in Table 60. The Riverlands plant has its own wastewater system, and is not included in the figures below.

Table 60: Background Data – Bulls Wastewater

Asset Type	Asset Parameters
Treatment Plant	Mechanical screen Facultative pond (1.978 Ha) Secondary settling pond (1.648 Ha) Capable of treating 515m^3/day (Resource Consent)
Pump Stations	1
Mains	16.6 km total 15.3 km of gravity mains 1.3 km of rising mains
Fittings	211 manholes 1 LHCE
Connections	5.7 km of service lines
Population Connected	1,800

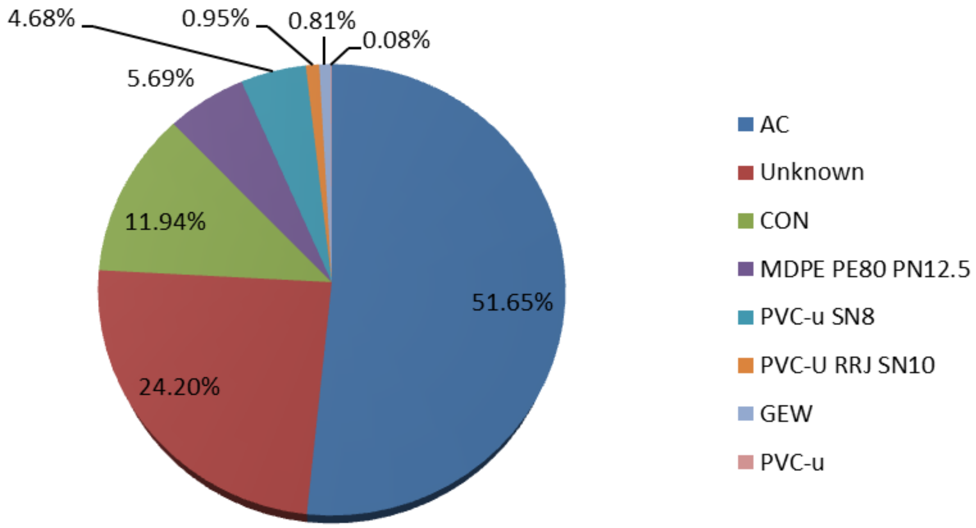
The age profile for Bulls wastewater assets is shown in Figure 75. Most of the infrastructure is around 40 years old.

Figure 75: Asset Age – Bulls Wastewater



The predominant wastewater pipe material in use in Bulls is AC. There is, however, around a quarter of pipes for which the material is unrecorded (Figure 76).

Figure 76: Pipe Material – Bulls Wastewater



The large amount of "unknown" pipe material can be shown to be the lateral connections from private property to the main. It is assumed these would be GEW pipes if they are part of the original construction.

4.16.1.2 Asset Capacity/Performance

The ponds are considered to be oversized for the community and this provides an extra level of security for any possible growth or infiltration. It is considered that there are no undersized assets in this scheme.

There is some evidence from recent CCTV surveys indicating illegal stormwater connections.

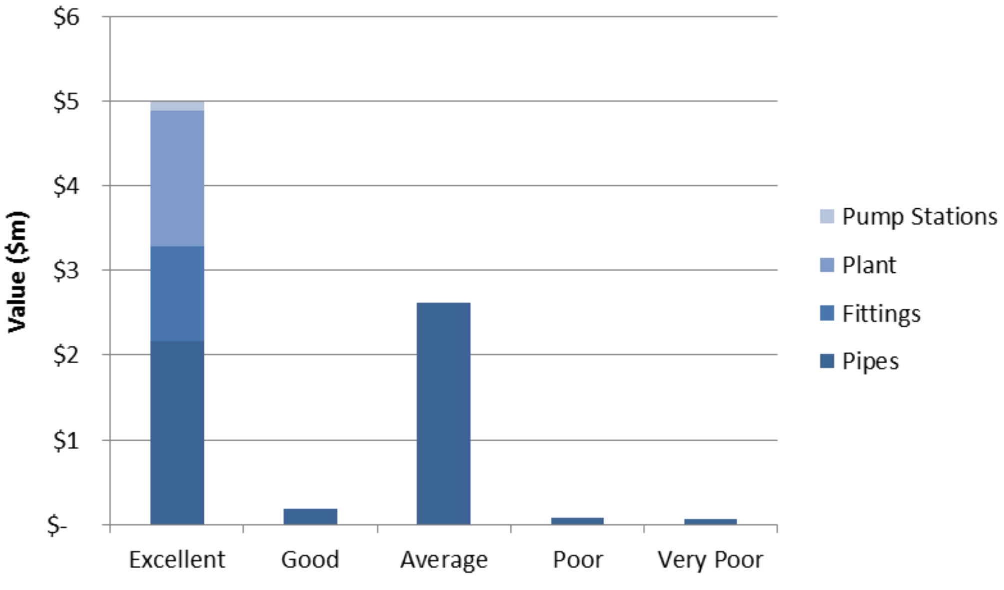
The majority of the network is made of 3 m or 6 m lengths of fibre cement pipes. There are few issues with joint displacements or cracks within the network due to its young age.

Council has identified the need to control the quantity of infiltration and inflows to reticulated systems, including Bulls. This is extremely important in terms of the capacity of the sewerage system. Heavy rainfall flows, far in excess of the normal flows, have been and will be experienced in the sewerage networks from time to time. While the sewerage system has been designed to carry some extra water during storm flow conditions, flows far in excess to non peak flow will lead to low lying access chambers and gully traps in some areas of the sewerage network to overflow. Smoke testing has been found to be more effective that visual inspections alone. I&I investigations have been carried out, and findings will be used to improve network performance.

There are few reticulation failures with the only causes being root intrusion and fat build-ups. These are promptly cleared and the cause investigated and rectified where possible.

The performance of Bulls wastewater assets is shown by Figure 77. Most of the assets have been rated “Excellent”, but there is a significant number which are only “Average”, and some rated even lower. The performance grading for the pipe network is largely determined by the occurrence of infiltration of ground water, tree roots or other sources of restricted flow. Approximately 4% of the network is considered to have poor or very poor performance. Despite much of the reticulation being laid in private property, tree roots are not a major issue.

Figure 77: Asset Performance – Bulls Wastewater



4.16.1.3 Asset Condition

The embankment around the wastewater ponds has been damaged by the failure of the concrete waveband in several locations. The quality of the original concrete waveband is poor and in places the slope of the embankment is such that concrete has moved allowing subsequent erosion of the material behind the band. Some areas have been repaired by filling the voids behind the concrete band with mass concrete. In some of these locations the repair work has not been particularly successful with continuing damage occurring. These observations indicate that the deterioration of the waveband and embankment will continue and in the long term failure of part of the embankment could occur. Remedial options have been considered. Repair of the waveband would only be a short term fix as indicated by other areas already repaired where further damage is occurring. The costs for repair would vary however the costs would be in the order of 20% of replacement costs. Replacement – removal and replacement of the existing concrete waveband would involve removal of the existing waveband, regarding the steeper sections of embankment and reinstatement of the waveband using reinforced concrete.

The mechanical screen is well maintained and in good condition.

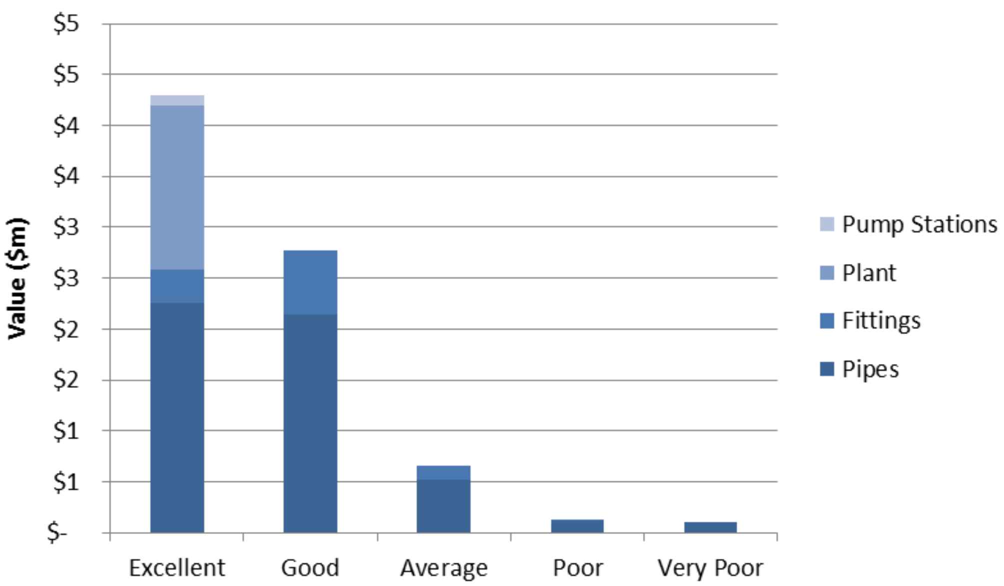
The pump structure is in reasonable condition. The power/control cabinet has been renewed recently to alleviate heat build up and reliability issues. Telemetry systems have a redundant system which can be switched on when the older system fails.

The reticulation is generally in good condition. The only known problem is the build-up of fats in the Air Force housing area. The surface condition of some larger concrete pipes near the treatment plant shows exposed aggregate material suggesting chemical attack.

The bulk of the reticulation was installed in the 1970s. The condition profile is good with less than 5% of the network being in poor or very poor condition.

Asset condition information for Bulls wastewater is shown in Figure 78. Most assets are in either "Excellent" or "Good" condition. Network condition is based on CCTV grading for 4.6 km (30%) of sewer main.

Figure 78: Asset Condition – Bulls Wastewater



4.16.1.4 Asset Valuations

The Bulls wastewater asset values are shown in Table 61.

Table 61: Value by Asset Group – Bulls Wastewater (29 Jan 2015)

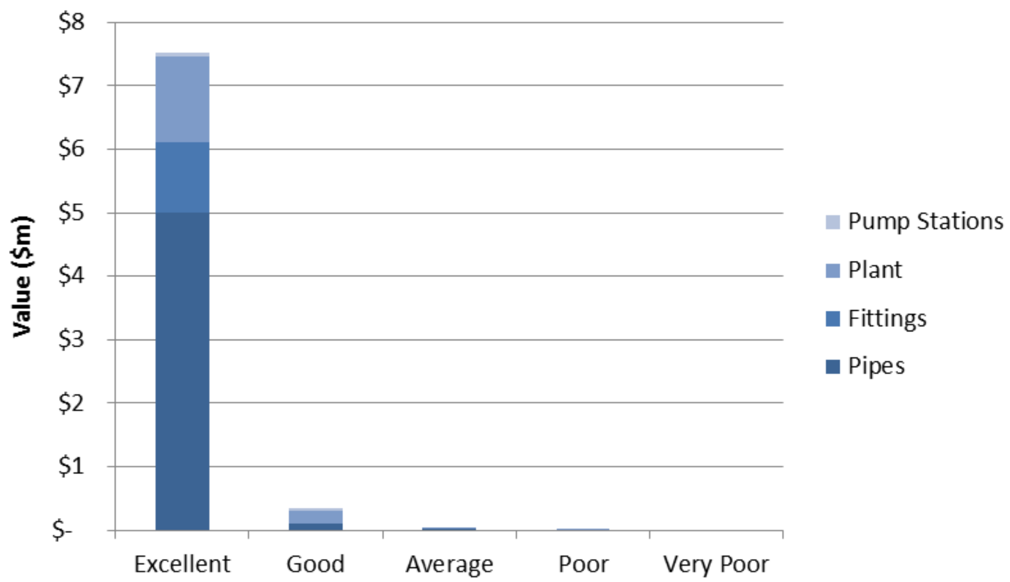
Asset Group	Replacement Cost ($)	Written Down Value ($)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Treatment Plant	1,605,428	1,201,546
Pump Stations	99,541	37,834
Gravity Mains	4,185,925	1,988,822
Rising Mains	77,881	71,748
Manholes	1,106,681	665,417
Service Lines	859,402	627,437
LHCEs	250	160
Service Connections	261,660	139,552

4.16.1.5 Historic Data

Confidence in the asset data held for this wastewater scheme is shown in Figure 79. Confidence in the data is mostly "Excellent". The Bulls wastewater network was mostly constructed in the 1970s when the town moved from individual septic tanks on private properties to a reticulated wastewater system. When this scheme was created, property owners had to connect their septic tanks to the reticulation. Records were sent to the Council by plumbers showing the locations of these connections, and dimensions. These have since been scanned, and the information contained within them uploaded to our asset register.

Figure 79: Data Confidence – Bulls Wastewater



4.16.2 Routine Operations and Maintenance Plan

Only 30% of the public network is laid in the road reserve causing significant problems in monitoring and cleaning of the pipes. The reticulation was laid to connect onto existing septic tanks from the 1970s.

Most of the treatment plant equipment is maintained by local engineering firms, although replacement brushes for the screen are sourced from Italy and require a long lead-time. Sourcing an alternative supplier and stocking replacement inventory will reduce the risk of screen failure.

There have been no significant failures of treatment plant which is of a passive design. Staff have developed a maintenance manual for the treatment plant which specifies the daily, monthly and annual inspections of any mechanical equipment there.

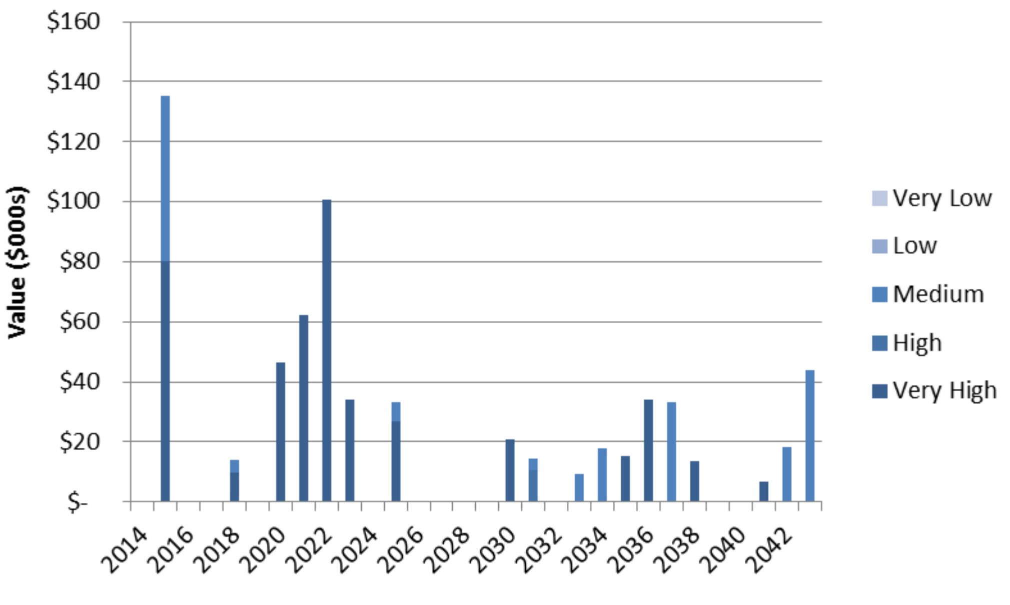
There is no alarm system except for a visible light on the pump station itself. Power outages have caused pump failures and the Council is reliant on the public to notify staff. Failures at the pump station have caused localised overflows at nearby residences. This is unacceptable and measures will be taken to prevent these occurrences.

4.16.3 Renewal/Replacement Plan

The major renewal projects for Bulls wastewater are the upgrade of the WWTP and the renewal of the associated resource consent. As mentioned earlier, Council is working through consent issues with Horizons, with the New Zealand Defence Force at Ohakea, and with Manawatu District Council. It is anticipated that a consent application will be made before the end of 2014. $3 million had been budgeted for this work, but this funding has been carried over while the issue is worked through and a decision is made by Horizons Regional Council on the quality of discharge the plant will be expected to deliver. Following this, the plant can be designed and built.

The renewal forecast for the next 30 years is shown in Figure 80. The largest amount of annual expenditure is forecast for 2015, when more than $130,000 worth of renewals are forecast. This information should be confirmed by assessments of condition and performance, before renewals are programmed.

Figure 80: Renewal Forecast by Criticality – Bulls Wastewater



4.16.4 Creation/Acquisition/Augmentation Plan

There is a $100,000 project underway to construct a caravan waste dump station near the reservoir. There are no other new works planned for Bulls at this stage.

4.17 Hunterville Wastewater

4.17.1 Background Data

Hunterville is a small town in the Rangitikei District and located on SH1 about 40 kilometres north of Bulls. The town has a population of approximately 450 people and is mainly a support town for the rural community in the area. The wastewater net work comprises largely earthenware pipe that were installed around 1910. The reticulation operates exclusively by gravity flow.

Sewage from Hunterville is treated in primary and secondary oxidation ponds that are located between State Highway 1 and the Porewa Stream, and approximately 500 metres south of Hunterville. The plant was constructed in 1977 and replaced the community septic tank. The ponds were commissioned in March 1978 and design and constructional requirements were as per the Ministry of Works and Development, 'Guideline for the Design, Construction and Operation of Oxidation Ponds'. Treated effluent is discharged via an open drain to the Porewa Stream under conditions set by resource consent.

The floating media at the Hunterville WWTP is shown in Figure 81.

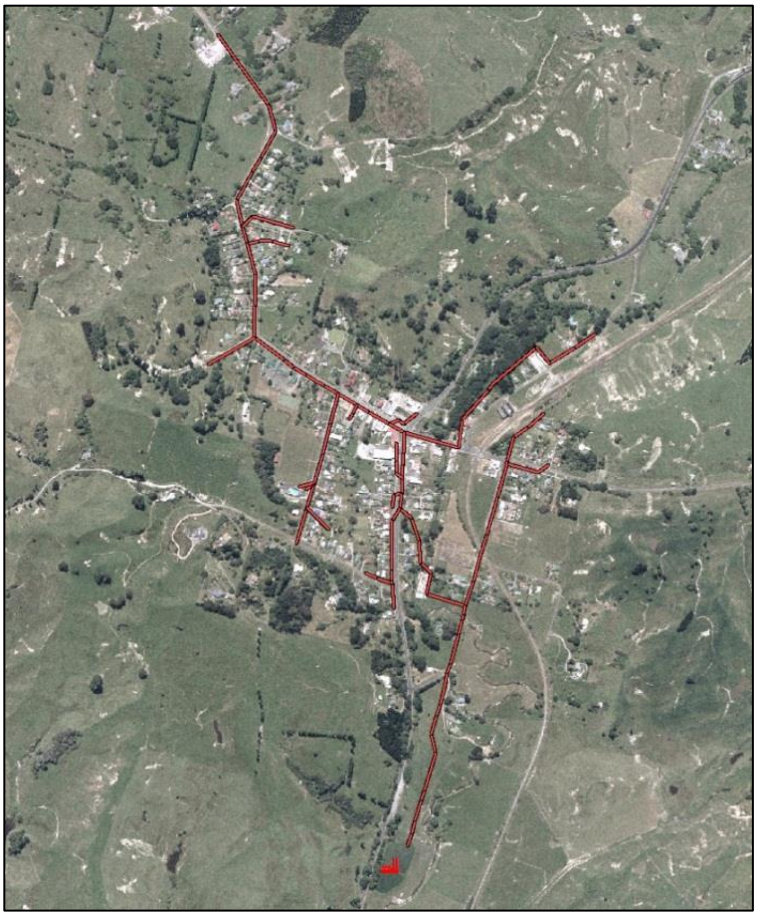
Figure 81: Hunterville WWTP

The Rangitikei District Council applied for renewal of Discharge Permit (7079) to continue discharge treated sewage from the Hunterville oxidation ponds into the Porewa Stream for a term of 24 years at a rate of up to 250 m^3/day. Discharge Permits 105833/4/5 permitted Rangitikei District Council to discharge treated sewage from the Hunterville oxidation ponds into the Porewa Stream for a term expiring on 1 July 2037.

A report on the Water Quality of the Porewa Stream at the Sewage Treatment Ponds in Hunterville was completed in July 2008. An Assessment of Environmental Effects (AEE) report for the proposed effluent treatment upgrade was completed in May 2011 and lodged together with the resource consent applications 105833, 105834 and 105835 in May 2011.

The extent of the area served by the Hunterville wastewater scheme can be seen in Figure 82.

Figure 82: Extent of Hunterville Wastewater Scheme



Key issues for Hunterville wastewater are:

- The system is old and there is significant infiltration and inflow.
- The remainder of the network is PVC pipe laid in the mid 1990s. It is in good condition and is not expected to require maintenance in the near future.
- The oxidation pond is undersized for the current demand, even without infiltration or inflow considerations.

The following table lists the resource consents associated with the Hunterville Wastewater system.

Table 62: Resource Consents – Hunterville Wastewater

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Discharge to Water	105833	1 Jul 2037	250 m^3/day Max. 7 L/s Avg. 3 L/s $scBOD_5 < 2$ g/m^3 TSS < 26 g/m^3 NH_4-N < 3 g/m^3 DRP < 0.010 g/m^3 *E. coli* < 260/100 mL DO ≥ 2 mg/L	Discharge to land that enters Porewa Stream; shall not give rise to negative effects on receiving environment as detailed in consent
Discharge to Land	105834	1 Jul 2037	N/A	Discharge to land via pond seepage
Land Use	105835	1 Jul 2037	N/A	Construction of rock outfall within Porewa Stream bed; no instream works between 1 May and 31 December of any year

4.17.1.1 Physical Parameters

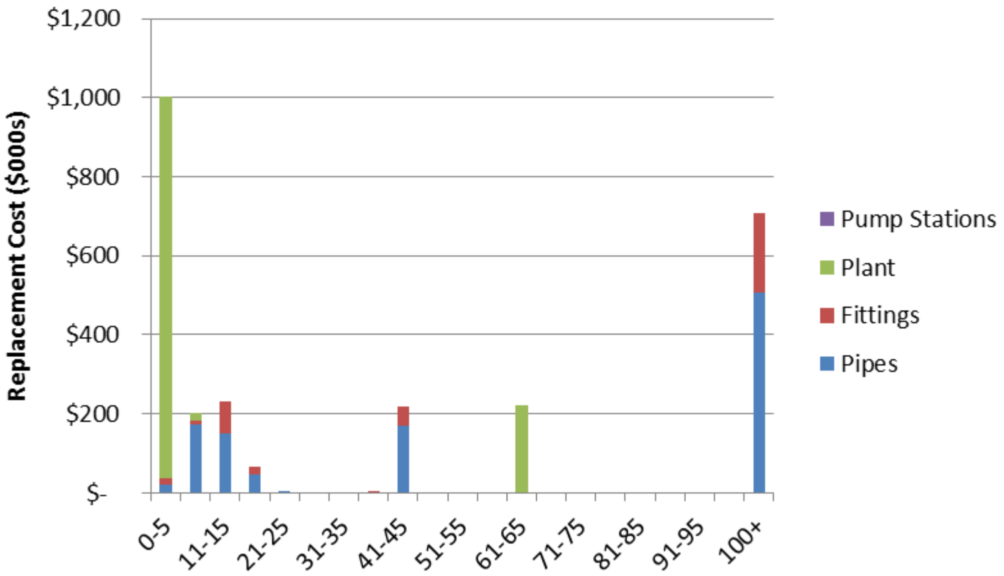
Background data for the wastewater system in Hunterville follows. Graphs of pipe age and material are also given. 50% of the reticulation was installed in the 1910s, and is now around 100 years old.

Table 63: Background Data – Hunterville Wastewater

Asset Type	Asset Parameters
Treatment Plant	2 primary treatment ponds totaling 0.853 ha Flow Meter
Mains	5.5 km of gravity mains
Fittings	76 manholes 3 LHCEs 5 inspection points
Connections	0.2 km of service lines
Population Connected	444

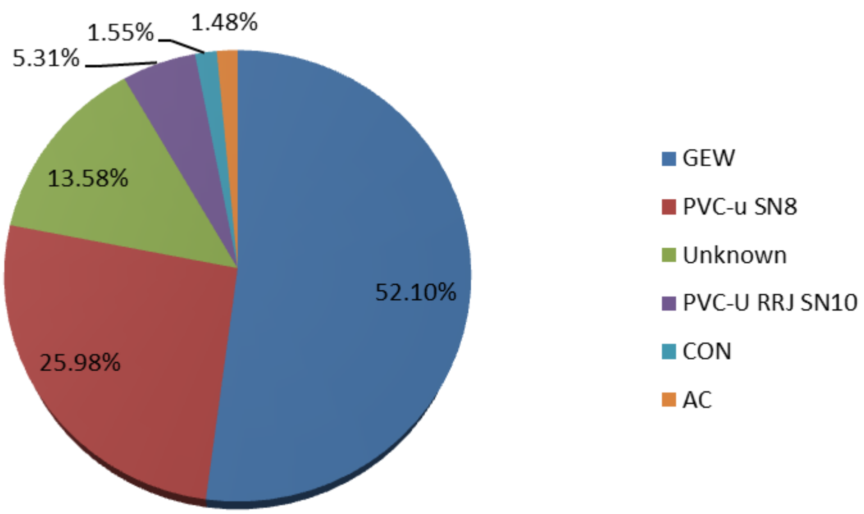
Figure 83 shows the age profile of Hunterville wastewater assets. Most treatment plant assets are less than 5 years old. However, most of the pipes and fittings are greater than 100 years old.

Figure 83: Asset Age – Hunterville Wastewater



Because of the age of the infrastructure, most pipes on the Hunterville wastewater scheme are constructed from glazed earthenware. There is a substantial amount of newer, plastic pipe however (as seen in Figure 84).

Figure 84: Pipe Material – Hunterville Wastewater



4.17.1.2 Asset Capacity/Performance

A CCTV survey in 2007 has provided good condition and performance ratings for the reticulation. This confirms that much of the original pipework from 1910-1930 is subject to infiltration. During wet weather this overwhelms the ability of the oxidation ponds to provide proper treatment. Heavy rainfall flows, far in excess of the normal flows, have been and will be experienced in the sewerage networks from time to time. While the sewerage system has been designed to carry some extra water during storm flow conditions, flows far in excess to non peak flow will lead to low lying access chambers and gully traps in some areas of the sewerage network to overflow. Council has identified the need to control the quantity of infiltration and inflows (I&I) to reticulated systems, including Hunterville. This is extremely important in terms of the capacity of the sewerage system. These I&I issues can lead to emergency discharges of wastewater occurring from the treatment plant during winter. Upgrade work to the plant is planned to prevent this occurring, and ongoing I&I investigations will contribute to solving this problem.

Hunterville is a town with a decreasing population; however with the significant inflows there is a need to upgrade the capacity of the treatment process.

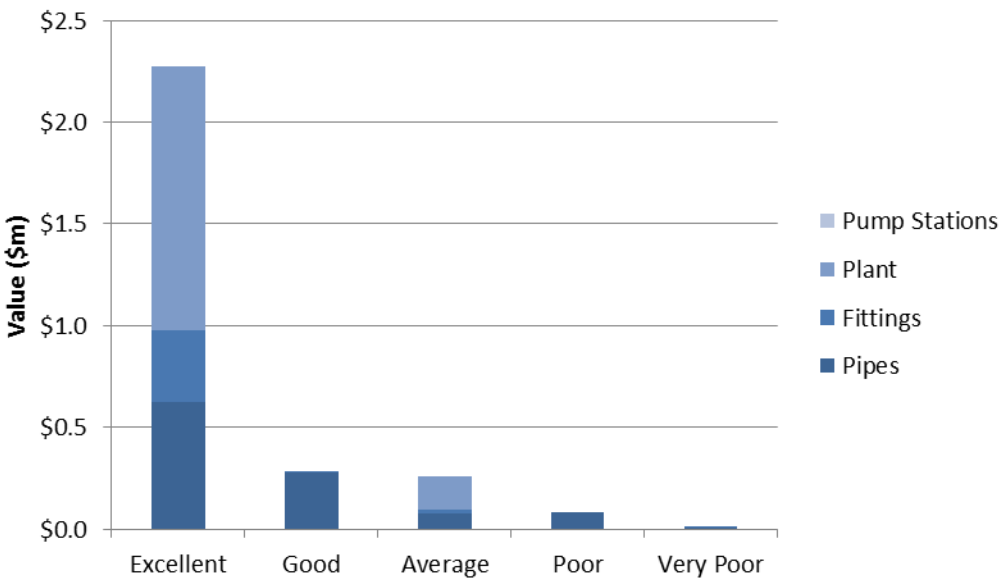
There are several cases of reticulation failure each year. These primarily occur in the older sections of pipe. They are promptly cleared and the cause investigated and rectified where possible.

There have been no significant failures of the network or treatment plant.

The system has had a power supply installed at the oxidation ponds to allow flow monitoring, in anticipation of new resource consent requirements for additional telemetry controls.

The performance of Hunterville wastewater assets is rated in Figure 85. Mostly, the asset performance is considered “Excellent”.

Figure 85: Asset Performance – Hunterville Wastewater



4.17.1.3 Asset Condition

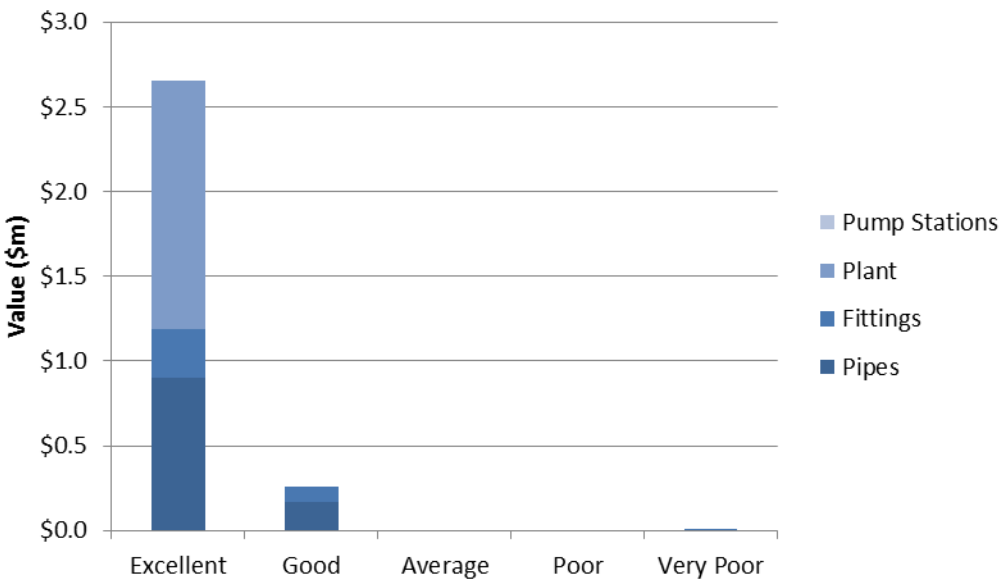
The system consists of two primary treatment ponds, with an outflow to the Porewa Stream. The site is generally in good condition, with no requirement for major renewals, although a formal review of the condition has not been undertaken.

A large proportion of the network (30%) is still the original earthenware pipe laid in the 1910-1930 period and is generally in very poor condition. It is nearing the end of its service life. There is a considerable infiltration problem due to the poor condition of the older pipes in the system.

A section of pipe was laid in the 1970s by a Government work scheme crew and has previously been reported as being of poor condition. This section used second-hand materials and an unskilled workforce. A survey carried out in 2007 showed that the pipeline has an average condition and will not require renewal within the 20-year timeframe of this report. However, its condition should be regularly monitored due to its criticality ,with regular jetting. Its renewal may be triggered by performance factors.

The condition of our wastewater assets in Hunterville is mostly “Excellent”, with a number rated “Good” and few assets rated lower than this.

Figure 86: Asset Condition – Hunterville Wastewater



4.17.1.4 Asset Valuations

Hunterville’s wastewater asset valuation is shown in Table 64.

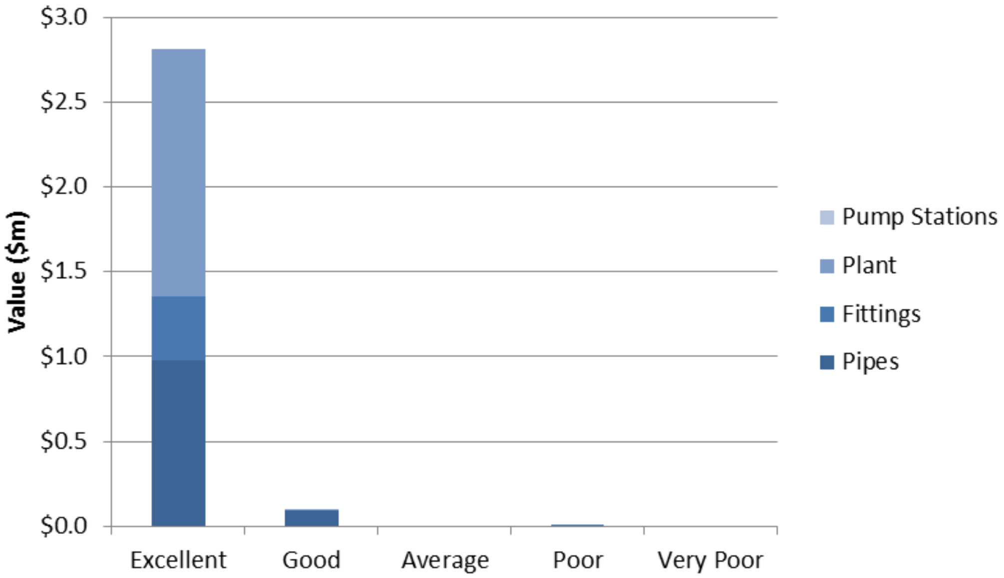
Table 64: Value by Asset Group – Hunterville Wastewater (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Treatment Plant	1,466,459	1,193,698
Gravity Mains	1,034,380	464,752
Manholes	375,588	141,010
Service Lines	37,494	22,576
LHCEs	750	675
Inspection Points	1,250	891
Service Connections	221,759	35,482

4.17.1.5 Historic Data

In general, the confidence in our data for Hunterville wastewater has been rated "Excellent". See Figure 87. Data on the WWTP is good, as it is for other WWTPs, although some of it is aggregated and has not been broken down to component level.

Figure 87: Data Confidence – Hunterville Wastewater



4.17.2 Routine Operations and Maintenance Plan

Minor blockages are dealt with by staff as they occur. Blockages are recorded in GIS, which affect the pipe's historical performance score.

There is a 360 m section of 150 mm pipe with moderate criticality that runs through private property and includes a stream crossing. Due to the environmental sensitivity of the area it should be regularly jetted to reduce the risk of overflows. However its location makes this difficult.

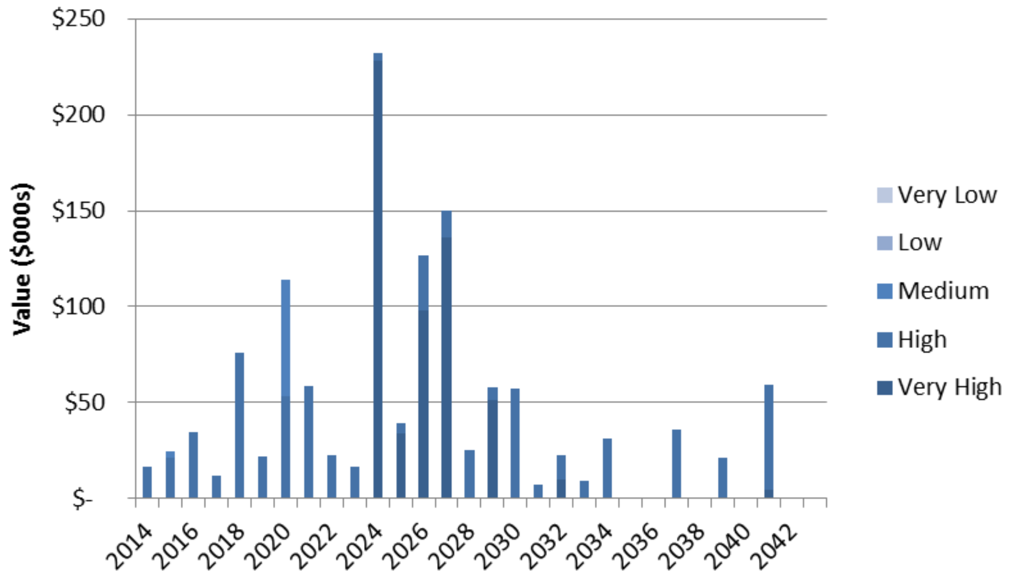
General hazards associated with working in confined spaces and handling biohazardous materials are present. There are no specific safety hazards identified.

4.17.3 Renewal/Replacement Plan

The only renewal required for Hunterville wastewater in the medium term is along Ongo Road (No. 12 to 18), which is expected to cost $50,000.

The projected renewal work for Hunterville wastewater over the 30 year term of this Plan is shown in Figure 88.

Figure 88: Renewal Forecast by Criticality – Hunterville Wastewater



4.17.4 Creation/Acquisition/Augmentation Plan

There are no new works planned for the wastewater system in Hunterville at this stage.

4.18 Koitiata Wastewater

4.18.1 Background Data

Koitiata is a small beachside community with a mainly seasonal population. The wastewater scheme is small and usually operates well below design capacity. The Koitiata sewer network serves a limited population with 17 connections. The community has a total seasonal population of between 100 and 250 people.

The Koitiata wastewater scheme was installed in 1986 when the Council built a new subdivision. The scheme serves only this subdivision and the camping grounds ablution block. The wastewater drains by gravity to a pump station outside the camping grounds and is then pumped to the oxidation lagoon. The effluent is then discharged by way of evaporation, but does have an overflow pipe.

Originally there was no resource consent, but on 21 November 2011 Resource Consents 105079 and 106028 were granted authorising (a)the discharge of pond treated wastewater into an oxidation pond and then into and onto land; and (b) the land disturbance of threatened habitat associated with the construction of the land disposal area and upgrade of the treatment system.

Figure 89 shows the extent of the Koitiata wastewater scheme.

Figure 89: Extent of Koitiata Wastewater Scheme

The key issues relating to the scheme are:

- This scheme has been built for the subdivision that it serves and cannot be added to without considerable investment by Council.
- Koitiata is seen as an area of potential growth. Properties with old septic tanks may be refused to replace them when they fail.
- The pumping line may be subject to vehicle damage in the soft sand country.
- Work is required to fully comply with consent conditions.

There are issues around the disposal of treated wastewater from the existing pond. Council is working with Horizons and affected parties to develop a solution to these issues that is environmentally, culturally and economically sustainable. This solution will address the potential of future additional connections to the scheme. Plans have been submitted to Horizons for a proposal to discharge to land. It is proposed that the discharge from the Koitiata pond would require a maximum area of 2500 m^2 for disposal via ground soakage. It is also proposed that the existing discharge pipe be replaced with a siphon chamber which fills with treated wastewater and then empties by being diffused through a filter system over the discharge area at a rate set so as not to exceed 5 $mm/m^2/day$.

The following table lists the resource consents associated with the Koitiata Wastewater system.

Table 65: Resource Consents – Koitiata Wastewater

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Discharge to Land	105079	1 Jul 2024	16.2 m^3/day (based on inflow) Discharge area ≥ 940 m^2	Discharge from oxidation pond to land
Land Use	106028	1 Jul 2024	N/A	Construction of land disposal area

A key issue arisen since 1 July 2009 is the compliance issues of the majority of the septic tanks in Koitiata. Regardless of the material of construction, a septic tank must be watertight and structurally sound to protect the environment and function properly. At Koitiata extraneous groundwater entering non-watertight septic tanks has in some cases resulted in:

- The hydraulic overloading of the leach-fields, also ultimately leading to the surfacing of the effluent.
- The disruption of the anaerobic digestion process going on within the tank.
- The severe hydraulic overloading of downstream treatment processes, such as intermittent and re-circulating packed bed filters.

As part of its Long Term Planning process, Council will investigate the provision of a reticulated wastewater system at Koitiata, in consultation with the community. We have allowed $130,00 in the 2015-2016 financial year to investigate options for a reticulated system for the entire community. $2,000,000 has been flagged for 2017-2018 for potential construction of such a system. The 2012 Long Term Plan flagged a project the installation of a pressure sewer system with grinder pumps. The cost for such a system was estimated at $1,000,000. Whether this is the selected option will depend on the investigation mentioned above.

4.18.1.1 Physical Parameters

The Koitiata wastewater network comprises 300 m of 150 mm PVC pipeline. The scheme is only 25 years old. No CCTV has been conducted at Koitiata as there have been no faults reported, and the system is new.

Background data for Koitiata wastewater are given in Table 66.

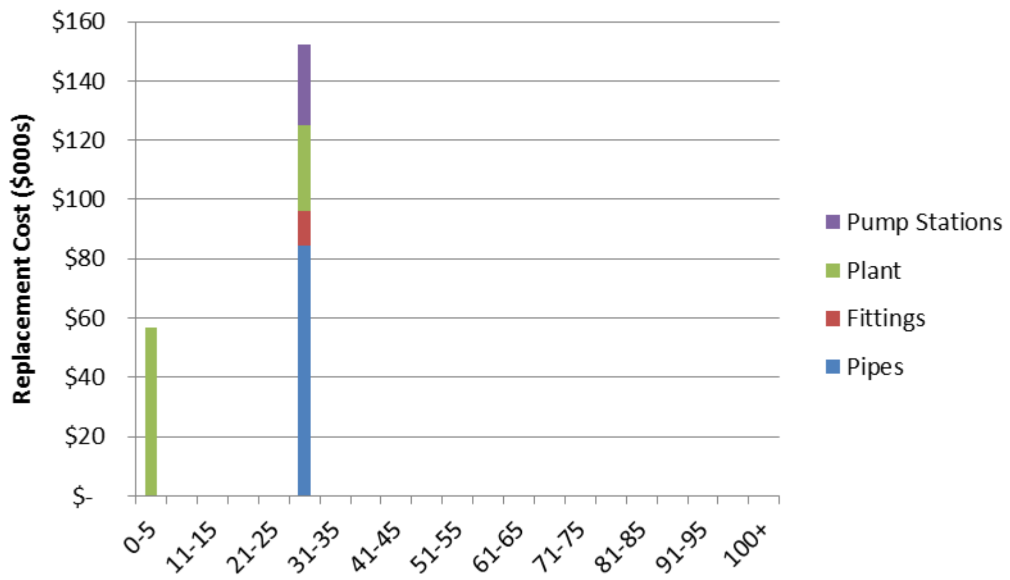
Table 66: Background Data – Koitiata Wastewater

Asset Type	Asset Parameters
Treatment Plant	Facultative Pond with butenyl liner (0.048 Ha)
Pump Stations	1

Asset Type	Asset Parameters
Mains	0.9 km total 0.3 km of gravity mains 0.6 km of rising mains
Fittings	4 manholes
Connections	17
Population Connected	Maximum capacity 58 (single subdivision)

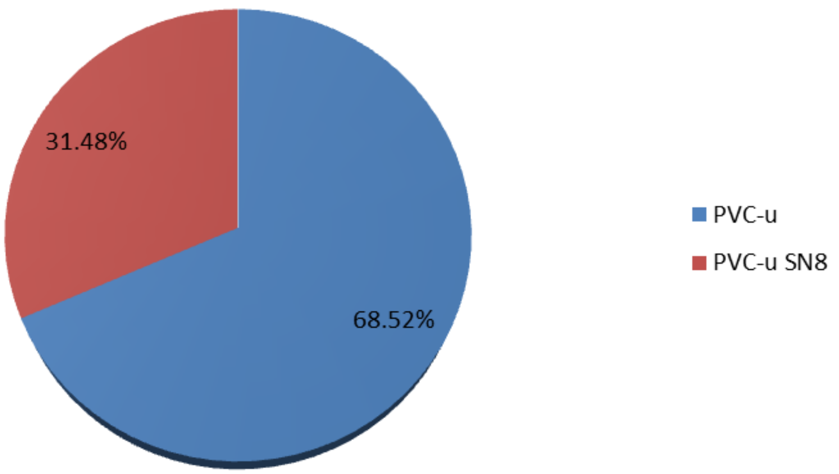
The age profile of the assets for Koitiata is given in Figure 90. Most of the infrastructure is around 30 years old, with some newer treatment plant assets in the mix.

Figure 90: Asset Age – Koitiata Wastewater



Being relatively new reticulation, all Koitiata wastewater pipes are constructed from uPVC (see Figure 91).

Figure 91: Pipe Material – Koitiata Wastewater



4.18.1.2 Asset Capacity/Performance

Currently the system fails to meet the objective of preventing pollution of the environment. The fact that the system does not extend to all properties in the village indicates a failure to provide to all within the 'urban area'.

The pond itself is 625 m^2 with a volume of 812.5m^3. The plant is designed to only cope with the original 17 properties in the subdivision. Maximum loading for the pond is 58 persons. The census data indicates a usually resident population of 93 and a total of 125 properties. This would rise seasonally to well over 250 people. There is pressure from other residents to connect to the system to satisfy infill housing or new subdivisions. It is suspected that some non-approved connections have been installed by local residents.

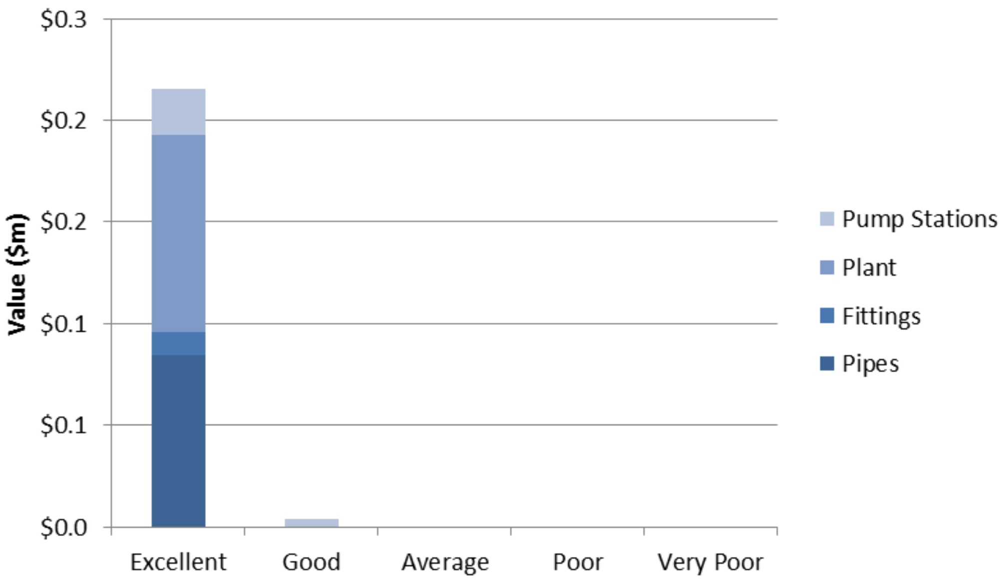
A Koitiata Oxidation Pond Assessment of Environmental Effects (AEE) was prepared for the Rangitikei District Council in October 2008. In 2009 Council was notified by the Regional Council that Koitiata did not have a valid resource consent to discharge sewage into the surrounding sand dunes. It was requested to abate and invest in a new treatment facility as soon as possible. Regional Council requires the community to improve the quality of effluent treatment from the oxidation pond. A concept design for a sub-surface irrigation scheme has been accepted by Horizons as the appropriate solution.

There are no issues with I&I. There are no overflows, blockages or pump failures reported.

The pumping line is buried in sand country, and may be exposed to vehicular damage as it is laid adjacent to a forestry track.

Asset performance ratings are shown in Figure 92. The performance of the Koitiata wastewater assets is almost exclusively "Excellent".

Figure 92: Asset Performance – Koitiata Wastewater



4.18.1.3 Asset Condition

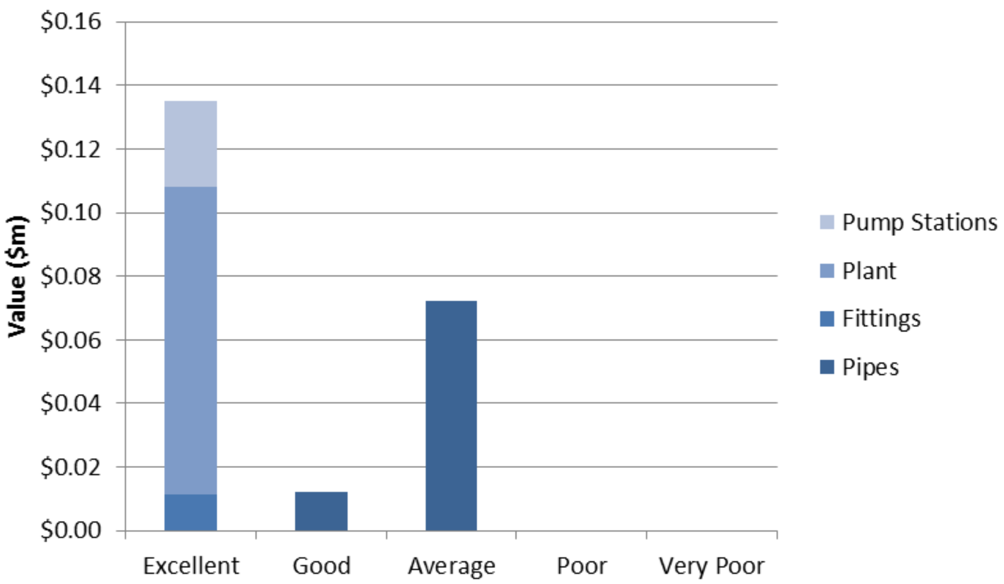
The lagoon is in good condition and shows no condition-related problems. The liner is in excellent condition.

There are no problems experienced with the pipe network or the rising main, as could be expected of a system of this age and materials. No CCTV surveys have been carried out in this area due to the low probability of such a recent network needing work.

The pump should be assessed for condition and replaced if required.

The overall condition of wastewater assets here is shown in Figure 93. Most of the assets are in "Excellent" condition, but around $70,000 worth are in only "Average" condition.

Figure 93: Asset Condition – Koitiata Wastewater



4.18.1.4 Asset Valuations

A breakdown of the current valuation for the Koitiata wastewater scheme is given in Table 67.

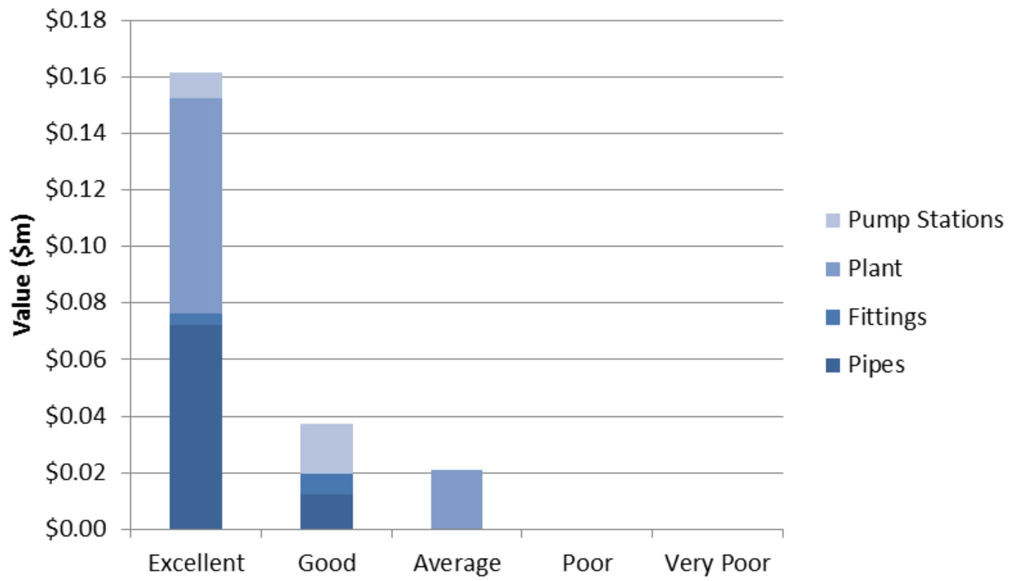
Table 67: Value by Asset Group – Koitiata Wastewater (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Treatment Plant	96,708	76,930
Pump Stations	27,025	8,068
Gravity Mains	53,319	35,682
Rising Mains	31,045	18,992
Manholes	11,527	8,299

4.18.1.5 Historic Data

Koitiata is a small and simple wastewater system. Good information is held on the reticulation, the wet well and the treatment facilities. Figure 94 shows the confidence in data held for Koitiata wastewater. Mostly, the data is “Excellent” or “Good”, but some data for the treatment plant is only “Average”.

Figure 94: Data Confidence – Koitiata Wastewater



4.18.2 Routine Operations and Maintenance Plan

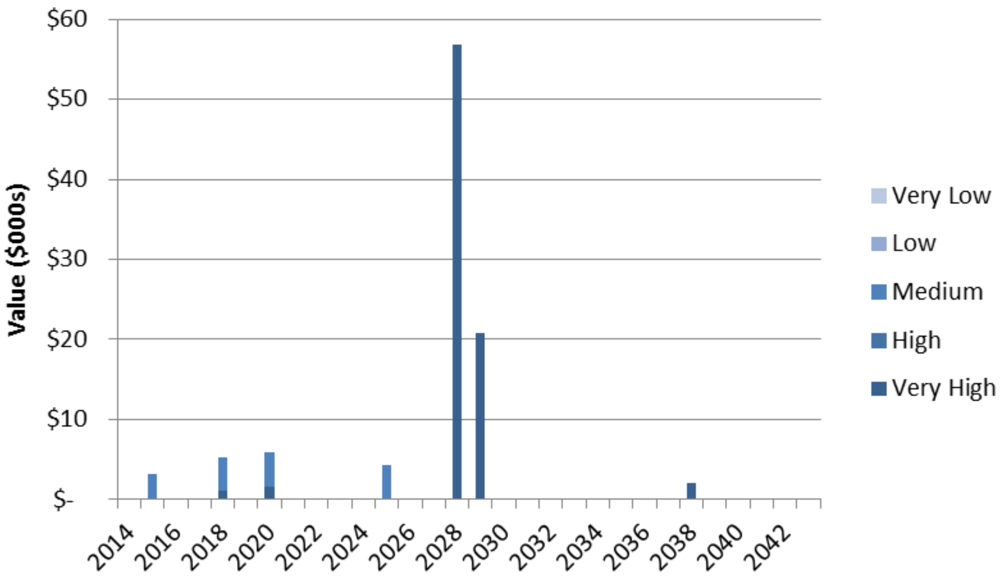
There have been no significant failures of treatment plant which is of a passive design.

There is only a flashing light to notify Council staff when the pump fails; usually notification is reliant upon residents. The oxidation pond should be better secured from the public by adequate fencing.

4.18.3 Renewal/Replacement Plan

The renewal forecast for Koitiata is shown in Figure 95, along with an indication of the criticality of proposed assets to be renewed. The largest renewal expenditure forecast for the scheme is for almost $60,000 in 2028.

Figure 95: Renewal Forecast by Criticality – Koitiata Wastewater



4.18.4 Creation/Acquisition/Augmentation Plan

There are no plans to improve service levels or extend the system to other properties at this time.

4.19 Mangaweka Wastewater

4.19.1 Background Data

The Mangaweka wastewater scheme was established in 1910 as reticulated pipe network directing effluent to a community septic tank. The effluent from this tank discharged directly into the Rangitikei River. In 2006 a new treatment plant was commissioned for the community after public consultation. This provides a much higher quality effluent to meet the new resource consent conditions.

The reticulation does not service all properties within the town: properties on Raumaewa Road, Cage Road, Weka Street and the south end of Mangawharariki Road (SH1) are not serviced. A separate waste disposal system operates at the Mangaweka Campground, but is not evaluated in this Asset Management Plan.

The extent of the Mangaweka wastewater system is shown in Figure 96.

Figure 96: Extent of Mangaweka Wastewater Scheme

Key issues at Mangaweka:

- Much of the old earthenware system is prone to infiltration.
- Some stormwater inflow is suspected to come from private property.
- Some pipes cross underneath the State Highway or through private property, which makes renewal or repairs more difficult.

The following table lists the resource consents associated with the Mangaweka wastewater system.

Table 68: Resource Consents – Mangaweka Wastewater

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Discharge to Water	101726	19 Mar 2024	90 m3/day 20 m3/h	Discharge to Mangatera Stream

4.19.1.1 Physical Parameters

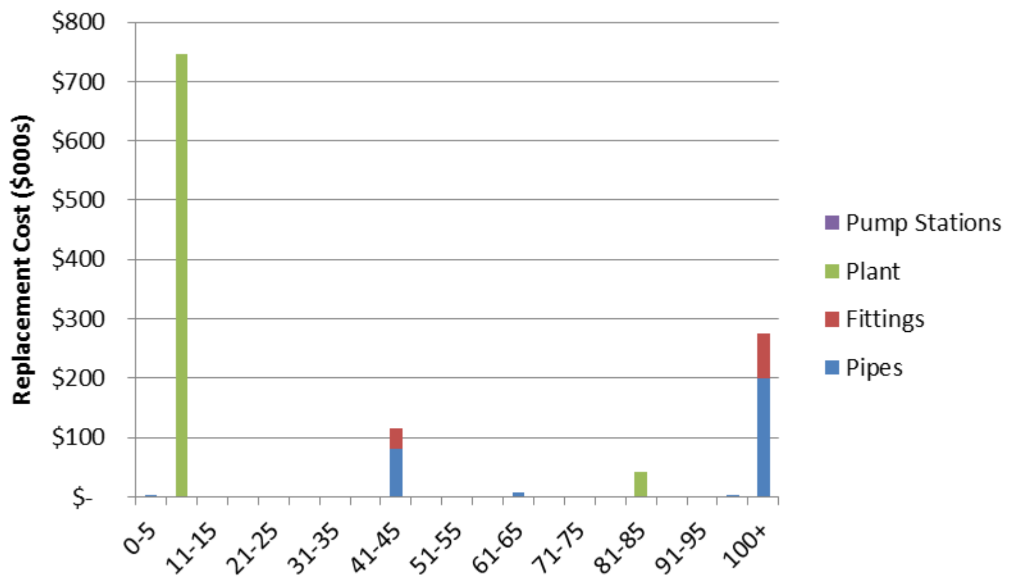
Background data for the Mangaweka wastewater scheme is given in the following table.

Table 69: Background Data – Mangaweka Wastewater

Asset Type	Asset Parameters
Treatment Plant	2 x 70m³ community septic tanks in series 4 x Orenco Bio Tube Filters AdvanTex™ Recirculating Textile Packed Bed Reactor 70m³ recirculation tank Open channel UV disinfection Rock Filter 10m3/hr flow rate
Pump Stations	1
Mains	1.6 km of gravity mains
Fittings	22 manholes 1 LHCE 1 inspection point
Connections	0.1 km of service lines
Population Connected	Approx. 60% of resident population of 250

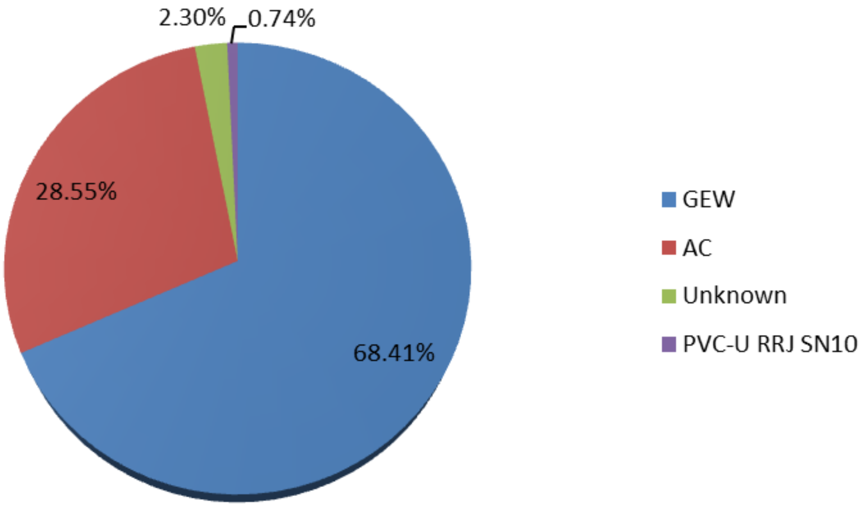
The age profile for Mangaweka wastewater is shown in Figure 97. Assets associated with the treatment plant are mostly new (less than 10 years old), but a substantial proportion of the pipes and fittings are more than 100 years old.

Figure 97: Asset Age – Mangaweka Wastewater



There are mostly two materials found in wastewater pipe assets in Mangaweka: glazed earthenware and AC (Figure 98).

Figure 98: Pipe Material – Mangaweka Wastewater



4.19.1.2 Asset Capacity/Performance

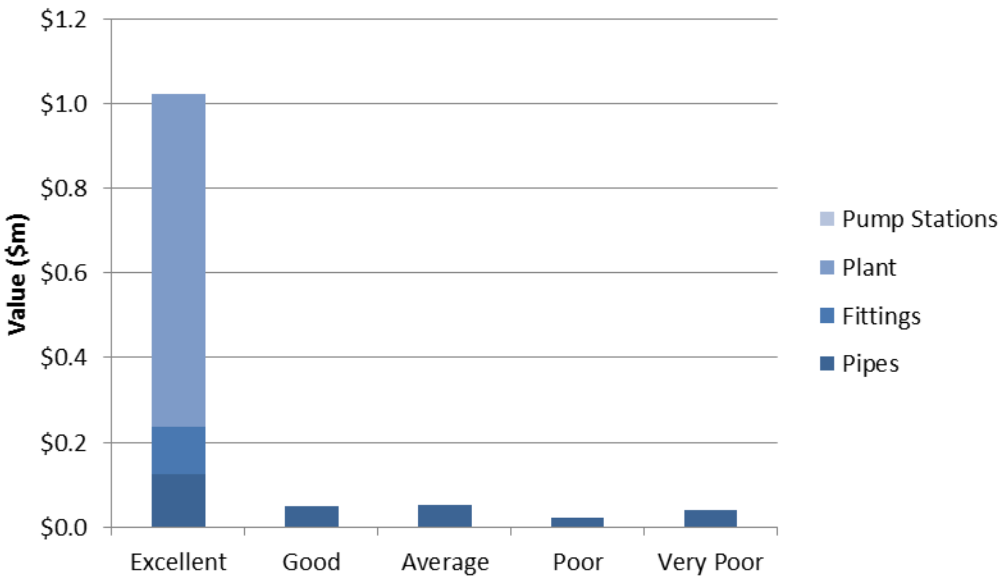
Since the original commissioning in 2005-2006 there have been no operational problems with the system, which has a fully documented maintenance manual. The rock filter is installed as a requirement of the resource consent, but does not contribute to the overall effluent quality.

A study to remove the most significant inflows from stormwater connections was carried out in 2005 as part of the new treatment plant design process. It is believed that some inflow sources remain. The original earthenware pipes are known to have some groundwater infiltration but not to a large extent.

There are no known issues around reliability.

The performance of the assets for Mangaweka wastewater is shown in Figure 99. The performance of most assets is “Excellent”.

Figure 99: Asset Performance – Mangaweka Wastewater



4.19.1.3 Asset Condition

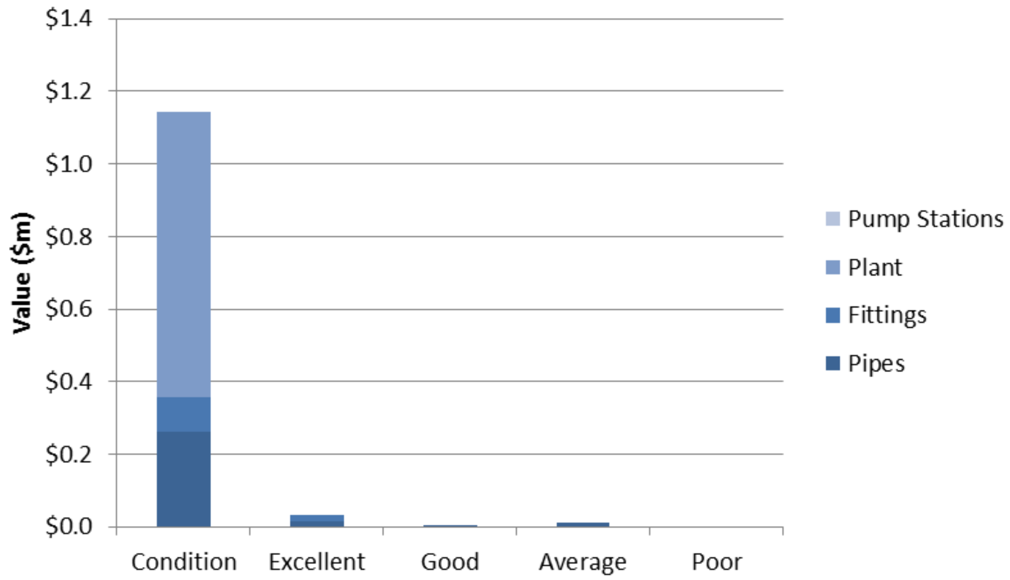
The three-stage treatment plant was installed in 2005, and is in excellent condition. The original septic tank is still retained as an emergency overflow tank, but is considered in poor to very poor condition. The system comprises of primary septic tanks, with effluent being filtered and treated in a recirculating packed bed reactor. Tertiary treatment is by way of UV disinfection and rock filter before discharge over the Rangitikei River bluff to the river below.

The original sewer dates back to the early 1900's when the town was a significant railway town.

Condition of pipes is based on CCTV surveys carried out in 2007. The condition profile for the network is markedly skewed with the majority of pipe work either in very good condition or very poor condition. This would indicate a backlog of deferred renewals with half of the pipes targeted for renewal in the first 10 years of this plan.

The condition of Mangaweka wastewater assets is mostly rated as "Excellent" (see Figure 100).

Figure 100: Asset Condition – Mangaweka Wastewater



4.19.1.4 Asset Valuations

The value of each asset group in the Mangaweka wastewater scheme is shown in Table 70.

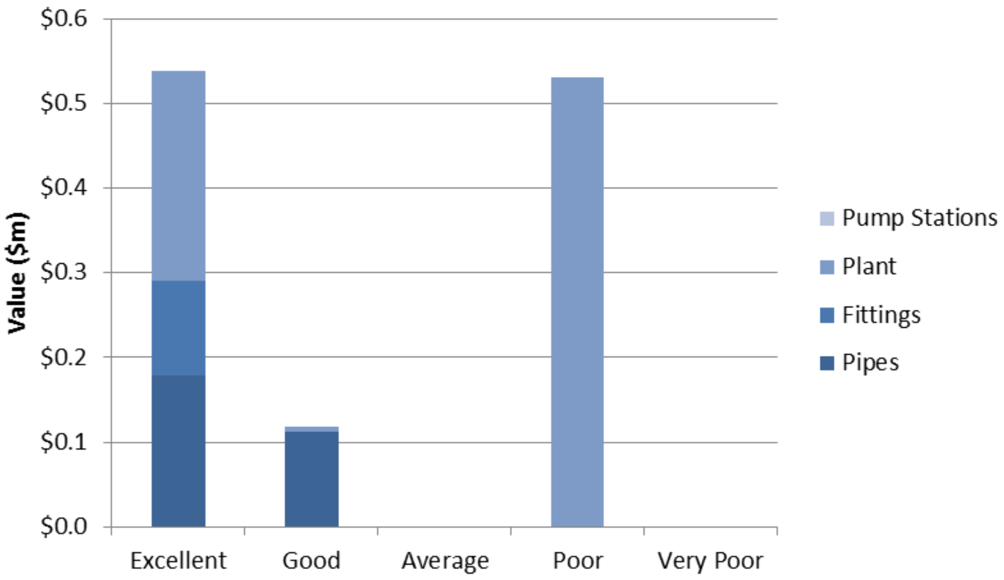
Table 70: Value by Asset Group – Mangaweka Wastewater (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Treatment Plant	785,983	544,685
Gravity Mains	278,501	44,932
Manholes	111,801	22,938
Service Lines	11,346	5,419
LHCEs	250	16
Inspection Points	250	234
Service Connections	41,413	1,038

4.19.1.5 Historic Data

Data confidence for Mangaweka wastewater has been assessed, and is reported in Figure 101. Confidence in treatment plant data is mostly “Poor”. The scheme in general is very old, much of it dating from the 1890s. Relatively speaking, there have been few maintenance issues with the system. For this reason, the assets have not been inspected as frequently as assets on our other wastewater schemes, and information is lacking. The system has, however, had CCTV work done on its entirety, and these records have been captured.

Figure 101: Data Confidence – Mangaweka Wastewater



4.19.2 Routine Operations and Maintenance Plan

The treatment plant is a modern packaged treatment plant with good support from the manufacturers. A small section of the reticulation is laid through a private property and should be realigned to the State Highway road reserve in conjunction with parallel water main realignment.

There have been no significant failures of the network or treatment plant. Minor blockages are dealt with by staff as they occur. Blockages are recorded in GIS, which affect the pipe's historical performance score.

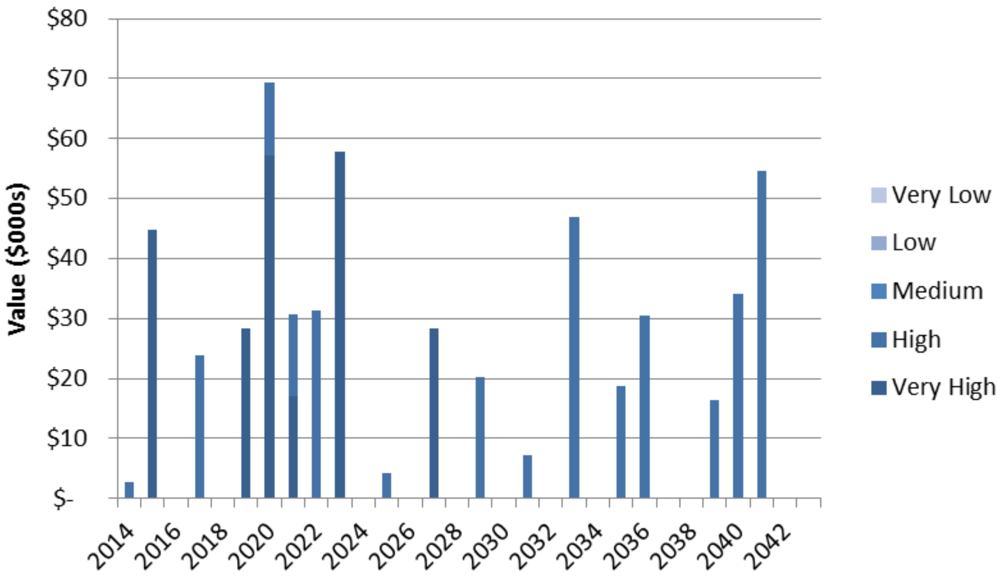
General hazards associated with working near/with sewage are present including working in confined spaces, handling chemicals and biohazardous materials. There are no specific issues known with the operation or maintenance of the system.

4.19.3 Renewal/Replacement Plan

The only pressing renewal for Mangaweka wastewater is a minor job to upgrade the inlet chamber at the WWTP.

Figure 102 shows the projected renewals expenditure for the Mangaweka wastewater scheme in the long-term. On a case-by-case basis, these forecast renewals will be assessed as they come up. The decision to renew will be based on asset condition, performance and criticality.

Figure 102: Renewal Forecast by Criticality – Mangaweka Wastewater



4.19.4 Creation/Acquisition/Augmentation Plan

The wastewater consent for Mangaweka expires in 2024. Prior to this, it is possible that upgrade work would be required to meet any new consent conditions. Aside from this future work there is not expected to be any new works on the wastewater system for Mangaweka.

4.20 Marton Wastewater

4.20.1 Background Data

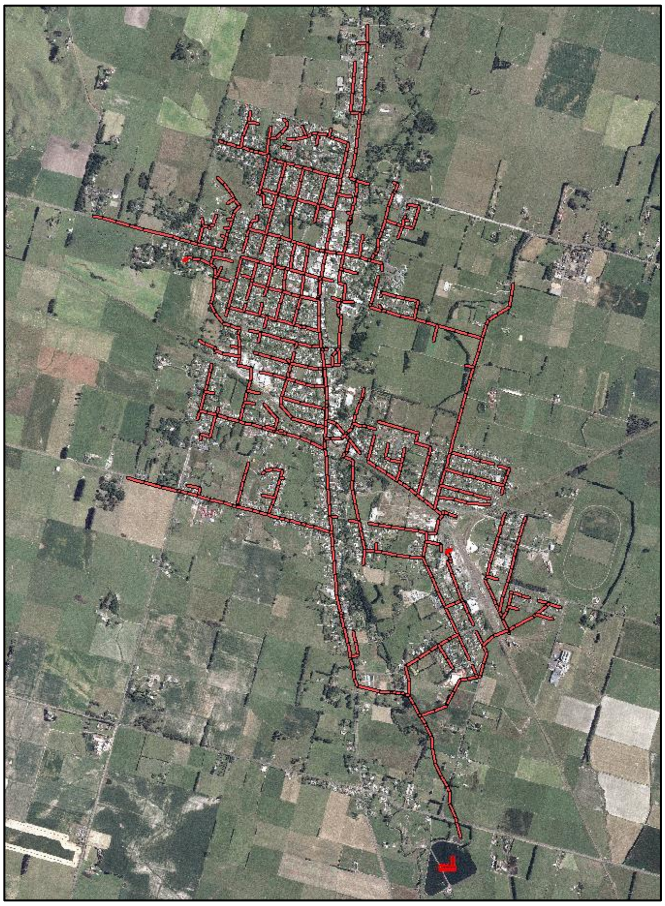
Marton is situated on mildly rolling terrain, which gradually slopes to the oxidation ponds at the south of the town. The reticulation relies entirely on gravity flow to service the properties connected.

Marton has a population of some 2,200 served by residential and commercial sewer connections. There are a handful of food processing industries. Two major inputs to the Marton WWTP are Speirs Foods and Malterup. Both industries contribute to create imbalanced waste as sulphur, hydrogen and the Chemical Oxygen Demand levels are higher than municipal waste, therefore the inherent odours that are produced are going to be an ongoing issue.

The treatment plant uses anaerobic and facultative ponds with tertiary step rapid sand filtration system. The anaerobic lagoon is designed to be predominantly anaerobic, and relies on the development of a biological active sludge layer. Oxygen transfer through the air-water interface is not important in anaerobic ponds and is, in fact, undesirable. Therefore, minimizing re-aeration and heat loss the surface on the basin has recently been covered with a Floating Treatment Wetland. Covering the anaerobic pond with a FTW has effectively altered the treatment train of the Marton WWTP in the primary pond. The change is a shift from the current “anaerobic lagoon” and the principles surrounding this technology, to an “anaerobic digester” and the associated treatment with this. It is also a step to mitigating odour.

The extent of the Marton wastewater scheme can be seen in Figure 103.

Figure 103: Extent of Marton Wastewater Scheme



The following table list the resource consents associated with the Marton Wastewater system.

Table 71: Resource Consents – Marton Wastewater

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Discharge to Water	7312	31 Mar 2019	See comments	Shall not give rise to negative effects on receiving environment as detailed in consent
Discharge to Air	7313	31 Mar 2019	DO > 1.0 g/m3	

Monitoring results with Consent 7312 indicate that the Marton WWTP does not comply consistently with the downstream ammoniacal nitrogen limit.

In 1998 the Rangitikei District Council was granted a resource consent which allowed the effluent discharge to continue, subject to meeting minimum receiving water quality conditions downstream of the discharge. The consent expires in 2019. One of the receiving water conditions in the resource consent is for the ammonical nitrogen (NH_4-N) concentration. This must be less than 2.0 g/m^3 at temperatures less than 15^{o}C or less than 2.8 g/m^3 at temperatures greater than 15^{o}C. The effluent generally meets this limit during summer, however during the winter the NH_4-N exceeds the consent limit. Analysis of ammoniacal nitrogen concentrations shows that:

- The effluent NH_4-N concentration (blue line) is below the resource consent stream limit (dotted line) during December to April - hence no dilution is required to meet the stream limit during this period.

- The effluent NH_4-N concentration exceeds the stream limit during May – November and dilution in the stream is required in order to meet the stream limit. At times the stream flow provides sufficient dilution (eg June-October 2002), however at other times there is insufficient dilution and the resource consent limit is exceeded.

The critical period for compliance is May to November when effluent NH_4-N concentrations are high and stream flows are not always sufficient to enable compliance with the resource consent stream limit.

The methodology for improving the objective of reducing the ammoniacal nitrogen of the discharge will centre on configuration of the lagoons, recirculation, feed and withdrawal variations, pond transfer inlets and outlets, supplementation of oxidation capacity, and algae removal of the lagoons.

Key issues at the plant include:

- The filter screens and aerators at the treatment facilities have high maintenance requirements.

- There are large quantities of old earthenware pipes that need replacing due to poor condition and infiltration.

- Food processing business operations have committed to the Trade Waste Bylaw, to meet the cost of treating the significant volumes of waste they produce.

- Trade waste discharges are very high in H_2S, which leads to corrosion in AC pipes. The trade waste places the highest single loading on the treatment plant equivalent to approximately 12,000 persons per day.

- There is evidence of high infiltration in the Dunallen/Wanganui Road area which requires further investigation.

4.20.1.1 Physical Parameters

The Marton wastewater network comprises 48.4 km of pipeline ranging from 100 to 500 mm in diameter. Approximately 25% of the network is thought to be over 90 years old. A large modernisation project in the 1970s included the construction of some 16 km (30%) of Asbestos Cement (AC) pipes.

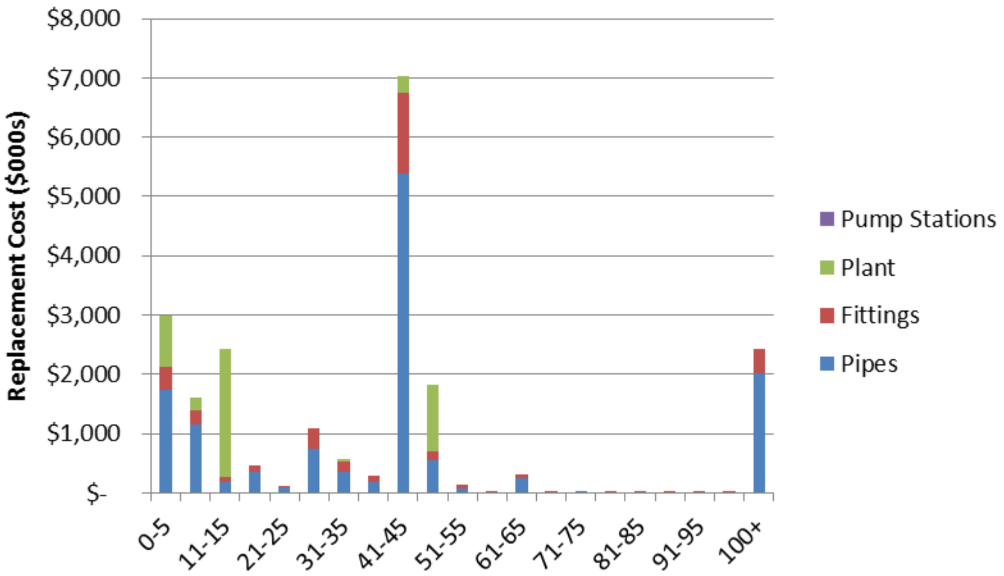
Background data for the scheme are given in the following table.

Table 72: Background Data – Marton Wastewater

Asset Type	Physical Parameters
Treatment Plant	Capable of treating 3,600m^3/day Continuous moving bed filtration system UV disinfection Sludge disposal system SCADA system Grit Trap Mechanical Screen Anaerobic pond Aeration Lagoon (0.254 Ha) Facultative Pond (5.421 Ha) Secondary settling pond (2.670 Ha)
Mains	48.4 km total 48.3 km gravity mains 01 km rising main
Fittings	688 manholes 1 LHCE 1 non-return valve
Connections	7.1 km of service lines Two wet industries (MaltEurop and Speirs)

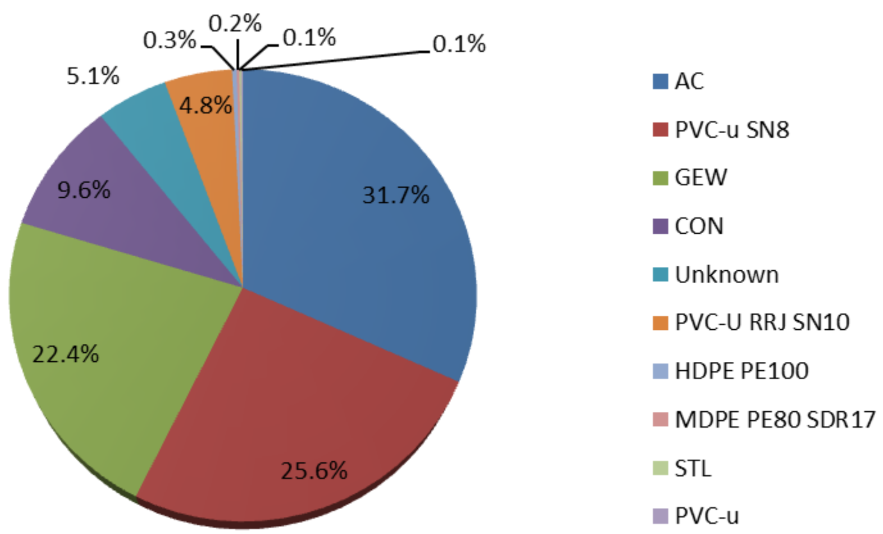
An age profile of Marton wastewater assets is given in Figure 104. Although most assets are less than 50 years old, there is more than $2 million worth of pipes that are over 100 years.

Figure 104: Asset Age – Marton Wastewater



The most common wastewater pipe material for Marton is AC (31.7%), with PVC (25.6%) and glazed earthenware (22.4%) close behind. See Figure 105 for more details.

Figure 105: Pipe Material – Marton Wastewater



4.20.1.2 Asset Capacity/Performance

Under the conditions of the current Resource Consent, the change in water quality of the Tutaenui Stream must lie within required levels rather than a specified quality of effluent. Therefore, the plant has the ability to bypass the filter when there is high stream flow. Since the installation of the tertiary treatment filters, the effluent has met resource conditions except for ammonia levels.

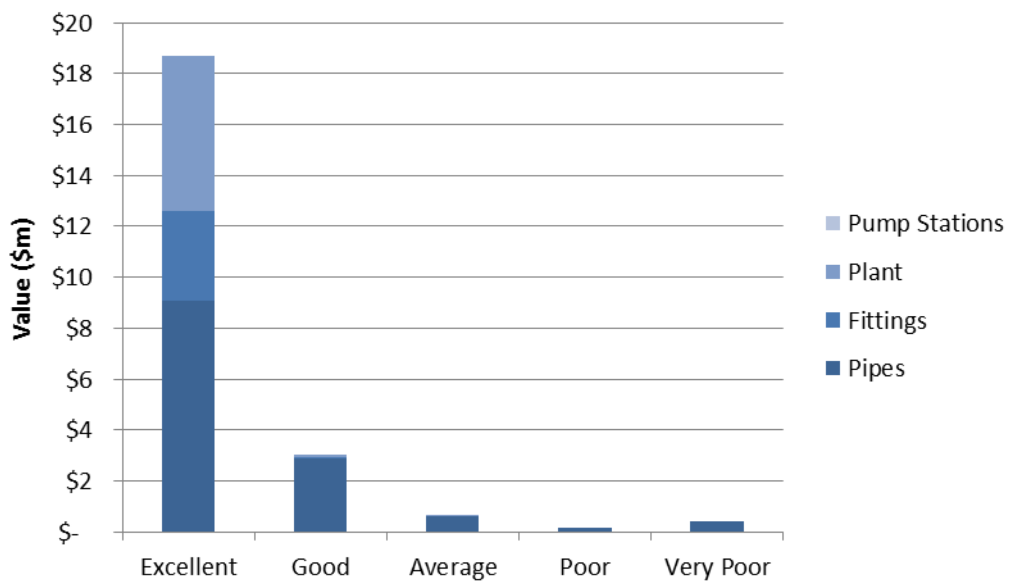
The static population growth in Marton indicates little requirement for future reticulation development. Periodic flow monitoring at the ponds indicates a high level of infiltration/inflow corresponding with winter rainfalls. This poses a risk to the quality and quantity conditions of the resource consent as the biological treatment processes are slowed down with cooler temperatures, and the extra flow reduces detention time. Private water consumption and therefore sewage production is expected to rise slightly despite the static growth rate.

An infiltration study in 2001 indicated elevated inflow and infiltration in some catchments. Replacement of earthenware pipes is programmed to reduce the amount of ground water infiltration which is estimated at 45% of the dry weather flow or 1400 m^3/day. Significant wet weather volume infiltration is over represented in the older catchment areas and deeper sewers. Although the oxidation ponds are currently designed to cope with current inflow, it places unnecessary loading on the treatment facilities and increases the potential for overflows in the network. Approximately 60% of the network has been surveyed since 2001 identifying the major faults and sources of ground water infiltration. They are being programmed for repair using a risk-based approach.

Sewer systems tend to failure progressively and undetected over time through infiltration, joint displacements and build up of debris. Occasional blockages are generally cleared within the stated level of service. A couple of areas have sluggish flow and would benefit from an annual jetting operation to remove deposits. These lines are either on a shallow gradient and unable to self clean, or receive discharges from properties without grease traps. Occurrences of sewage overflow have reduced since replacing some shallow pipes in Henderson Line. Renewal and upgrade of the Skerman-Grey-Follett Street sewer has alleviated a history of sewer overflows during peak storm events. However the underlying inflow from has not been isolated from private properties in this area.

Performance ratings for Marton wastewater assets are totalled in Figure 106. Most of the assets have been rated “Excellent” for performance, but there are some with poorer performance than this.

Figure 106: Asset Performance – Marton Wastewater



The performance measure for the pipe network is largely determined by the occurrence of infiltration of ground water, tree roots or other sources of restricted flow. Approximately 8% of the network is considered to have poor or very poor performance on this basis.

A capacity model was constructed for the Council in 2010 identifying potential overflows in some catchments. These correlated with staff experiences. A substantial upgrade of 3 km of sewer main since 2008 has reduced the risk of future overflows. In some areas of the network, the system capacity is exceeded especially during wet weather. Some areas have experienced overflows from manholes. A hydraulic model of the network has identified these areas requiring larger capacity pipes and these upgrades will be undertaken subject to the renewal plans.

Key issues for Marton wastewater include:

- Odour emissions from Pond 1.
- In-pond nitrification enhancement in Pond 3.

Additional bio-mediation treatment processes have been investigated to further improve the effluent quality namely the NH_4-N and will be forwarded to the Regional Council during the consent period.

Work is underway at the WWTP to increase capacity, and address short-circuiting issues in the anaerobic lagoon.

4.20.1.3 Asset Condition

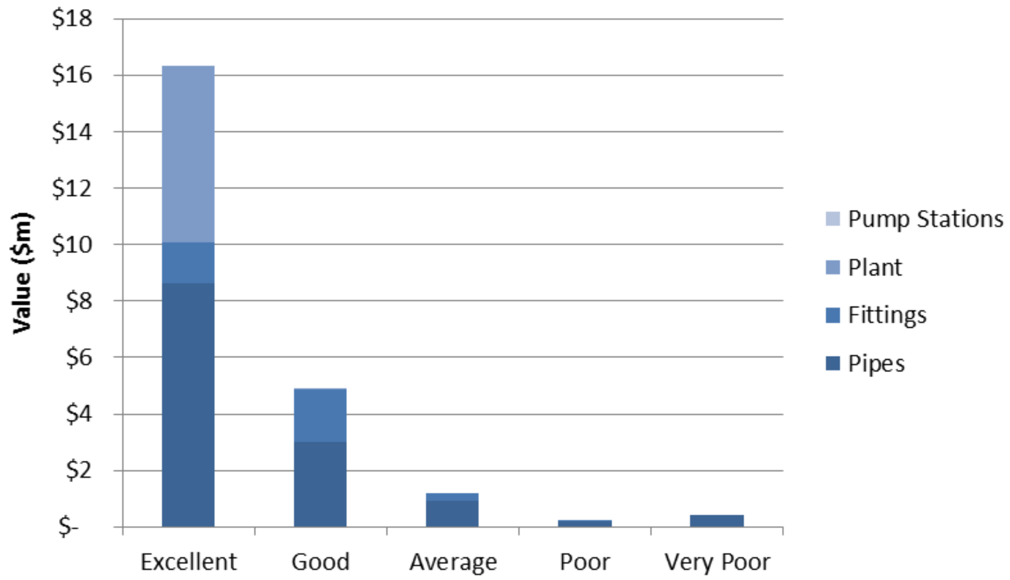
The initial two-stage oxidation ponds were built in the 1970s with the demolition of the original septic tanks, and have been progressively developed to improve the quality of effluent discharge. An aeration lagoon was added shortly afterward. This lagoon has since been upgraded to an anaerobic lagoon to overcome significant load and flow variations. This lagoon will provide a buffer and preliminary treatment for slugs of strong organic waste. Its objective is to partially stabilize the incoming wastewater. Another objective is to considerably reduce the organic loading to the secondary treatment units i.e. the secondary and tertiary oxidation ponds, before passing through to the filtration plant and UV disinfection system. The recirculation sand filter plant was built in 1997 and is in good condition.

The original sewer reticulation dates back to 1910, built from glazed earthenware. Development work in the 1970s saw the addition of asbestos concrete or concrete pipes, replacing 40% of the reticulation. The original earthenware pipes are generally in poor condition and are now causing infiltration and overflow problems due to root intrusion, collapsed pipes, offset joints and poor quality laying. Recent renewals of critical areas of the network especially in Wellington Road and Grey Street have alleviated the surcharging and overflows of recent years.

Asset condition confidence is generally good for these older pipes, and condition monitoring will target these areas with updated information added to the asset register on a regular programmed basis. Areas with overflow problems are recorded and will be assessed in prioritising-planned renewals.

Network condition is based on CCTV grading for 27.4km (57%) of sewer main. Figure 107 summarises the condition data held on Marton wastewater assets, most of which are in "Excellent" condition.

Figure 107: Asset Condition – Marton Wastewater



Approximately 12% of the network is in poor or very poor (condition 4 & 5). The age of these pipes are between 60 and 100 years old. The asbestos cement pipes laid in the 1970s are on average in worse condition than other pipe materials of similar age. AC pipe has suffered in some areas of town due to the aggressive acidic attack by industrial wastes suggesting poor material choices in the past. Overall most pipes in the network are in good condition.

4.20.1.4 Asset Valuations

The value of the Marton wastewater assets is shown in Table 73, broken down by asset group.

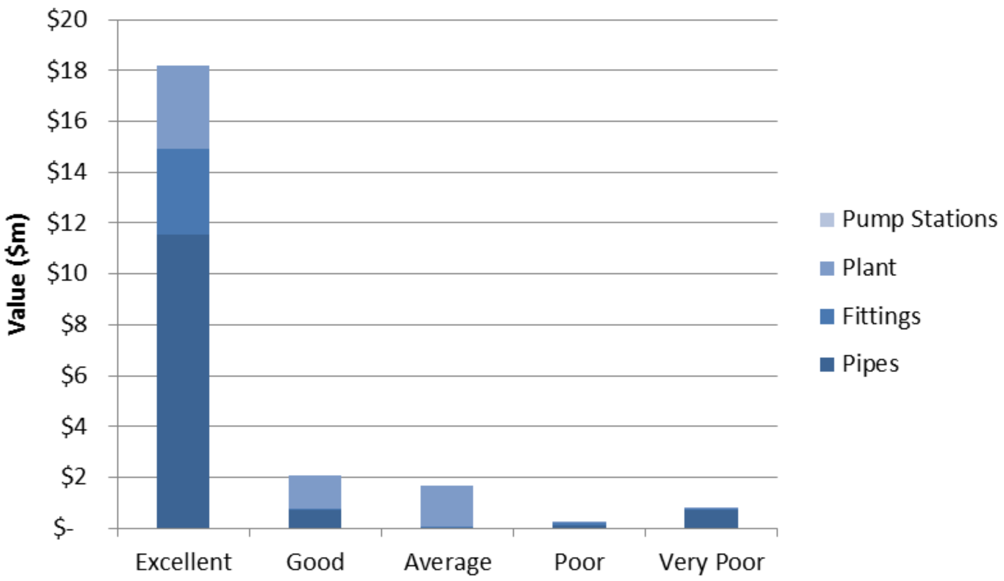
Table 73: Value by Asset Group – Marton Wastewater (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Treatment Plant	6,271,954	4,232,602
Gravity Mains	1,1952,105	6,240,343
Rising Mains	7,642	7,277
Manholes	3,545,137	2,059,734
Service Lines	1,167,924	837,064
LHCEs	2,719	68
Service Connections	1,125,897	420,335

4.20.1.5 Historic Data

The confidence in asset information for Marton wastewater is shown in Figure 108. There is a wide range of confidence in the various data, but mostly the confidence is “Excellent”. Treatment plant components have been assessed and information on them recorded in recent years, as mentioned earlier. Much of the wastewater reticulation in Marton was installed in the 1970s when the new treatment plant was constructed, so data is fairly reliable. There are extensive hard copy plans for Marton, and Council has had access to field books containing invert levels. Where the installation years of older pipes have been in doubt, they have been assigned a nominal installation year of 1910. This is the reason why a large proportion of Marton's wastewater assets are recorded as being more than 100 years old.

Figure 108: Data Confidence – Marton Wastewater



4.20.2 Routine Operations and Maintenance Plan

The access for cleaning and inspecting reticulation is good with 69% of pipes and manholes laid in road reserve. Inspections of manholes indicate some manholes have non-standard lids that impair access to some areas.

Most of the treatment plant equipment is maintained by local engineering firms, although replacement brushes for the screen are sourced from Italy and require a long lead-time. Sourcing an alternative supplier and stocking replacement inventory will reduce the risk of screen failure.

There have been no significant failures of the network or treatment plant. Minor blockages are dealt with by staff as they occur. Blockages are recorded in GIS, which affect the pipe's historical performance score.

The original Makirikiri Road septic waste dump point used by contractors has been relocated to a metered dump station built in 2010 at King Street. The site is more secure and less likely to be abused. The caravan dump station in King Street is maintained by Council wastewater staff.

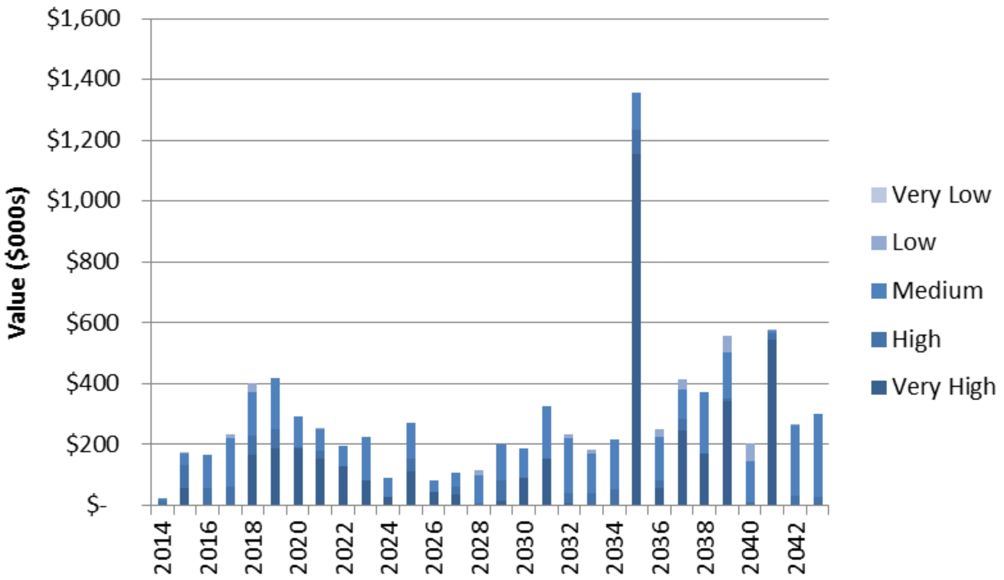
Hazards associated with working near/with sewage are present including handling chemicals, moving machinery and bio hazardous material, working in confined spaces.

4.20.3 Renewal/Replacement Plan

High priority renewals for Marton wastewater are the realignment of 1 km of sewer main along Goldings Line (estimated cost $345,000), a $1.4 million construction of a second anaerobic pond at the plant, and desludging of the existing anaerobic pond projected to cost $300,000.

Figure 109 shows the forecast long-term renewal expenditure for Marton wastewater, according to asset criticality. The locations of more than fifty sections of sewer main in Condition "4" or "5" have been determined. There will be significant expenditure required on Marton wastewater renewals each year for the projected future.

Figure 109: Renewal Forecast by Criticality – Marton Wastewater



4.20.4 Creation/Acquisition/Augmentation Plan

There are no new works planned for Marton wastewater at this stage.

4.21 Ratana Wastewater

4.21.1 Background Data

The Ratana wastewater scheme was installed in 1979. The Ratana oxidation ponds (a two- pond system) are located off Rangatahi Road, to the west of Ratana Township. They provide treatment for effluent from Ratana's reticulated sewerage system. In 1998 the system was upgrade by the installation of a screen and trickling filter. The final effluent is discharged into an unnamed tributary of Lake Waipu.

The scheme operates entirely by gravity. The pipelines are laid predominantly on private property.

The extent of the Ratana scheme is shown in Figure 110.

Figure 110: Extent of Ratana Wastewater Scheme

The following table describes the resource consent associated with the Ratana wastewater system.

Table 74: Resource Consents – Ratana Wastewater

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Discharge to Water	7400	31 Jul 2018	136 m^3/day NH_4-N < 30 g/m^3 NH_4-N < 10 g/m^3 avg. over 12 months $cBOD_5$ < 80 g/m^3 $cBOD_5$ < 50 g/m^3 avg. over 12 months TSS < 200 g/m^3 TSS < 120 g/m^3 avg. over 12 months *Enterococci* < 9000/100 mL *Enterococci* < 3000/100 mL avg. over 12 months DO ≥ 2 g/m^3	Discharge to unnamed tributary of Waipu Stream

4.21.1.1 Physical Parameters

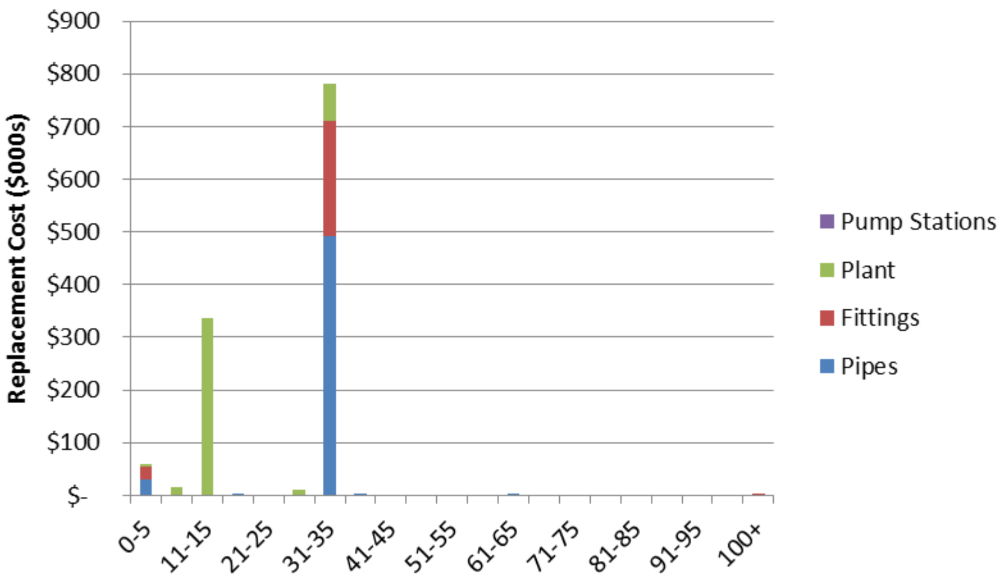
The physical parameters of the Ratana wastewater system are described in the table below. Following this are charts showing the age and material of the pipes. Pipes make up the bulk of the value of a wastewater system, so it is important to know this crucial data.

Table 75: Background Data – Ratana Wastewater

Asset Type	Asset Parameters
Treatment Plant	2 primary treatment ponds totalling 0.853Ha UV disinfection Rock Filter Flow Meter Aerators PETRO Trial Filter System
Mains	2.8 km of gravity mains
Fittings	52 manholes
Connections	0.7 km of service lines
Population Connected	366

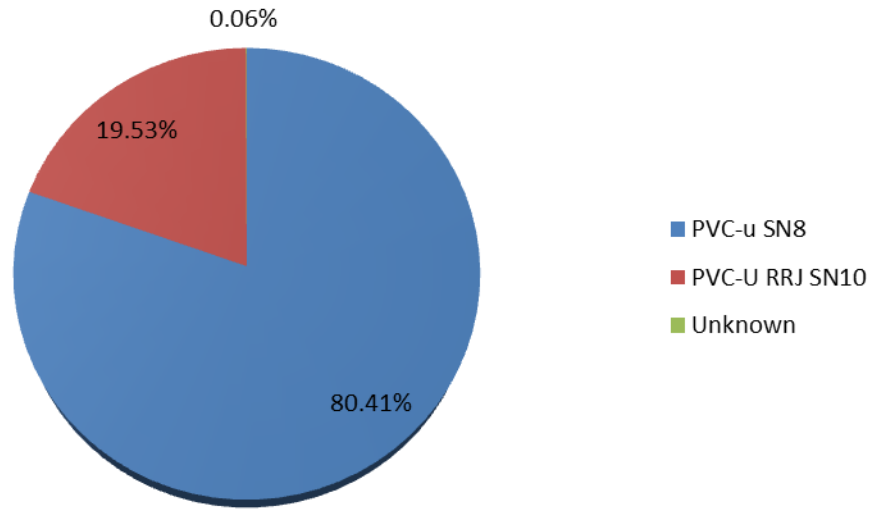
Most of the wastewater assets in Ratana are aged 35 years or less, as shown in Figure 111.

Figure 111: Asset Age – Ratana Wastewater



Wastewater pipes in Ratana, due to their fairly recent installation, are entirely uPVC plastic. This is shown in Figure 112.

Figure 112: Pipe Material – Ratana Wastewater



4.21.1.2 Asset Capacity/Performance

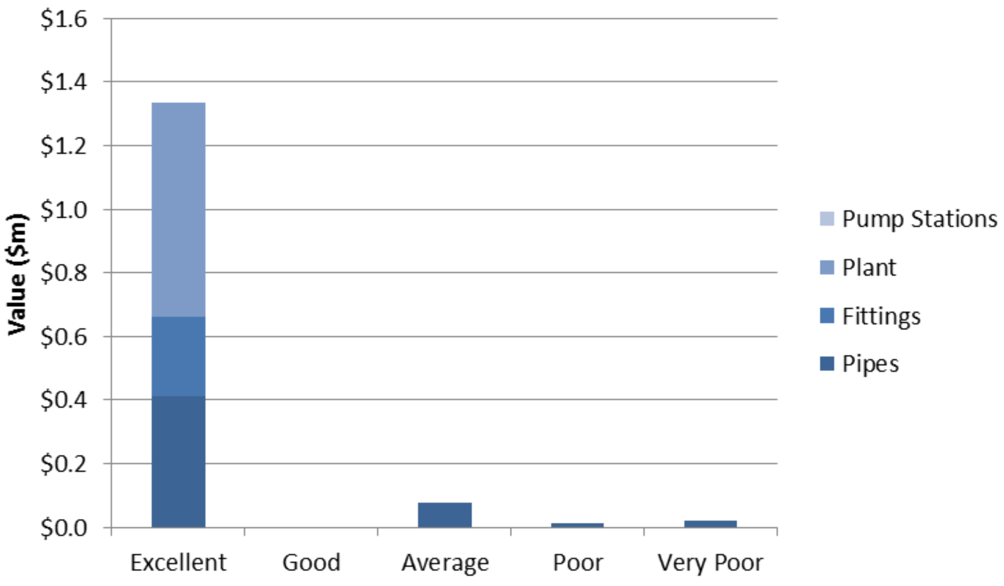
As part of the discharge monitoring program samples have been taken from the outfall, and upstream and downstream of the discharge monthly since August 2009. The sample results are disturbing with elevated ammoniacal nitrogen levels downstream of the discharge, one result exceeded 7 g/m^3 (this level of ammoniacal nitrogen is likely to be acutely toxic to aquatic life) at the pH and temperature of the water in the stream. The Dissolved Reactive Phosphorous (DRP) results were significantly elevated downstream compared to upstream, up to 100 times the recommended levels for limiting nuisance alagal growths. This combined with the increased soluble inorganic nitrogen (SIN) concentrations downstream of the discharge means that there is significant risk of excessive periphyton growth downstream of the discharge and given that the stream flows into a dune lake this also increases the risk of eutrophication of the lake and algal blooms, with corresponding detrimental effects on aquatic life. The proposed methodology to overcome these consent issues; is areas of biological treatment utilising Floating Treatment Wetlands formed in a layout opposing the flows in conjunction with a chemical/physical treatment system. This treatment system has been designed to remove and reduce the contaminants to a level suitable for discharge.

The performance of the wastewater reticulation system is adequate for all current needs, although it is at full capacity during the annual Ratana festival. The only problems encountered with the reticulation involve fat deposits. These are cleared promptly and the cause is investigated and rectified where possible. As mentioned in Section 3.2.2, the proposed 60-lot subdivision at Ratana will have the effect of increasing wastewater flows. The current treatment plant for Ratana was sized for the existing township. The increases in wastewater flows that would come about from such a substantial development mean that investigation will be required into the ability of the current system to cope. The most likely scenario is that some of our wastewater mains would need upsizing, and that the treatment process would need to be enhanced or expanded upon. As investigation work proceeds, funding will be budgeted in future years to deal with these additional requirements. The ultimate size of this subdivision is currently projected to be 120 lots, with the second group of 60 lots coming on line in 5-10 years time.

There have been no significant failures of the network or treatment plant.

The performance ratings for wastewater assets at Ratana is shown in Figure 113. Mostly, the performance of these assets is considered “Excellent”.

Figure 113: Asset Performance – Ratana Wastewater

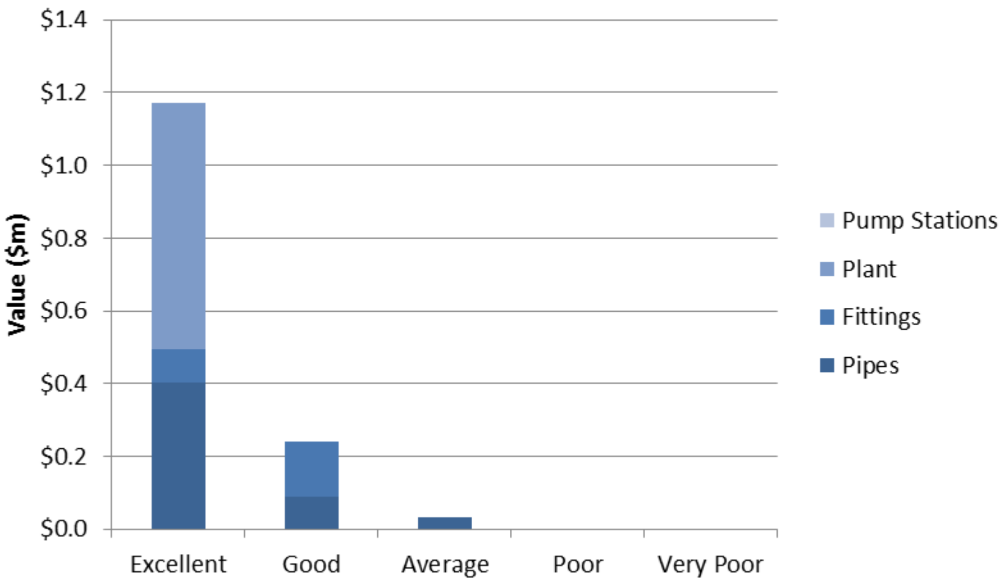


4.21.1.3 Asset Condition

The oxidation lagoons are in excellent condition as are all the treatment structures.

A summary of condition information for all Ratana assets is given in Figure 114. Most of the assets are in “Excellent” condition, with a significant amount “Good” and a small number “Average”.

Figure 114: Asset Condition – Ratana Wastewater



4.21.1.4 Asset Valuations

The value of the wastewater assets in Ratana is shown by asset group in Table 76.

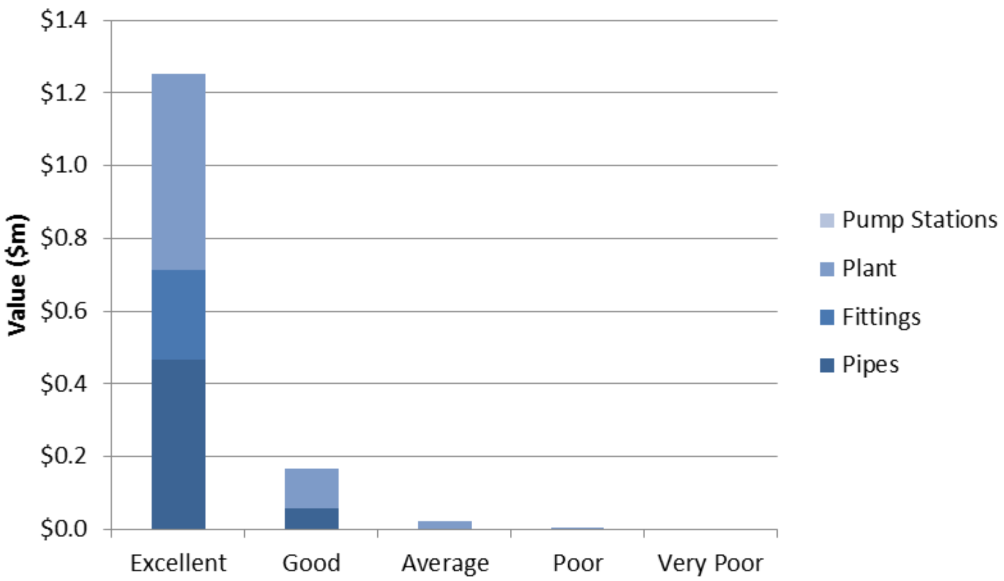
Table 76: Value by Asset Group – Ratana Wastewater (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Treatment Plant	675,831	464,312
Gravity Mains	420,568	285,833
Manholes	246,664	162,110
Service Lines	102,692	71,145
Service Connections	14,962	8,179

4.21.1.5 Historic Data

The wastewater network in Ratana was installed fairly recently, and there are few issues with lack of asset information. The reticulation is predominantly PVC and was laid in the 1980s. Confidence in the asset data held for Ratana wastewater is summarised in Figure 115. Most of the data is considered "Excellent".

Figure 115: Data Confidence – Ratana Wastewater



4.21.2 Routine Operations and Maintenance Plan

Aerators at the pond require regular maintenance and repair. Monitoring oxygen levels and running the aerators at optimum periods reduce energy consumption.

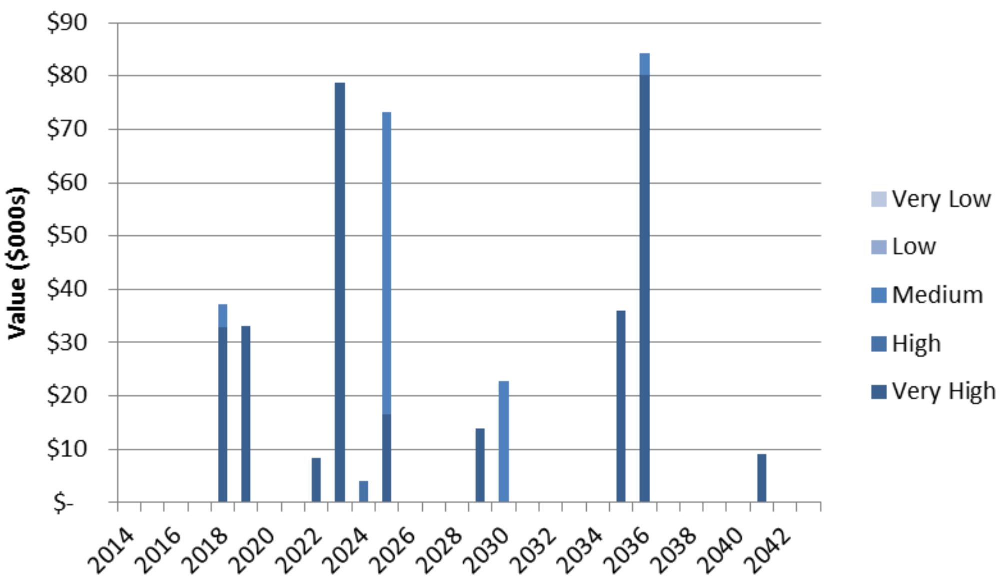
Regular proactive maintenance is achieved by council staff, making sure manholes and pond outfalls are clear.

General hazards associated with working near/with sewage are present including moving machinery, handling biohazardous materials and working in confined spaces. There are no specific safety issues with this system identified.

4.21.3 Renewal/Replacement Plan

Projected renewals for the wastewater system in Ratana are depicted in Figure 116. Additional work can be done to attempt to smooth this renewals projection, so that costs in any one year are not too great.

Figure 116: Renewal Forecast by Criticality – Ratana Wastewater



4.21.4 Creation/Acquisition/Augmentation Plan

The WasteWater Treatment Plant in Ratana will receive a major upgrade so that it can treat nitrogen and phosphorus in the wastewater. The work is expected to cost $1 million, but funding will be sought for assistance.

The plant upgrade will be designed to cater for additional wastewater flows from the proposed 60-lot subdivision for Ratana. There may also be a need to increase the capacity of certain sewer mains in town for the same reason. This will be investigated, and work programmed.

4.22 Taihape Wastewater

4.22.1 Background Data

Taihape is situated on moderately steep hill country and is bounded on the east side by the Hautapu River. The system has three pump stations to forward flows onto the oxidation pond situated on the east side of the Hautapu River.

The Taihape sewer network serves a population of 1506 but excludes the satellite catchments of Dixon Way and Mangaone Valley.

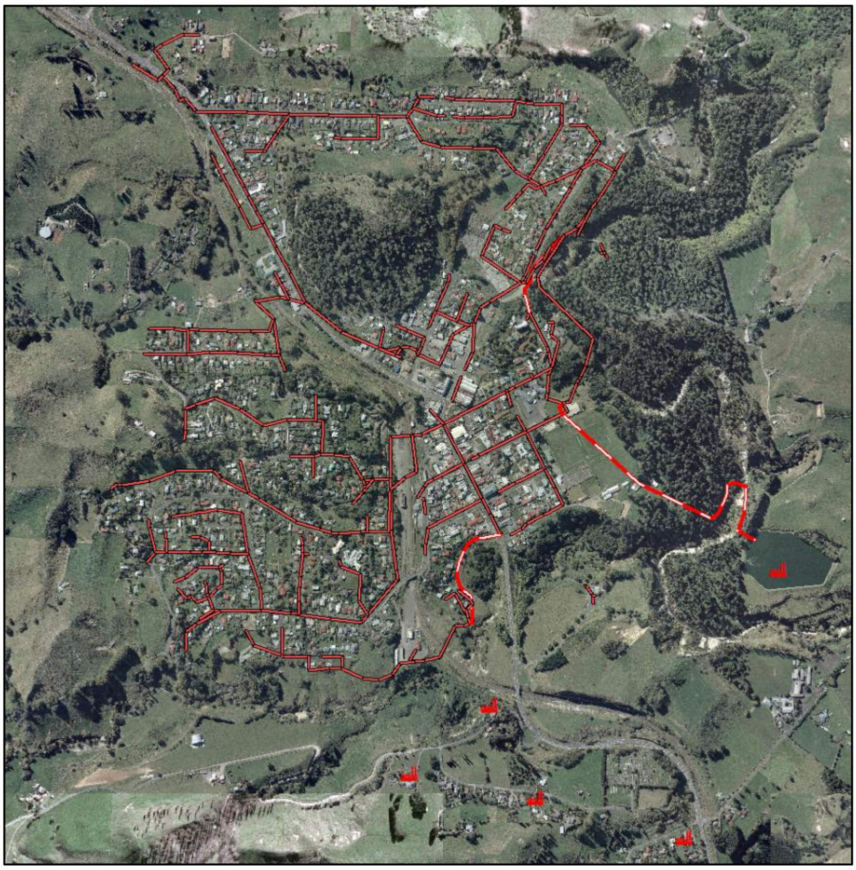
The system is very old and originally was built as a combined stormwater/effluent system until the 1940s when a stormwater network was constructed.

The oxidation pond was constructed well over 25 years ago. It was initially designed to provide for the treatment of sewage (for a population of 6,000), stormwater and other wastewater from the community of Taihape. Taihape wastewater treatment consists of a pumped sewer to a single oxidation pond of approximately 3.2 ha with a pond retention time of a minimum of 6 days. Effluent from the pond passes through an in-pond rock filter and then a 2 mm fixed screen for solids removal. After this, alum is introduced for DRP removal before entering a 25 m^3 retention tank for rapid mixing. From the retention tank, effluent enters a Zenon submerge membrane filtration plant (supplied and installed by Canadian Pacific Ltd in 2011-2012), then the final effluent is discharged to the Hautapu River.

A full study on the effect of the Taihape wastewater treatment on the water quality of the Hautapu River was undertaken in June 2009. A Taihape Oxidation Pond: Assessment of Environmental Effects (AEE) was completed in October 2010.

Figure 117 shows the extent of the Taihape wastewater scheme.

Figure 117: Extent of Taihape Wastewater Scheme



Key issues in the scheme in general are:

- Historical overflows at key locations have been identified and alleviated through clearing blockages.
- Historically unknown pipes have been identified through CCTV surveys, which need to be renewed.

- High infiltration rates are still a major problem and the pumping stations can be overwhelmed by high intensity rainfall. Identifying sources of inflow.
- Resource consent renewal will require treatment plant upgrades.
- Dixon Way may require the development of a community reticulation system.
- Concern about the effect of wastewater network condition is not thought to have a significant impact on earth movement from the West Taihape Slip Hazard Zone.

The following table describes the resource consent associated with the Taihape Wastewater system.

Table 77: Resource Consents – Taihape Wastewater

<table>
<tr><th>Consent</th><th>Consent Number</th><th>Expiry Date</th><th>Consent Limit</th><th>Comments</th></tr>
<tr><td rowspan="2">Discharge</td><td rowspan="2">105518</td><td rowspan="2">1 Jul 2027</td><td>1,200 m3/day
14 L/s</td><td>Discharge onto land that enters Hautapu River when flow > 2.8 m³/s at Alabasters</td></tr>
<tr><td>500 m3/day
5.8 L/s</td><td>Discharge onto land that enters Hautapu River when flow ≤ 2.8 m³/s at Alabasters</td></tr>
</table>

4.22.1.1 Physical Parameters

The Taihape wastewater network comprises of 21 km of pipeline ranging from 100 to 375 mm in diameter. Approximately 70% of the network is thought to be glazed earthenware pipes over 90 years old.

Key data for this wastewater scheme are given in Table 78.

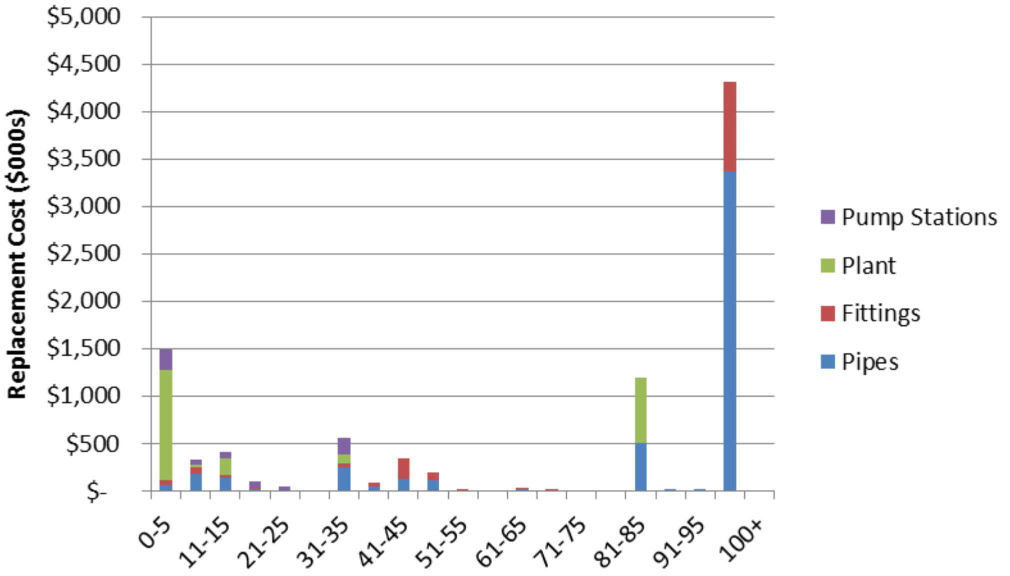
Table 78: Background Data – Taihape Wastewater

Asset Type	Asset Parameters
Treatment Plant	Secondary settling pond (3.438 ha)
Pump Stations	4
Mains	21.4 km total 20.2 km of gravity mains 1.3 km of rising mains
Fittings	321 manholes 5 LHCEs 5 inspection points
Connections	0.7 km of service lines

Asset Type	Asset Parameters
Population Connected	2,200

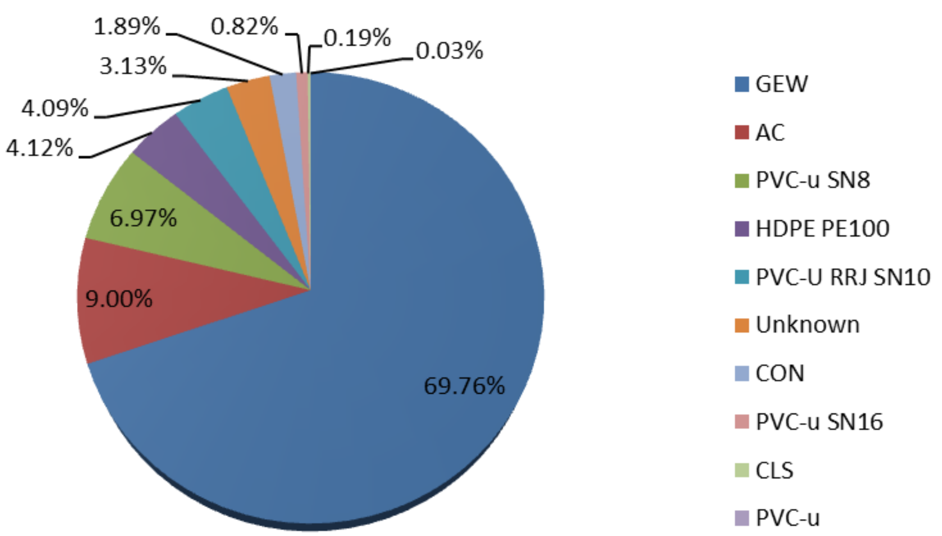
Figure 118 shows the asset age profile for Taihape wastewater. Most of the network is nearing 100 years of age. This has effects on the condition and performance of the system.

Figure 118: Asset Age – Taihape Wastewater



Due to the age of the reticulation (see above), most of the wastewater pipes are found to be glazed earthenware. The remaining 30% or so are made up of more than half a dozen material types (Figure 119).

Figure 119: Pipe Material – Taihape Wastewater



4.22.1.2 Asset Capacity/Performance

The Taihape WWTP operates under a consent granted in 2014 for a 13 year period expiring 1 July 2027. One of the original (2006) consent conditions for the Taihape WWTP is that Council must ensure that all wastewater discharged into the Hautapu River has passed through the oxidation ponds, rock filter and has been treated by UV disinfection to ensure that the discharge does not cause the concentration of *E. coli* to exceed 260 per 100mL, 200 m downstream of the discharge point.

In February 2009 Council contacted Horizons expressing concern that the initial proposal to install an UV system at the outfall (immediately after the oxidation pond without any pre-treatment for TSS removal) would not serve its purpose. It certainly would not address the DRP concentration in the effluent. After a meeting with Horizons officers and with their agreement, a comprehensive report on a proposal addressing the main issues of concern relating to the discharge of treated sewage to the Hautapu Stream was forwarded to Horizons in September 2009. This proposal explained that the reduction of the polluting nature of domestic wastewater is a priority for a sustainable future. The removal of algae from oxidation ponds is not easily achieved. Although algae in oxidation ponds are beneficial in terms of treatment, their presence in the final effluent results in UV treatment being less effective.

The method of treatment of mainly domestic waste at the Taihape WWTP is at this stage by biological means. Since the aim is to achieve a specific treatment objective including the removal of specific contaminants such as phosphorous and humic substances; in such situations, physical-chemical treatment may be considered the best alternative approach.

There are two key issues with the Taihape wastewater treatment plant, which need to be addressed. These are:

- *E. coli* levels breaching the current consent conditions.

- High nutrient levels in the Hautapu Stream, to which the effluent contributes.

A range of techniques can be applied that combine biological and chemical or physical unit operations and processes to reduce the concentrations of nitrogen and phosphorous in the plant effluent below the levels that would be attainable solely by synthesis in a typical secondary treatment facility. In general biological processes for nutrient control demand a far greater electrical energy input than integrated systems that require supplemental chemical addition and additional physical unit processes. The option adopted for the Taihape WWTP is chemical phosphorous removal and micro-filtration. Using the micro-filtration plant to remove *E. coli* will remove the need for additional UV disinfection.

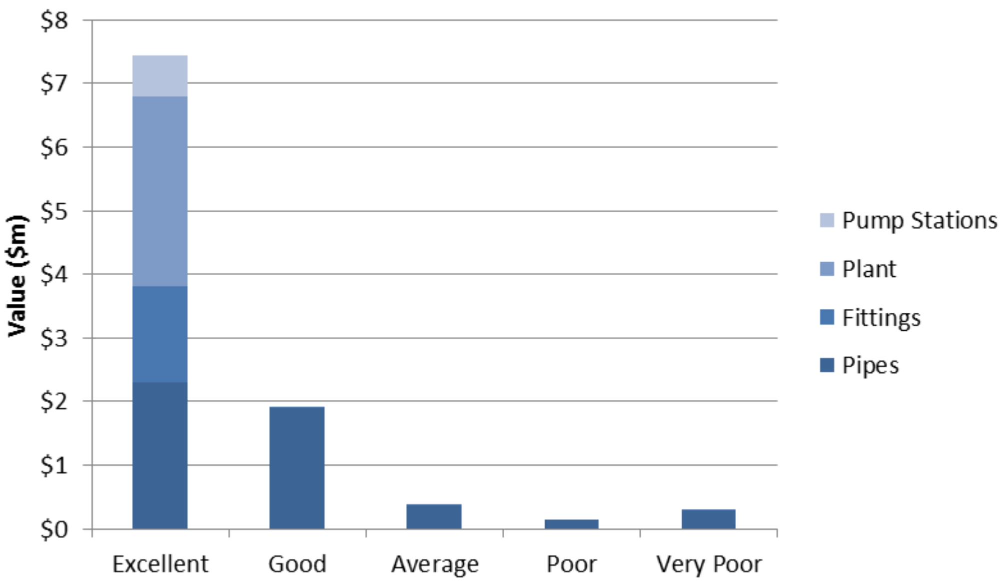
Historical flow monitoring at the ponds indicates a high level of infiltration/inflow at the ponds during winter months. This poses a risk to the quality and quantity conditions of the resource consent as the biological treatment processes are slowed down with cooler temperatures and the extra flow reduces detention time. This can be attributed to the poor condition of the reticulation and will be reduced as a reticulation programme is implemented. Council has identified the need to control the quantity of infiltration and inflows to reticulated systems. This is extremely important in terms of the capacity of the sewerage system. An inflow/infiltration study is planned to be carried out in 2012. Smoke testing has been found to be more effective that visual inspections alone. Taihape was originally built with a combined stormwater/wastewater network, which is gradually being separated. Sewer systems tend to failure progressively and undetected over time through infiltration, joint displacements and build up of debris. Occasional blockages are generally cleared within the stated level of service. A couple of areas through private property have sluggish flow and would benefit from an annual jetting operation to remove deposits.

It is believed that there are a high number of reticulation failures that continue unobserved underground due to the terrain of the scheme. These failures are likely to be the cause of a majority of the infiltration problems of the scheme and will be identified with the condition-rating programme.

The performance grading for the pipe network is largely determined by the occurrence of infiltration of ground water, tree roots or other sources of restricted flow. Approximately 10% of the network is considered to have poor or very poor performance. Root intrusion does not seem to be as prevalent as in other communities, but there is evidence of substantial infiltration.

The performance of assets in the Taihape wastewater scheme is rated in Figure 120. There are a range of performance ratings across the network, but most of the assets are considered “Excellent”.

Figure 120: Asset Performance – Taihape Wastewater



There are issues with the performance of the Taihape WWTP under the current arrangement. The membranes used to treat wastewater are subject to fouling, and are also undersized. These factors combine to reduce the throughput of the WWTP. Work is underway to address the issues. Since the membrane filtration plant was installed, there have been issues with the system including:

- Blinding of the rock filter and 2 mm screen starving the membrane plant.
- Short-circuiting in the oxidation pond meaning that wastewater does not get the retention times needed for optimum treatment in the size of pond at the plant.
- When dosing alum, the membrane plant blinds off within three weeks in the warmer months when algae loadings increase. This incurs cleaning costs, and also means that the membrane plant needs to be taken offline for three days at a time.

- The membrane plant cannot cope with winter flows (the membrane plant is designed for 55 m^3/h).

Currently, solutions to these issues are being developed. The following options are under consideration:

- Removal of the in-pond rock filter.
- Installation of a dividing curtain in the oxidation pond to prevent short-circuiting.
- Installation of a clarification process prior to membrane filtration, using the alum to enhance settling and DRP removal.

The current estimated cost to resolve these issues is $340,000.

There is currently no reticulated wastewater system for Dixon Way in Taihape. The provision of wastewater services to this area in some form will be investigated by Council, to determine the best approach.

4.22.1.3 Asset Condition

The oxidation pond is generally in good condition. The only concern is with an area of batter above the pond, which shows seepage year round causing minor slumping of the banks into the ponds. To rectify this, a drainage system has now been installed at the base of the bank to draw the water away from the slope. All the structures controlling the pond flow are in good condition.

Network condition is based on CCTV grading for 10.7km (55%) of sewer main, which was carried out predominantly in 2007-2008 and 2010-2011.

The bulk of the reticulation was installed between 1910 and 1920. This age data is considered accurate and from this we have estimated that 70% of today's reticulation was constructed during this period from 150mm diameter glazed earthenware pipe.

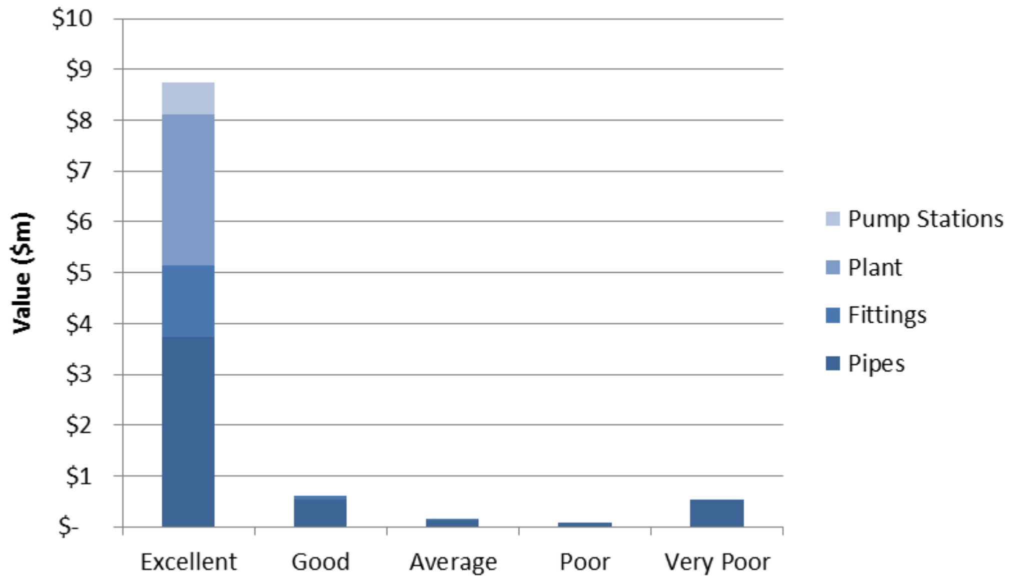
Approximately 22% of the network is in poor or very poor condition. Much of the network (70%) is recorded as being glazed earthenware pipe. Poor grading scores are caused by joint displacements.This is supported both from CCTV and the infiltration studies showing high groundwater inflow.

An assessment of the capacity of the reticulation network a (modelling of the network) has now been undertaken to be able to undertake upgrade the capacity of the network to prevent overflows.

There are no known condition problems with the pump stations. The main WWPS for Taihape had a major upgrade completed in late 2014.

A summary of the asset condition data for Taihape wastewater is given in Figure 121.

Figure 121: Asset Condition – Taihape Wastewater



4.22.1.4 Asset Valuations

The value of our wastewater assets in Taihape is shown in Table 79.

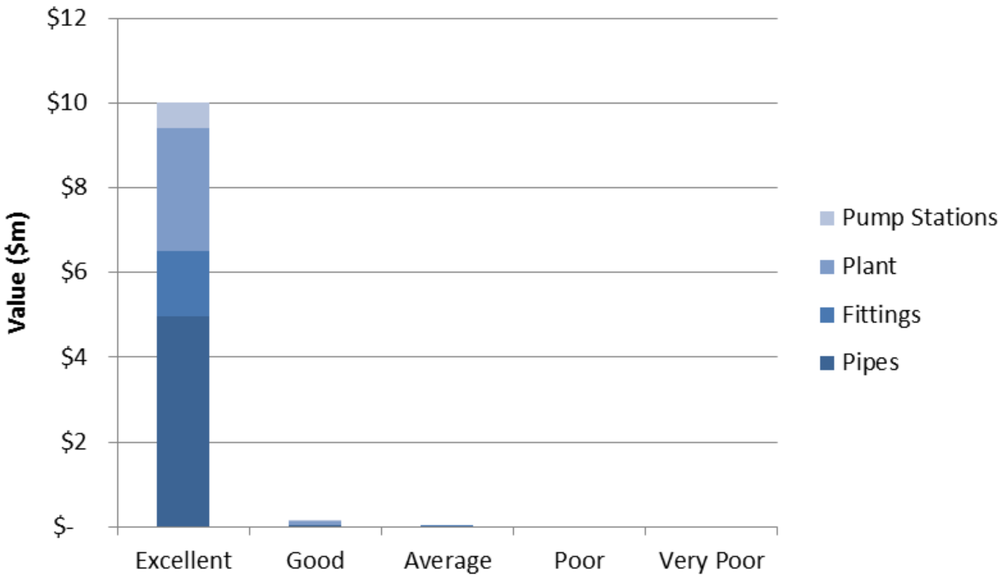
Table 79: Value by Asset Group – Taihape Wastewater (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Treatment Plant	2,986,980	2,097,577
Pump Stations	628,016	382,200
Gravity Mains	4,617,416	1,097,211
Rising Mains	272,567	101,577
Manholes	1,531,211	431,938
Service Lines	102,494	61,940
LHCEs	5,031	2,495
Inspection Points	1,250	680
Service Connections	693,866	17,393

4.22.1.5 Historic Data

In Figure 122, it can be seen that most asset information for Taihape is considered “Excellent”. In 2001-2002, GHD consultants carried out a network analysis and I&I investigation for Taihape. This exercise involved inspecting every manhole and taking invert levels, as well as pipe diameters and connection locations. It improved the quality of data held for Taihape wastewater assets considerably. There are some areas of uncertainty, for example underneath the railway lines. There are data gaps involving the piping of wastewater from the western side of town to the eastern. Some laterals are not shown. However, CCTV investigations of the most critical areas has improved the information we hold.

Figure 122: Data Confidence – Taihape Wastewater



4.22.2 Routine Operations and Maintenance Plan

The access for cleaning and inspecting reticulation is considered average with 61% of pipes and manholes laid in road reserve. Inspections of manholes indicate some manholes have non-standard lids that impair access to some areas. Some pipes in private property are laid under industrial buildings. The manholes are difficult to find in storage yards or even under workshop floors. This makes maintenance of the pipes very difficult. A critical 375mm pipe passes through the Taihape Area School with limited access.

The pumping line from the Domain to the Oxidation ponds crosses the Hautapu River. Very little is known about the condition or nature of this crossing.

Root blockages are known to occur in particular areas and these sections are programmed to be replaced.

Because of the historical combined sewer/stormwater nature of the reticulation, staff have discovered a handful of storm inflows and are attempting to redirect these flows away from the sewer network.

The caravan dump station is prone to continual blockages which require clearing twice per month. This site should be relocated off the street and redesigned to reduce staff workload.

There have been no significant failures of treatment plant which is of a passive design. Staff have developed a maintenance manual for the treatment plant which specifies the daily, monthly and annual inspections of any mechanical equipment there.

Hazards associated with working near/with sewage are present including moving machinery and biohazardous material, working in confined spaces.

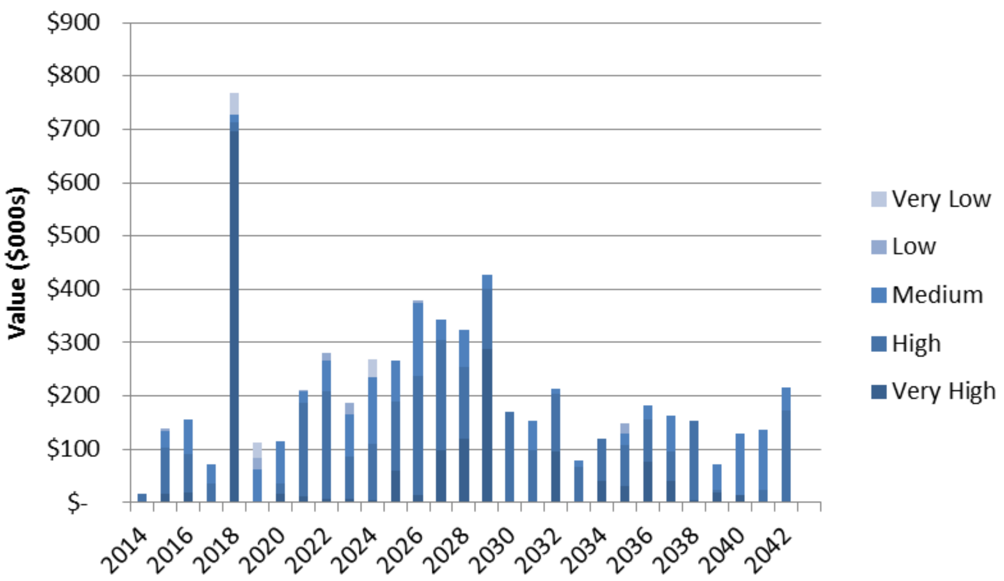
A manhole at the end of Huia Street is used by contractors for dumping septic tank sludge. There is evidence of spillage and overflows from this manhole which is located adjacent to the Taihape Area School.

4.22.3 Renewal/Replacement Plan

There are two wastewater reticulation renewals planned for Taihape in the medium term. One is for Huia Street and the Gumboot Reserve, for a 100 m length of main expected to cost $65,000. The other is a short length of main on Mataroa Road.

The long-term renewal forecast for this scheme is shown in Figure 123. More than $700,000 of renewals expenditure is forecast for 2018. This should be reviewed beforehand to see if any of these projected renewals can be deferred to smooth costs.

Figure 123: Renewal Forecast by Criticality – Taihape Wastewater



4.22.4 Creation/Acquisition/Augmentation Plan

The Wastewater Treatment Plant will be upgraded, at an expected cost of $300,000. The installation of UV disinfection at the plant to improve the discharge quality is a separate project worth $105,000.

4.23 Bulls Stormwater

4.23.1 Background Data

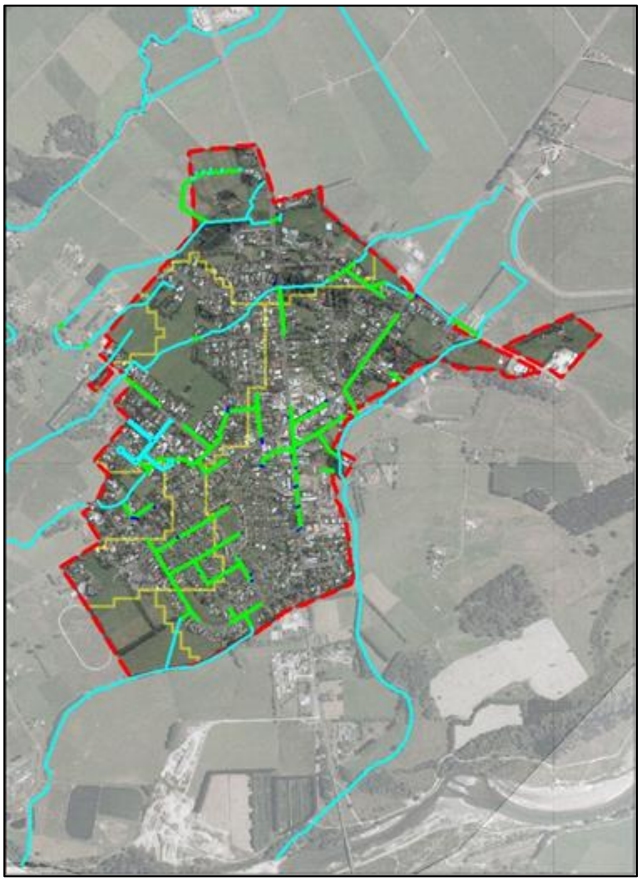
The Bulls urban stormwater scheme is characterised by a flat river plain on two distinct levels, serviced by public and private drains feeding into key catchments serviced by open unlined drains. These drains feed into the Rangitikei River and the Tutaenui Stream. The Bulls stormwater scheme is a mixture of mainly open drains with some short sections of piped reticulation.

The key issues relating to the scheme are:

- More data collection is required to ascertain the condition and performance of pipes and fittings.
- Open channels are owned and maintained by owners whose property through which they pass. Coordination of maintenance or upgrading works is very difficult and needs to be led by Council.
- Landscaping of property can adversely affect the operation and effectiveness of open channels.
- Flat to rolling countryside with depressions retaining surface water rather than discharging into waterways.
- Difficulty controlling runoff from roads where the road is elevated above private properties.
- There is inadequate public drainage system on the lower river flat next to the Rangitikei River on Bridge Street.
- Better knowledge of the gravel strata in the sub surface soils may enable better design for soakage pits to solve private property surface flooding.
- Improvements to meet even small increases in levels of service can be expensive for a very infrequent event. There is also the downstream effect to be considered.
- Resource consents could be required for discharges. This would have a significant effect on this small community with multiple discharge points. Treatment of surface water runoff may be required.
- The lack of administrative linkage between public reticulation, private pipes and open drains, road sumps and discharge pipes is an area of confusion.

The extent of the stormwater system for Bulls is shown in Figure 124.

Figure 124: Extent of Bulls Stormwater Scheme



Background data for Bulls stormwater are given in Table 80.

Table 80: Background Data – Bulls Stormwater

Parameter	Data
Population served:	1,649
Total urban catchment area	1.52 km^2
Number of catchments	4

4.23.1.1 Physical Parameters

The reticulation comprises approximately 6 km of pipeline of assorted sizes, materials, and age. Table 81 gives key asset data for the Bulls stormwater network.

Table 81: Asset Data – Bulls Stormwater

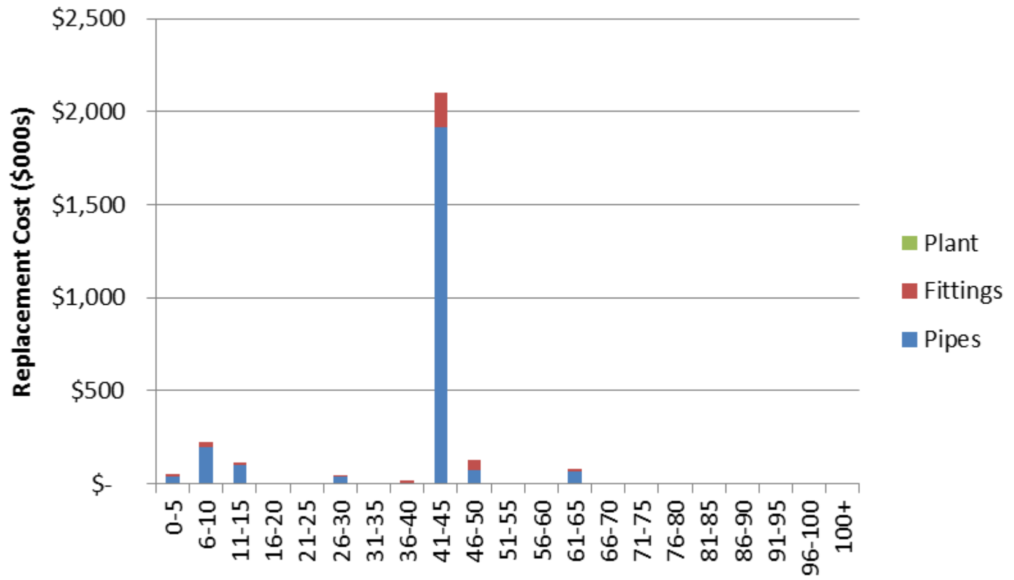
Asset Type	Asset Parameters
Gravity Mains	6.2 km

Asset Type	Asset Parameters
Manholes	96
Open Drains	0.06 km
Sump Leads	511
Service Connections	0.007 km
Sumps	6
Wingwalls	14

Secondary stormwater or road drainage system characteristics are included for completeness but do not form part of this plan.

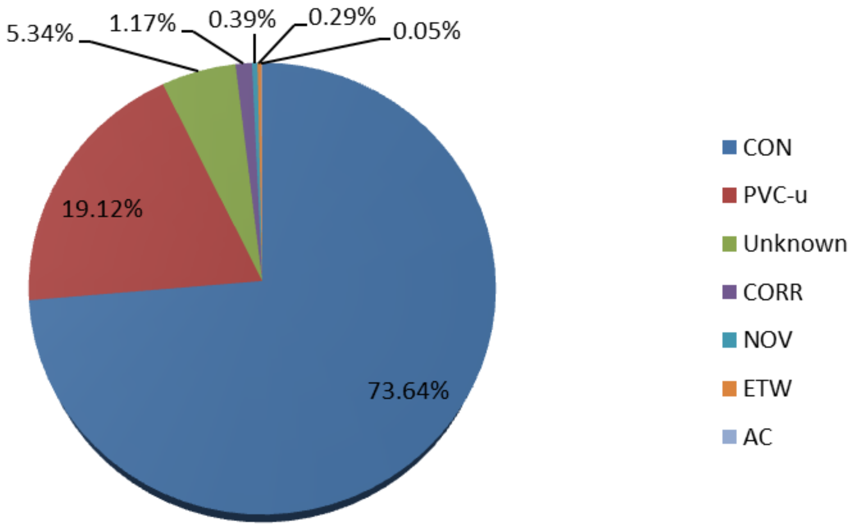
The age profile of assets for Bulls stormwater is given in Figure 125. Most of the assets are 41-45 years old.

Figure 125: Asset Age – Bulls Stormwater



A breakdown of pipe materials used for Bulls stormwater is given in Figure 126. Predominantly, the pipes are made of concrete. But at least 19% of the pipe network is plastic. Material is unknown for approximately 5% of stormwater pipes in Bulls.

Figure 126: Pipe Material - Bulls Stormwater



4.23.1.2 Asset Capacity/Performance

A Stormwater Management Plan is not currently available for the whole town although the Johnson Street catchment has had a report into capacity produced in 2004. Changes in rainfall patterns result at times in parts of the system being under capacity, although this is limited and not of serious enough nature to cause concern.

The system generally is capable of carrying a 10% AEP storm. Development improvements to pipe outlet systems have improved the performance of the capacity of the 10% AEP storm in critical catchments. Open drain clearance in 2002 improved flow characteristics.

Catchments meet the requirements for carrying the 1% AEP storm with minor flooding not exceeding floor heights as required under the Building Act.

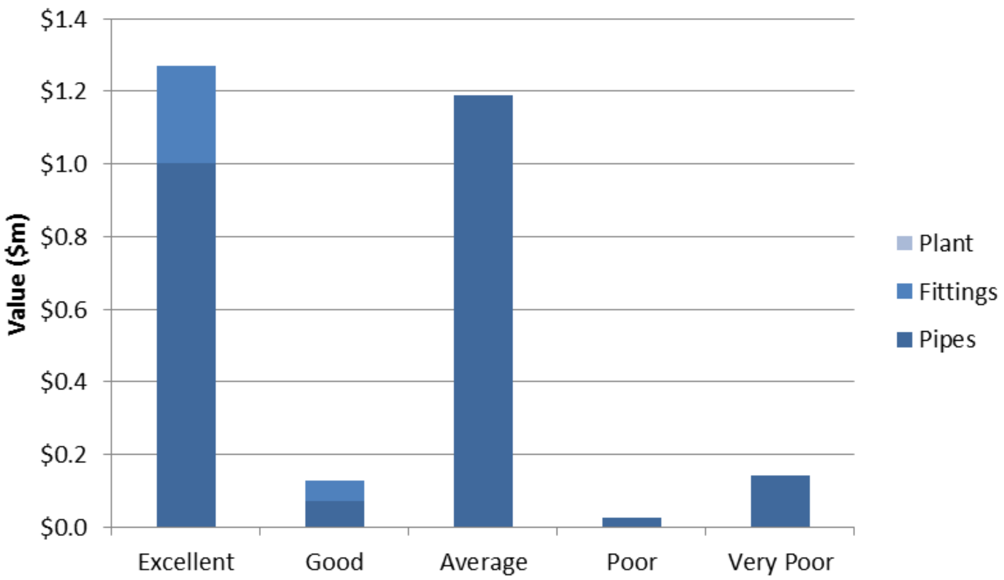
The Bulls system is considered to be efficient for the current state of development but is reliant on the maintenance of private property drainage.

Stormwater reticulation is a passive (gravity) system and available to ratepayers at all times. There are no plant assets associated with the network that require servicing, or maintenance off-line. There are no pump stations.

Reliability is solely restricted by the occurrence of blockages in the system caused by the ingress of vegetation (lawn clippings, leaves and deadfall wood), solid waste (rubbish bags, plastic bottles) and tree root intrusions. Regular servicing of sumps and grit traps, the clearance of pipes subject to root damage or debris, and repair of failed pipes should ensure the free passage of stormwater, subject to the system's capacity to handle the volumes of water envisioned.

The performance of stormwater assets for Bulls is shown in Figure 127. The greatest value of assets comes under the "Excellent" performance category, but most pipes are only "Average". There are some assets rated as "Poor" or even "Very Poor" for performance.

Figure 127: Asset Performance – Bulls Stormwater



4.23.1.3 Asset Condition

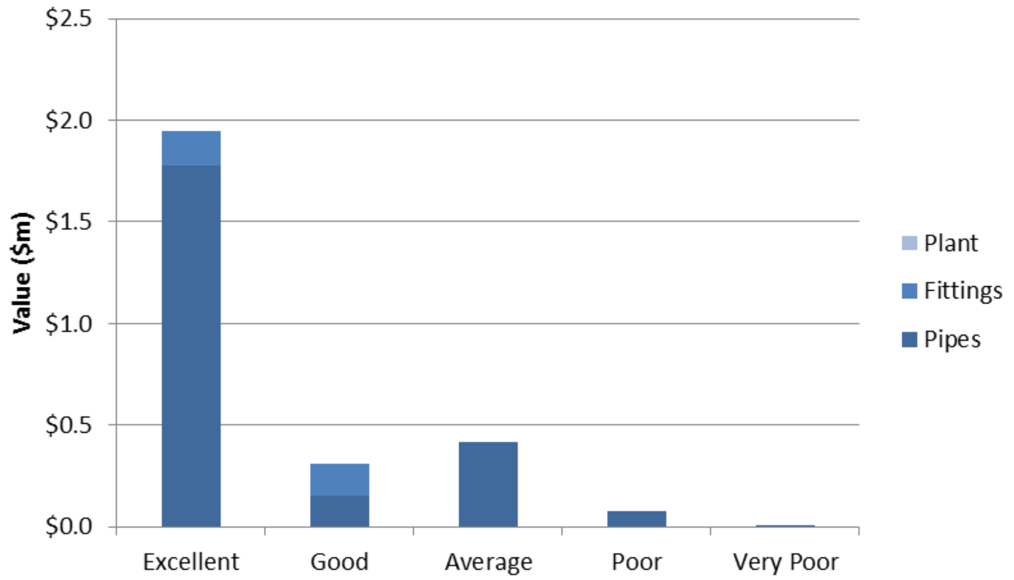
The knowledge of stormwater reticulation is good. In-house surveys, GPS surveys and field inspections have been incorporated into the GIS database. Reticulation pipes are generally of concrete construction. Lead-ins and sumps from kerbside channels to manholes are documented, and confidence of the pipe sizes, materials and condition has improved since 2008.

Accuracy of reticulation data has improved since the 2008 Asset Management Plan. Approximately 16% of pipes have been inspected, with a goal of increasing that figure to 100% by 2016. A condition assessment of most manholes has also been conducted within the last 5 years.

A lack of accurate installation data decreases confidence for modeling the remaining economic life. By grouping many assets as being installed in 1965, many assets are modelled in the AMS as requiring renewal circa 2026–2030. Replacement date uncertainties are inherent in this type of predictive modeling. Condition grading and more accurate dates of installation allow the Council to smooth out these spikes.

The condition of Bulls stormwater assets is summarised in Figure 128. Most of the assets are still in "Excellent" condition, according to the information in our Asset Register. However, not all pipes have been visually inspected, and values may be interpolated based on pipes of similar location, age, material and diameter. Condition grading following CCTV inspections and more accurate dates of installation will allow the Council to smooth out these spikes. Some reprioritisation is expected following this work.

Figure 128: Asset Condition – Bulls Stormwater



4.23.1.4 Asset Valuations

Infrastructure for stormwater in Bulls is shown by asset group value in Table 82.

Table 82: Value by Asset Group – Bulls Stormwater (29 Jan 2015)

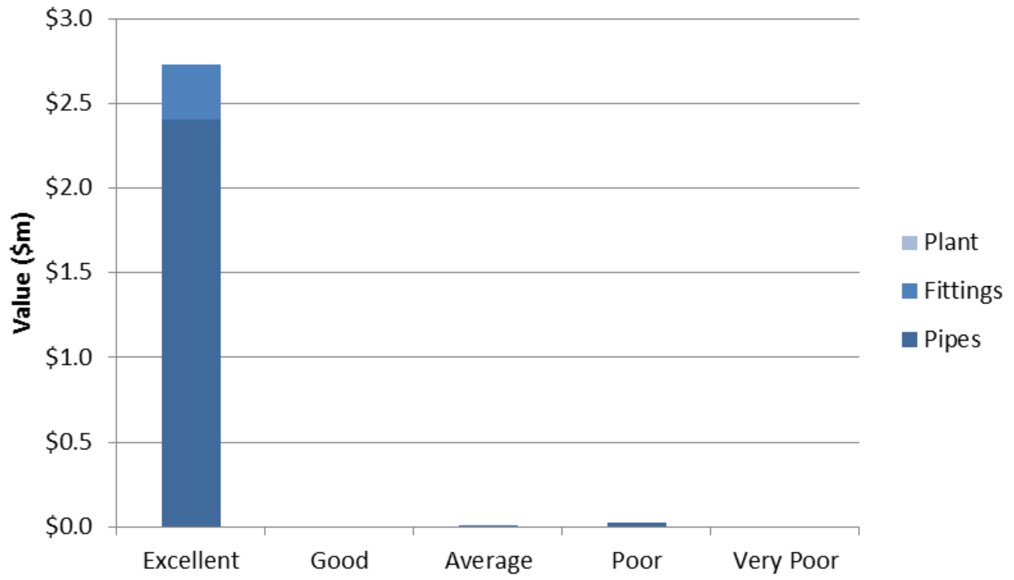
Asset Group	Replacement Cost ($)	Written Down Value ($)
Gravity Mains	2,254,182	1,413,964
Manholes	274,251	172,353
Open Drains	22,727	6,636
Sump Leads	136,424	89,191
Service Connections	1,693	1,269
Sumps	6,170	5,174
Wingwalls	43,364	25,834

4.23.1.5 Historic Data

Information on Council's stormwater assets in Bulls is reasonably complete. There is, however, an extensive network of open drains on private property for which information is not known. These drains are not owned or maintained by Council, but they do have an impact on our reticulated system.

The confidence in our asset information for Bulls stormwater is shown in Figure 129. Most of the assets have been given an "Excellent" rating for confidence. However, there are issues around some of the condition information as described in Section 4.23.1.3.

Figure 129: Data Confidence – Bulls Stormwater

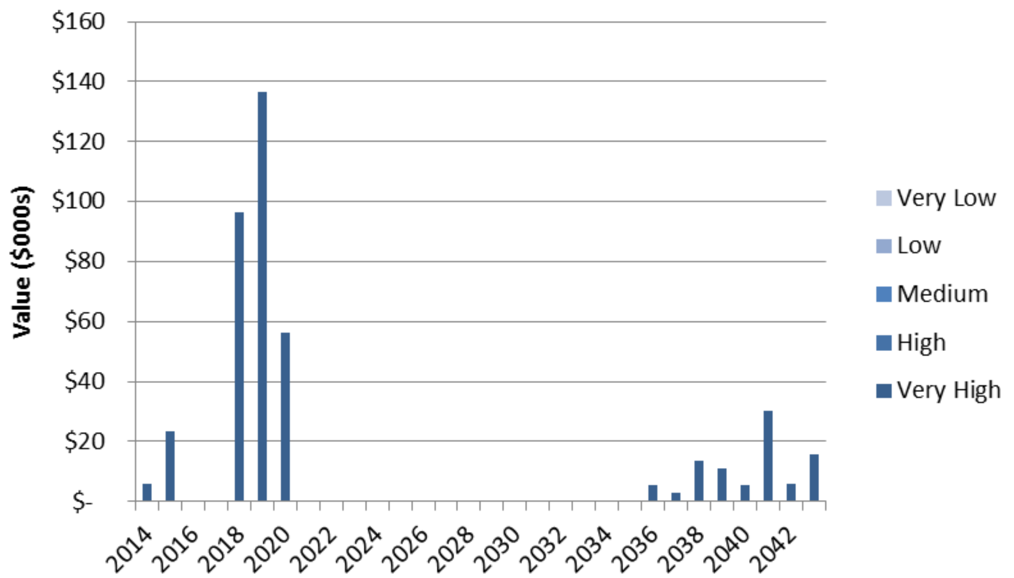


4.23.2 Renewal/Replacement Plan

It is planned to renew the concrete gravity main which crosses the road culvert at 18 Wilson Street, at a cost of some $10,000. There is a similar issue at 138 High Street which will be investigated before work on it is committed.

The renewal forecast for Bulls stormwater is shown in Figure 130. There is a significant amount of expenditure on renewals predicted for 2018-2020. The need to renew Bulls stormwater assets should be assessed in more detail before this time.

Figure 130: Renewal Forecast by Criticality – Bulls Stormwater



4.23.3 Creation/Acquisition/Augmentation Plan

There are no new works planned on the stormwater system for Bulls.

4.24 Hunterville Stormwater

4.24.1 Background Data

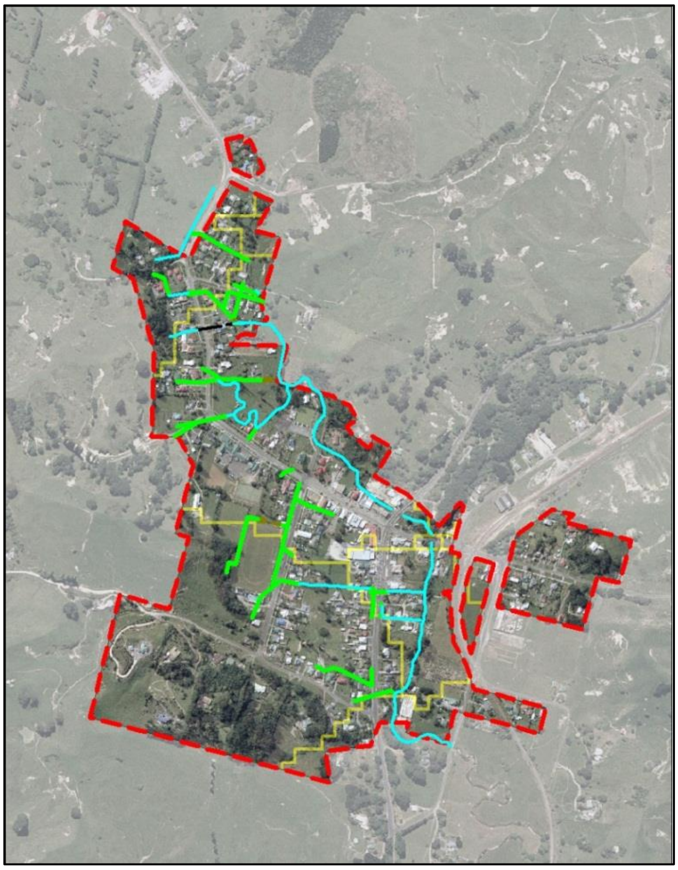
Hunterville is situated at the confluence of several valleys. The natural grades are steep and significant runoff can occur quickly. The natural grade through–out the township varies, but is generally rolling to steep. The Hunterville urban stormwater scheme receives stormwater runoff from the surrounding rural area, conveys it through the town collecting runoff from the urban environment on the way and discharges to the Porewa Stream catchment.

The key issues relating to the scheme are:

- More data collection is required to ascertain the condition and performance of pipes and fittings for this scheme is a high priority.
- Need for fully-reticulated stormwater system in certain areas.
- Open channels are owned and maintained by owners whose property through which they pass. Coordination of maintenance or upgrading works is very difficult and needs to be led by Council.
- Landscaping of property can adversely affect the operation and effectiveness of open channels.

The area served by the Hunterville stormwater scheme is displayed in Figure 131.

Figure 131: Extent of Hunterville Stormwater Scheme



General information on the scheme is shown in Table 83.

Table 83: Background Data - Hunterville Stormwater

Parameter	Data
Population served:	438
Total urban catchment area	0.69 km^2
Number of catchments	11

4.24.1.1 Physical Parameters

The reticulation comprises approximately 2 km of pipeline of assorted sizes, materials, and age. The following table summarises the key asset data for the scheme.

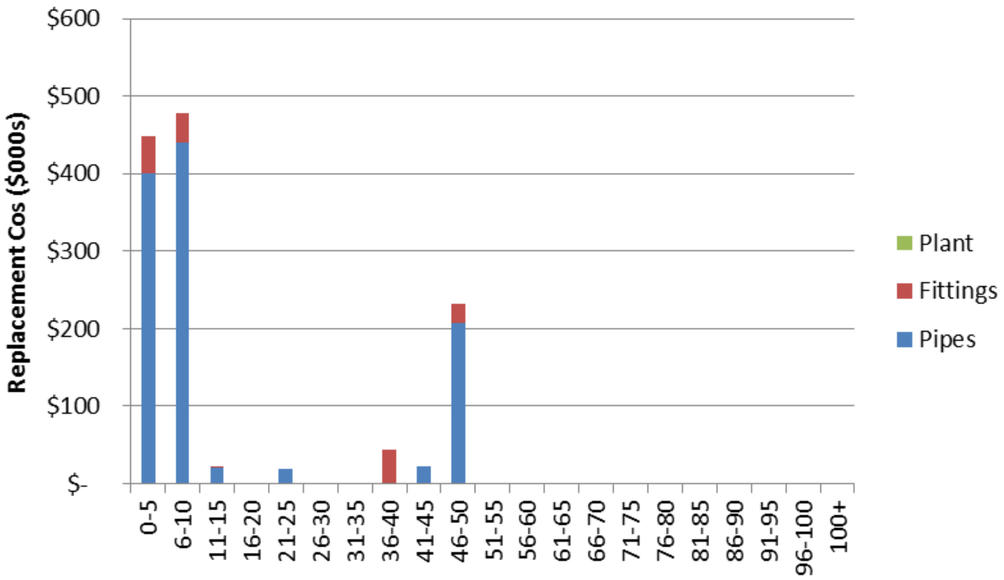
Table 84: Asset Data – Hunterville Stormwater

Asset Type	Asset Parameters
Gravity Mains	2.2 km
Manholes	41
Open Drains	0.2 km
Sump Leads	0.04 km
Sumps	9
Wingwalls	7

Secondary stormwater or road drainage system characteristics are included for completeness but do not form part of this Asset Management Plan.

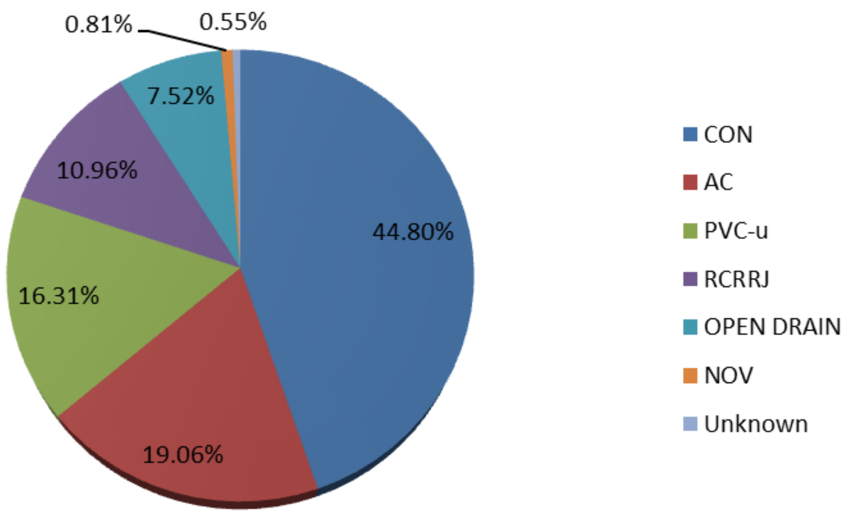
The age profile of stormwater assets for Hunterville is shown in Figure 132. Most of the infrastructure is relatively new (less than 10 years old). There are some pipes and fittings as old as 50 years, however.

Figure 132: Asset Age - Hunterville Stormwater



Most stormwater pipes in Hunterville are concrete, as indicated in Figure 133 by "CON" and "RCRRJ". There is a reasonable amount of AC pipe on the scheme as well (19%).

Figure 133: Pipe Material - Hunterville Stormwater



4.24.1.2 Asset Capacity/Performance

Changes in rainfall patterns result at times in parts of the system being under capacity, although this is limited and not of serious enough nature to cause concern.

The current system is capable of handling a 10% AEP storm. Some minor development works are required to improve critical areas. The system generally is capable of carrying a 10% AEP storm.

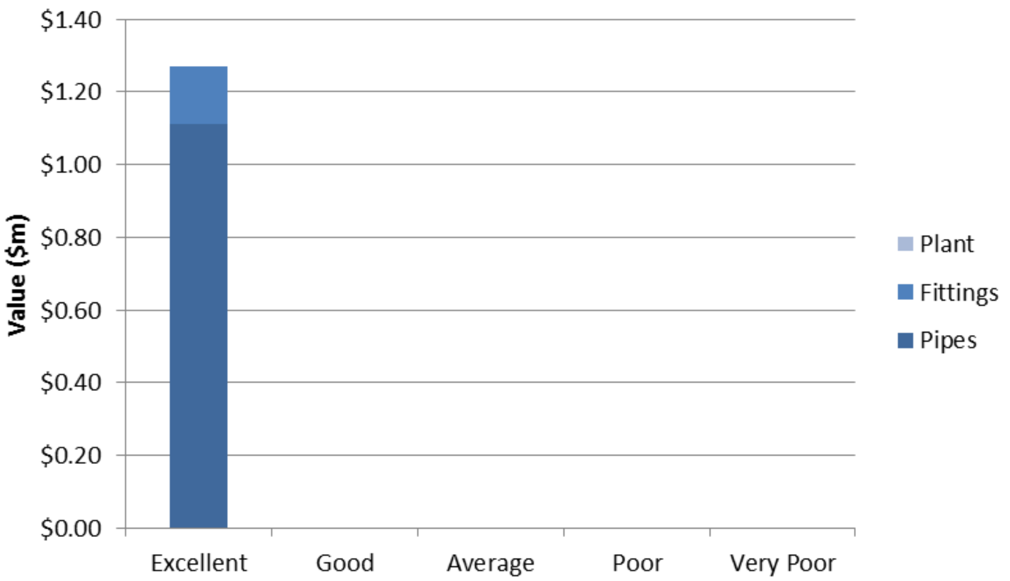
The current system is capable of handling a 1% AEP storm with minor flooding possible. Recent historical events (February 2004, July 2006 and 2007) had a significant negative impact on Hunterville. Since then the focus has been on mitigating or minimizing these.

The Hunterville system is generally regarded as efficient for the current state of development but is reliant on the maintenance of private property drainage.

While the initial design of a stormwater system may be sized to cope with 10% or 1% AEP storms, the network remains susceptible to blockages by debris which severely restricts flow. Most reports of flooding are generally caused by poor control and removal of debris from open drains and pipe inlets.

The performance of stormwater assets in Hunterville is indicated in Figure 134. All of the assets that have been rated for performance have been given an "Excellent" rating.

Figure 134: Asset Performance - Hunterville Stormwater



4.24.1.3 Asset Condition

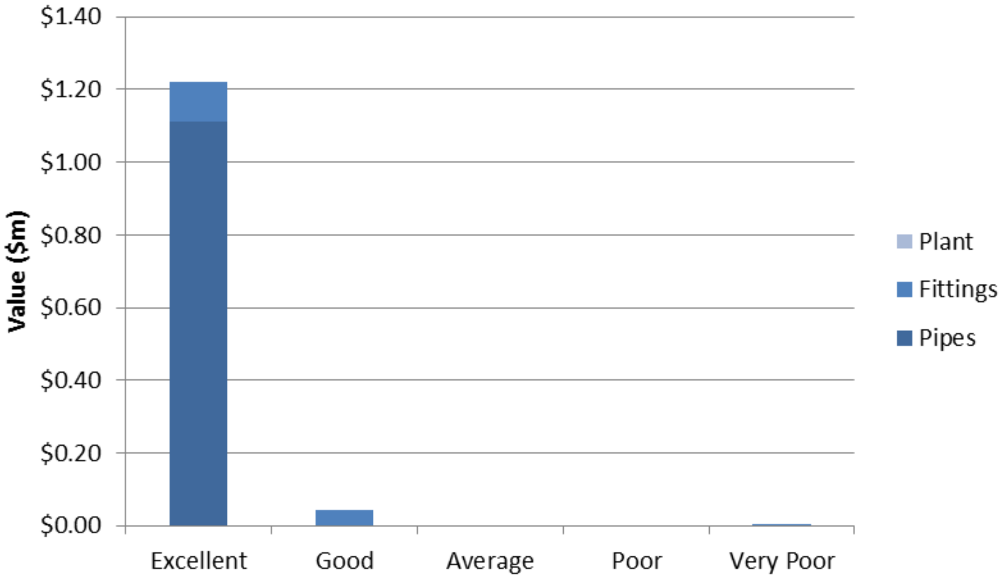
The knowledge of the stormwater layout is poor. In-house surveys have incorporated GPS and aerial surveys, but field surveys and inspections are needed to improve asset confidence in the GIS. Reticulation pipes are predominately AC, with PVC lead-ins. Invert levels are undocumented and a comprehensive survey is required to give more value to the asset register.

Reticulation condition data however is variable in accuracy. Data confidence will be improved upon with planned CCTV inspections in the next five years. Similarly, condition data for the manholes, sumps and head works can also be verified at this time.

The current lack of accurate installation age data leads to a poor model for remaining economic life. By grouping many assets as being installed in 1965, many assets are modelled in the asset register as requiring renewal simultaneously. Condition data may even out this peak, and it will require research into construction drawings to determine the maximum age of the reticulation pipes.

The condition of stormwater assets in Hunterville has generally been assessed as "Excellent", as seen in Figure 135. There are some gaps in information for this scheme, however. Condition grading following CCTV inspections and more accurate dates of installation will allow the Council to improve our asset information.

Figure 135: Asset Condition - Hunterville Stormwater



4.24.1.4 Asset Valuations

The total value of stormwater assets in Hunterville is more than $1 million. A breakdown by asset group is shown in Table 85.

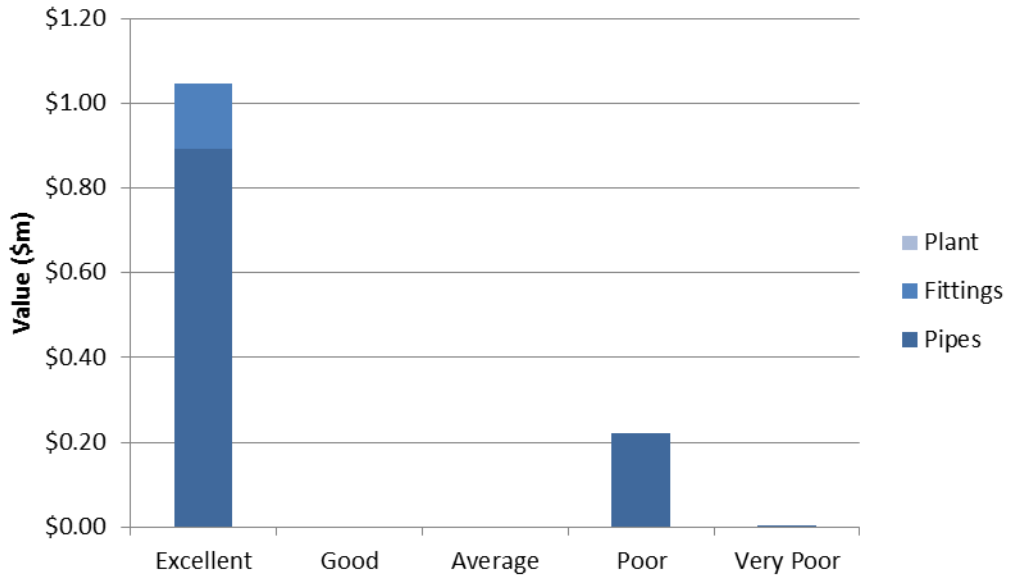
Table 85: Value by Asset Group – Hunterville Stormwater (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Gravity Mains	1,063,920	873,240
Manholes	123,151	94,009
Open Drains	1,525	1,429
Sump Leads	14,704	14,183
Sumps	9,734	9,424
Wingwalls	23,672	20,689

4.24.1.5 Historic Data

The confidence we have in our asset information for this scheme is mostly "Excellent". But there are a number of assets for which the information is believed to be "Poor", and some for which it is "Very Poor". See Figure 136. As shown in Figure 132, there has been heavy investment in the stormwater system for Hunterville and many of the assets are new. There is excellent information on these assets, but for the older assets the information is not as good.

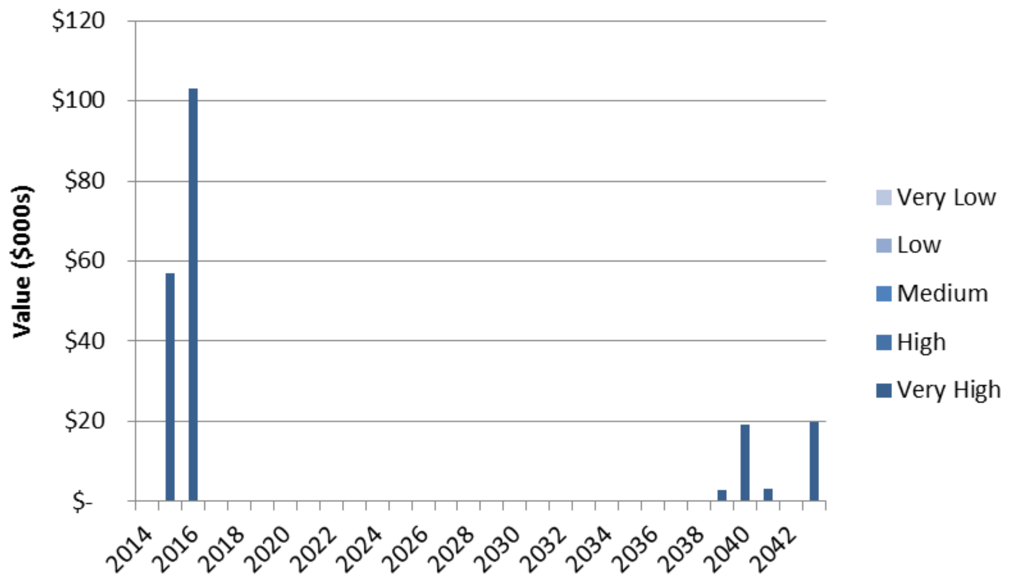
Figure 136: Data Confidence – Hunterville Stormwater



4.24.2 Renewal/Replacement Plan

The renewal forecast for the long term of the scheme is given in Figure 137. There is forecast to be a high level of expenditure needed in the next two years. This needs to be investigated further to determine whether these renewals are actually required yet.

Figure 137: Renewal Forecast by Criticality - Hunterville Stormwater



4.24.3 Creation/Acquisition/Augmentation Plan

No projects have been identified for growth or levels of service on the stormwater system in Hunterville.

4.25 Mangaweka Stormwater

4.25.1 Background Data

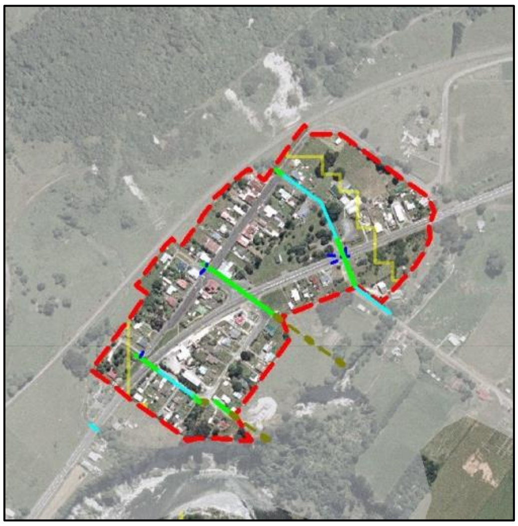
Mangaweka's urban drainage is predominately made of concrete culvert pipes laid around about 1945 connecting roadside drains. It is considered a relatively simple network. The town is situated on a river terrace and the three main drains on Bank St, Kawakawa St and Raumaewa St all drain towards the Rangitikei River. All three drains run underneath the state highway. There are other culverts outside the town boundary which are maintained as road assets either by the local authority or by NZTA.

The key issues relating to the scheme are:

- More data collection is required to ascertain the condition and performance of pipes and fittings for this scheme is a high priority.
- Open channels are owned and maintained by owners whose property through which they pass. Coordination of maintenance or upgrading works is very difficult and needs to be lead by Council.
- Landscaping of property can adversely affect the operation and effectiveness of open channels.
- Determination of catchment areas from topographical maps.

The extent of the stormwater scheme for Mangaweka is shown by Figure 138.

Figure 138: Extent of Mangaweka Stormwater Scheme



A summary of background data for the Mangaweka scheme is given in Table 86.

Table 86: Background Data – Mangaweka Stormwater

Parameter	Data
Population served:	168

Parameter	Data
Total urban catchment area	2.545 km^2
Number of catchments	3

4.25.1.1 Physical Parameters

Key information on the Mangaweka stormwater system is found in the following tables and charts.

Table 87: Asset Data – Mangaweka Stormwater

Asset Type	Asset Parameters
Gravity Mains	0.4 km
Manholes	10
Open Drains	0.2 km
Sump Leads	0.1 km
Wingwalls	3

Secondary stormwater or road drainage system characteristics are included for completeness but do not form part of this plan.

Figure 139 shows the scheme asset age profile. Most of the assets are 46-50 years old, with none being older than this.

Figure 139: Asset Age – Mangaweka Stormwater

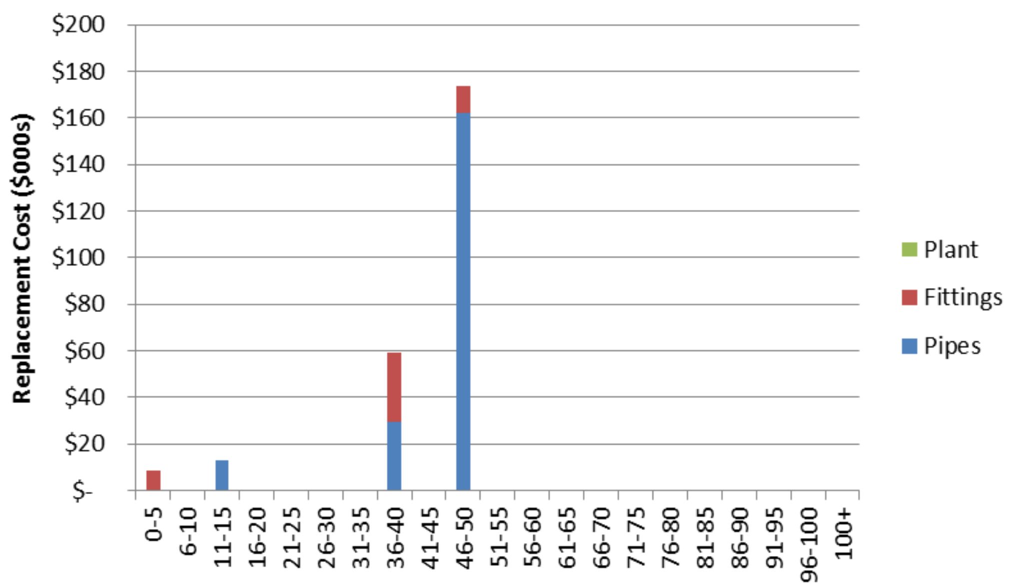
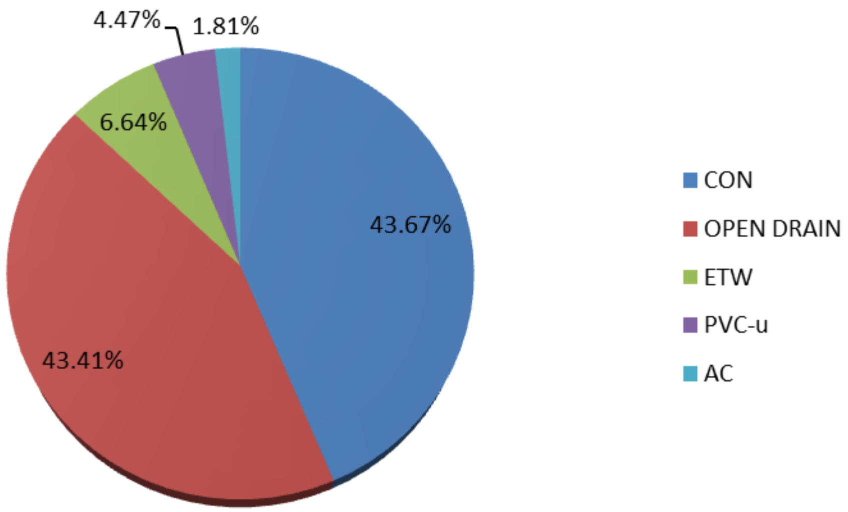


Figure 140 shows the breakdown of pipe materials used in Mangaweka stormwater. The pipes themselves are mostly concrete (43.67%). But a significant amount of the assets (43.41%) are open drains.

Figure 140: Pipe Material – Mangaweka Stormwater



4.25.1.2 Asset Capacity/Performance

The current system is capable of handling a 10% AEP storm. No planned improvements are necessary for the current state of development.

The current system is capable of handling a 1% AEP storm with minor flooding possible. No planned improvements are necessary for the current state of development.

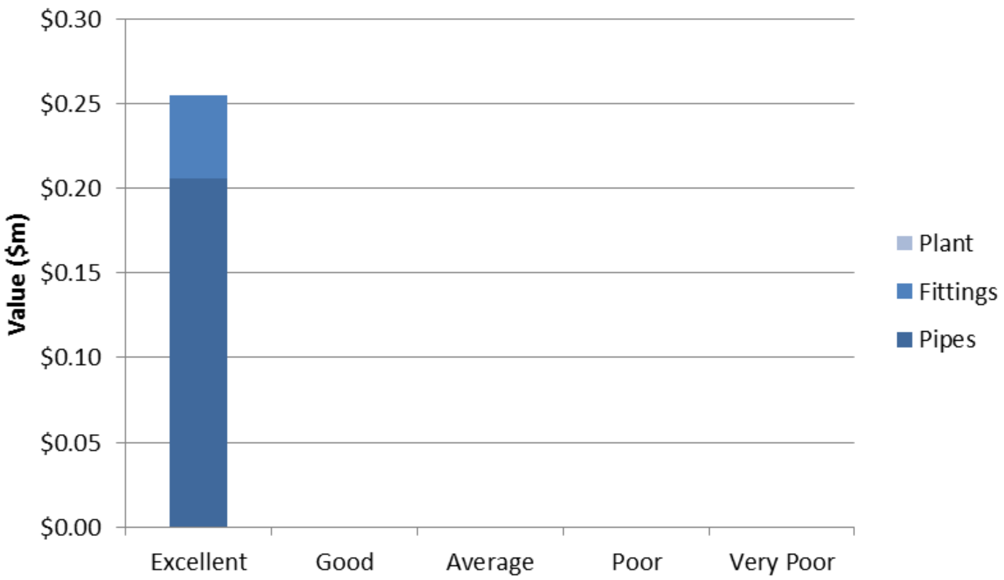
The Mangaweka system is generally regarded as efficient for the current state of development.

While the initial design of a stormwater system may be sized to cope with 10% or 1% AEP storms, the network remains susceptible to blockages by debris which severely restricts flow. Most reports of flooding are generally caused by poor control and removal of debris from open drains and pipe inlets.

Reliability is solely restricted by the occurrence of blockages in the system caused by the ingress of vegetation (lawn clippings, leaves, and deadfall wood), solid waste (rubbish bags, plastic bottles) and tree root intrusions. Regular servicing of sumps and grit traps, and the clearance of pipes subject to root damage or debris, repair of failed pipes, should ensure the free passage of stormwater, subject to the system's capacity to handle the volumes of water envisioned.

The performance of Mangaweka's stormwater assets is shown in Figure 141. All assets on the scheme are recorded as giving "Excellent" performance.

Figure 141: Asset Performance – Mangaweka Stormwater



4.25.1.3 Asset Condition

The knowledge of the stormwater layout is average. In-house surveys have incorporated employee knowledge, GPS and aerial surveys, and field inspections into the GIS. Reticulation pipes are predominately concrete, with small lengths of asbestos, PVC and earthenware.

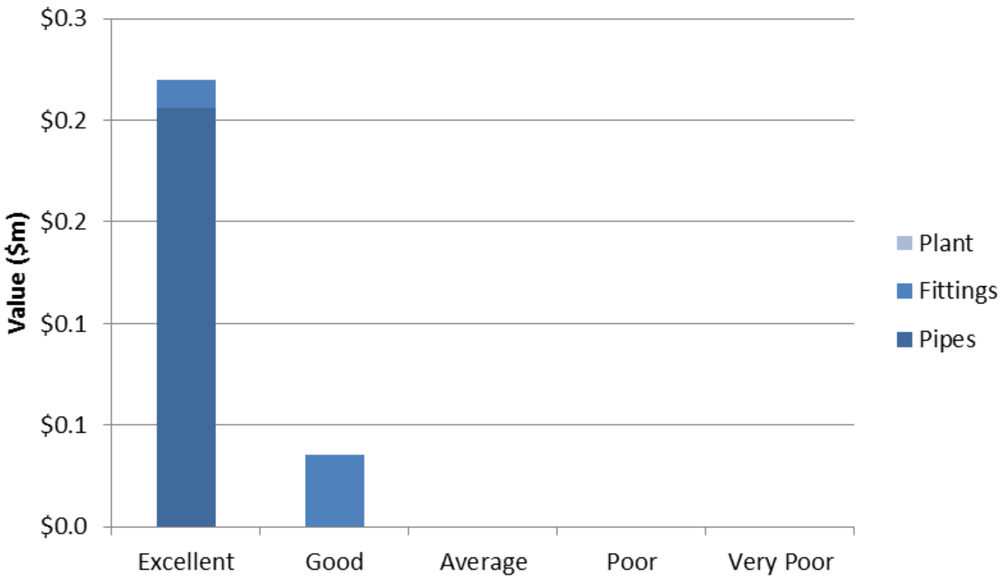
Lead-ins and sumps from kerbside channels to manholes need better documentation, and invert levels and gradients are not recorded.

Reticulation condition data is poor with no assessments being undertaken in the last ten years. Data confidence will be improved upon with planned CCTV inspections throughout the District in the next five years. Similarly condition data for the manholes, sumps and headworks can also be verified at this time.

The current lack of accurate installation age data leads to a poor model for remaining economic life. By grouping many assets as being installed in either 1965 or 1976, many assets are modelled in the asset register as requiring renewal simultaneously. Condition data may even out this peak, and it will require research into construction drawings to determine the maximum age of the reticulation pipes.

Information on the condition of the Mangaweka stormwater assets can be found in Figure 142. About 20% of the network has not been condition assessed or given an interpolated score either. However, these tend to be the newer pipes which it is assumed are still in very good condition. Condition grading following CCTV inspections and more accurate dates of installation will allow the Council to smooth out these spikes. Some reprioritisation is expected following this work.

Figure 142: Asset Condition – Mangaweka Stormwater



4.25.1.4 Asset Valuations

Mangaweka's stormwater asset values are shown by group in Table 88.

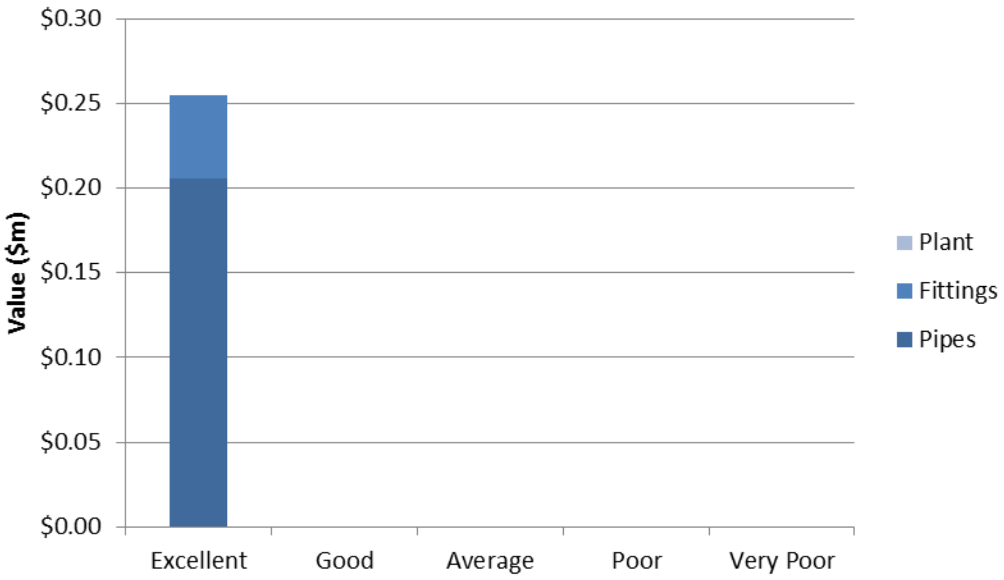
Table 88: Value by Asset Group – Mangaweka Stormwater (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Gravity Mains	164,813	102,714
Manholes	27,192	17,321
Open Drains	2,281	1,949
Sump Leads	37,648	22,672
Wingwalls	19,381	14,143

4.25.1.5 Historic Data

There is only a small number of stormwater assets in Mangaweka. Most of these are open drains adjacent to roads. The majority of stormwater pipes on the Council system are culverts crossing roads. There is "Excellent" confidence in the asset data we have for the Mangaweka stormwater system, as shown in Figure 143. As mentioned earlier, however, around 20% of the network does not have condition information attached to it as yet.

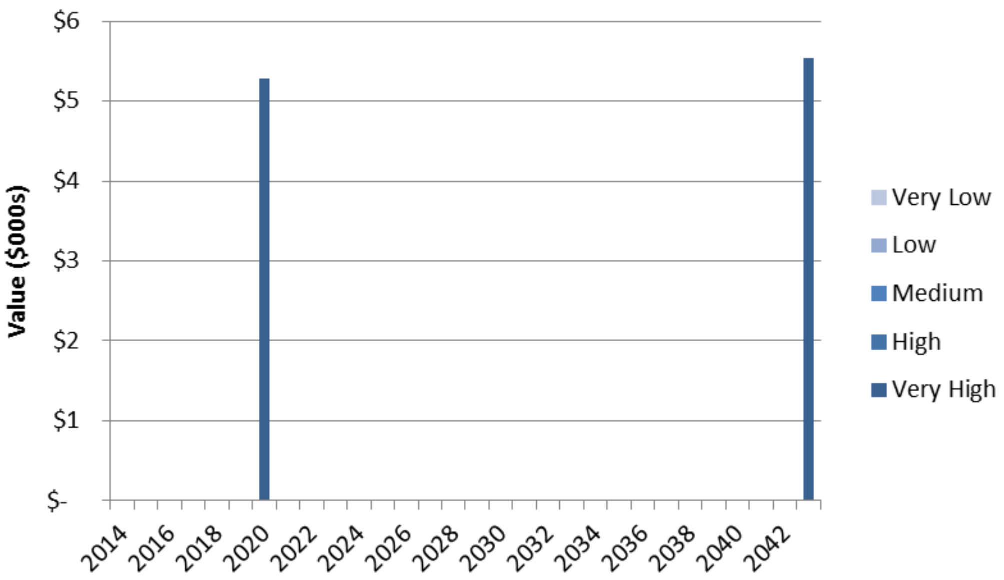
Figure 143: Data Confidence – Mangaweka Stormwater



4.25.2 Renewal/Replacement Plan

The projected renewals for Mangaweka are shown in Figure 144. There are two projected bursts of renewal expenditure required: one in 2020, and the other in 2044. The performance and condition of the network will be monitored regularly to determine whether renewals are required prior to these dates.

Figure 144: Renewal Forecast by Criticality – Mangaweka Stormwater



4.25.3 Creation/Acquisition/Augmentation Plan

There are no new works planned for Mangaweka stormwater over the life of this Plan.

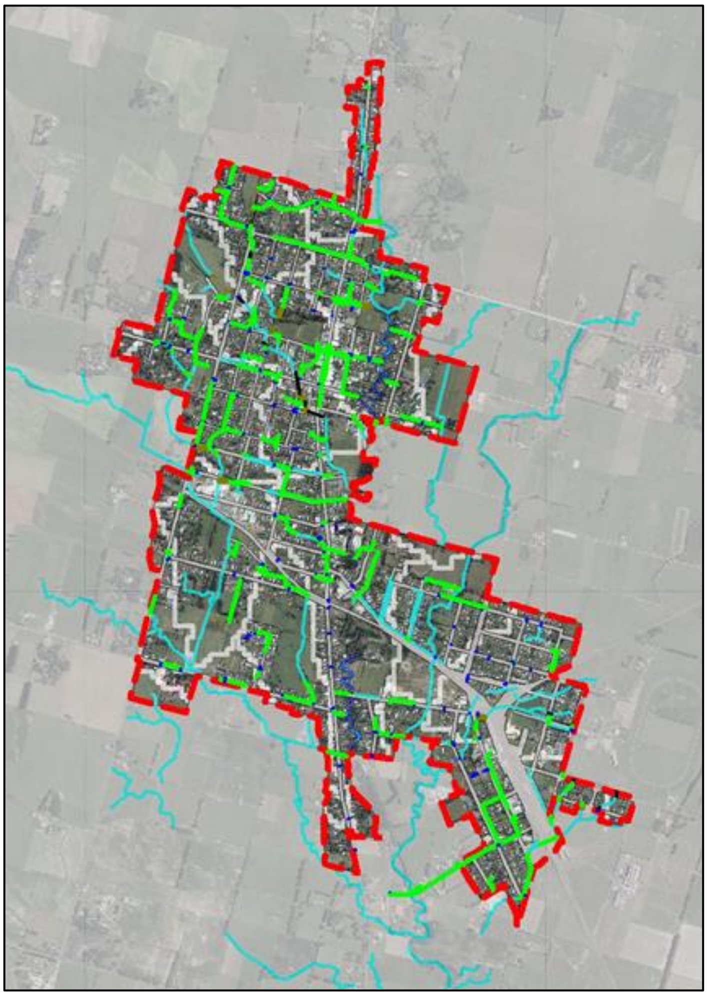
4.26 Marton Stormwater

4.26.1 Background Data

The Marton urban stormwater scheme receives stormwater runoff from the surrounding rural area, conveys it through the town collecting runoff from the urban environment on the way and discharges to the Tutaenui Stream catchments. Marton is situated on mildly rolling terrain, which gradually slopes toward the Tutaenui Stream. The natural grade varies, but is generally mild.

The Marton stormwater system catchment is shown in Figure 145.

Figure 145: Extent of Marton Stormwater Scheme



The key issues relating to the scheme are:

- More data collection is required to ascertain the condition and performance of pipes and fittings for this scheme is a high priority.
- Pro-active maintenance policies are required for this scheme to improve its effectiveness.

- Open channels are owned and maintained by owners whose property through which they pass. Coordination of maintenance or upgrading works is very difficult and needs to be lead by Council.

- Landscaping of property can adversely affect the operation and effectiveness of open channels.

- Horizons have signalled that a resource consent could be required for Marton stormwater.

In reference to the point about resource consents, work underway on stormwater discharges at Hammond Street in Marton is likely to require consent, as is future work on Russell Street. Given this, it has been decided to investigate the acquisition of an overall resource consent for the town of Marton that would cover this and all other discharges from the Council stormwater system. The potential need for a consent is being worked through with Horizons at the moment. This involves the collection of baseline data to determine the significance of any effects on the natural environment. Following a successful application for such a consent to cover Marton, other urban areas would be looked at with the same intent (particularly Bulls and Hunterville).

Background data for the Marton stormwater scheme are given in Table 89.

Table 89: Background Data – Marton Stormwater

Parameter	Data
Population served	4,637
Total urban catchment area	5.754 km^2
Number of catchments	19

4.26.1.1 Physical Parameters

The reticulation comprises approximately 20 km of pipeline of assorted sizes, materials, and age. Key asset data is shown in Table 90.

Table 90: Asset Data – Marton Stormwater

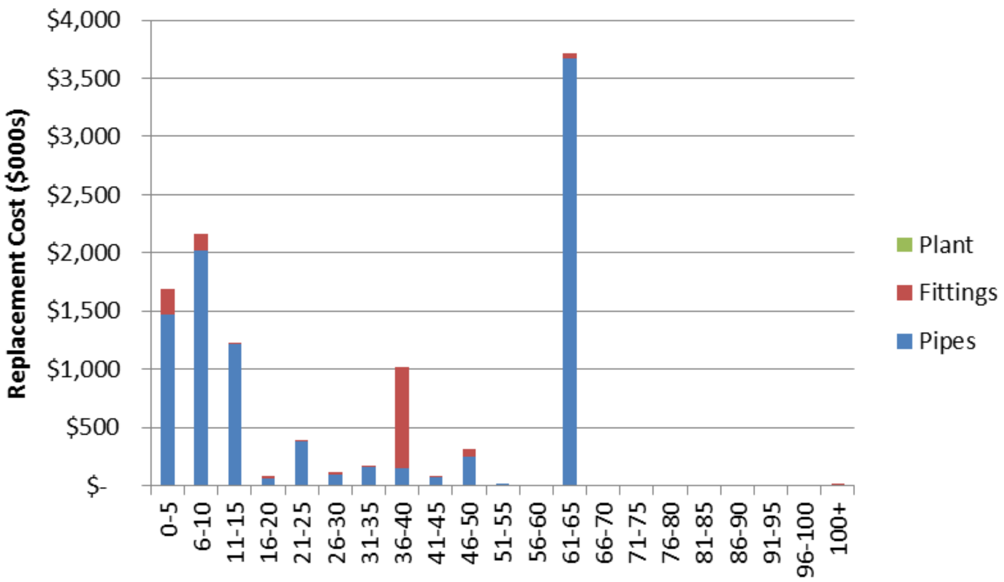
Asset Type	Asset Parameters
Gravity Mains	20.6 km
Manholes	408
Open Drains	1.2 km
Sump Leads	2.4 km
Service Connections	0.2 km
Sumps	40

Asset Type	Asset Parameters
Wingwalls	7

Secondary stormwater or road drainage system characteristics are included for completeness but do not form part of this plan.

The age profile of Marton's stormwater assets is shown in Figure 146. The assets are mostly less than 65 years old, with a significant proportion less than 15 years old.

Figure 146: Asset Age – Marton Stormwater



4.26.1.2 Asset Capacity/Performance

A Stormwater Management Plan is not currently available for the whole town, although two catchments have been documented. Changes in rainfall patterns result at times in parts of the system being under capacity, although these occurrences are limited and not of serious enough nature to cause concern from a network perspective they are to the affected property owners at the time.

The system generally is capable of carrying a 10% AEP storm. Development improvements to pipe outlet systems have improved the performance of the capacity of a 10% AEP storm in the critical catchments.

Catchments meet the requirements for carrying a 1% AEP storm with minor flooding not exceeding floor heights as required under the Building Act.

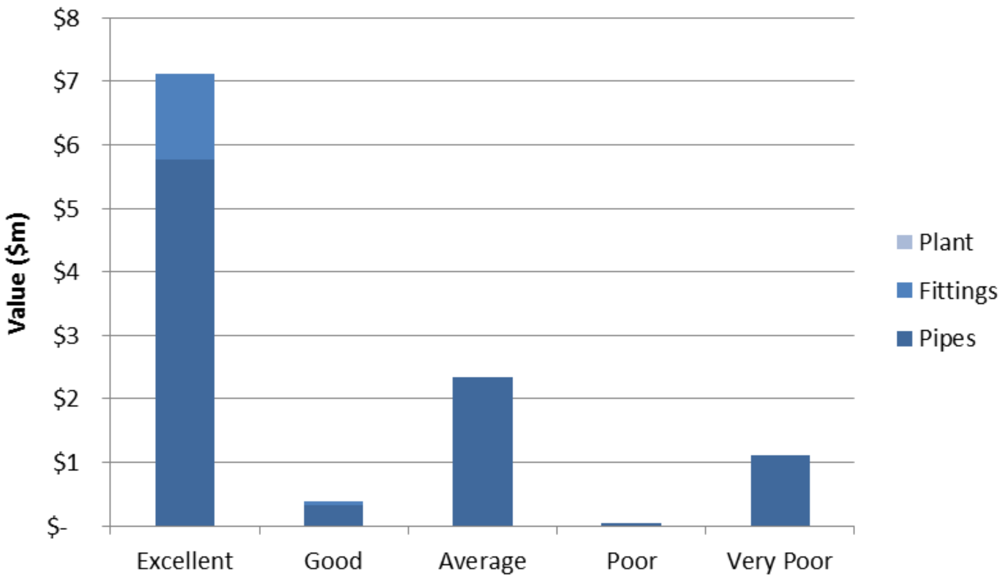
The Marton system is considered to be economically efficient for the current state of development but is reliant on the maintenance of private property drainage.

While the initial design of a stormwater system may be sized to cope with 10% or 1% AEP storms, the network remains susceptible to blockages by debris which severely restricts flow. Most reports of flooding are generally caused by poor control and remedied by removal of debris from open drains and pipe inlets.

Reliability is solely restricted by the occurrence of blockages in the system caused by the ingress of vegetation (lawn clippings, leaves, and deadfall wood), solid waste (rubbish bags, plastic bottles) and tree root intrusions. Regular servicing of sumps and grit traps, and the clearance of pipes subject to root damage or debris, repair of failed pipes, should ensure the free passage of stormwater, subject to the system's capacity to handle the volumes of water envisioned.

Performance ratings for the stormwater assets in Marton are given in Figure 147. There is a wide cross-section of performance across the asset groups, particularly stormwater pipes. But most are rated as "Excellent" for performance.

Figure 147: Asset Performance – Marton Stormwater



4.26.1.3 Asset Condition

In general, the knowledge of the stormwater layout is good. In-house surveys have incorporated employee knowledge and field inspections into GIS. Some previously unknown stormwater pipe has been discovered by staff in the streets around Wilson Park. Some of this pipe may only be 20 years old, and may have been constructed by road contractors during area wide pavement rehabilitation work.

Reticulation pipes are generally of concrete construction (150 mm diameter and up). The majority of lead-ins and sumps from kerbside channels to manholes are documented, with pipe diameter and materials. Private connections are shown where observation of the entry point to the manhole is known.

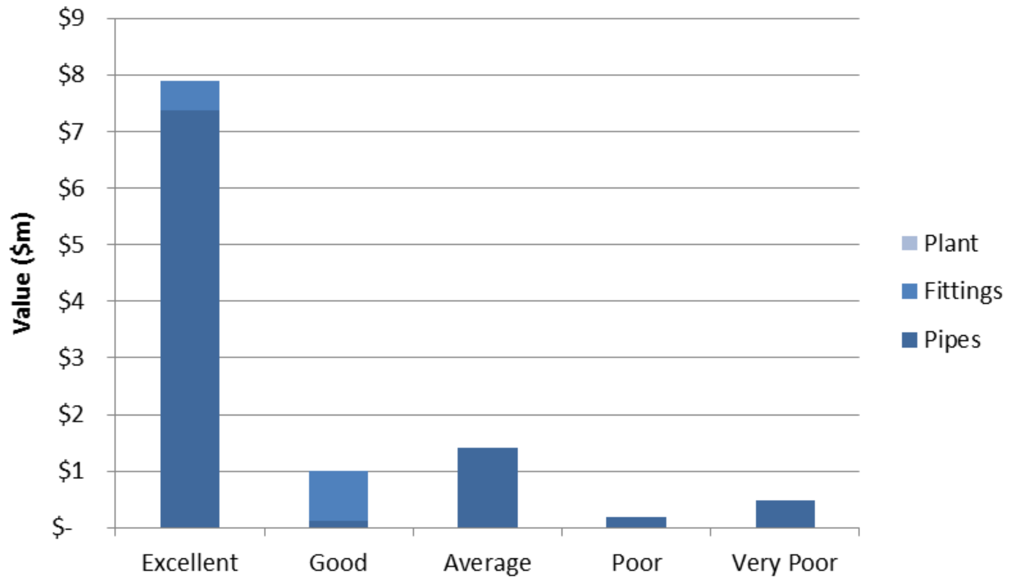
Accuracy of reticulation data has improved since the 2008 Asset Management Plan. Approximately 20% of pipes have been inspected, with the goal of increasing that figure to 100% by 2016. Condition assessment s of most manholes has also been conducted.

A lack of accurate installation data decreases confidence for modelling the remaining economic life. By grouping many assets as being installed in 1965, many assets are modelled in the asset register as requiring renewal circa 2026–2030. Replacement date uncertainties are inherent in this type of predictive modelling.

Condition grading following CCTV inspections and more accurate dates of installation will allow the Council to smooth out these spikes. Some reprioritisation is expected following this work.

The current assessment of condition information for stormwater in Marton is given in Figure 148.

Figure 148: Asset Condition – Marton Stormwater



4.26.1.4 Asset Valuations

The value of Marton's stormwater assets is broken down in Table 91.

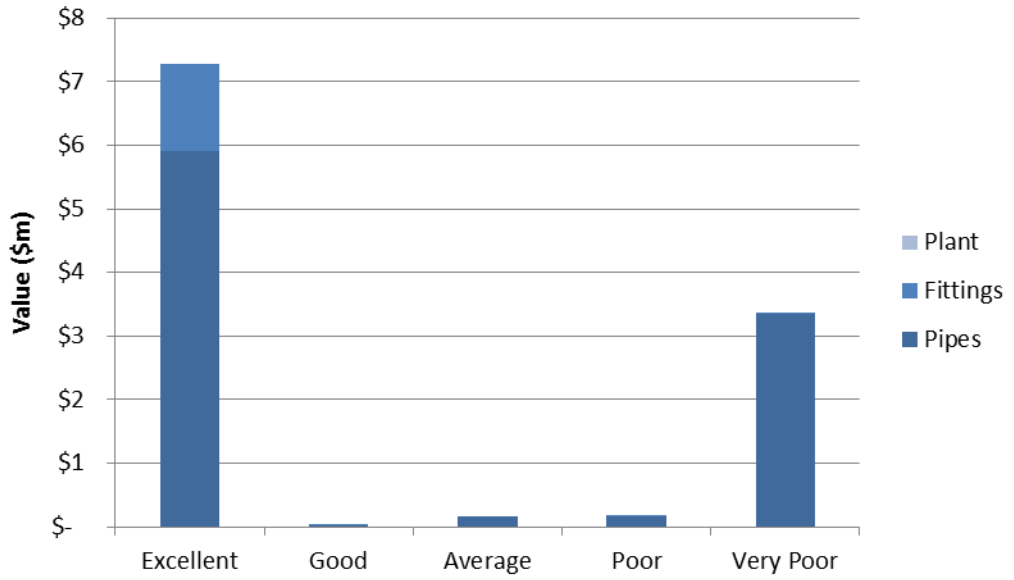
Table 91: Value by Asset Group – Marton Stormwater (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Gravity Mains	7,982,463	5,557,865
Manholes	1,342,381	944,285
Open Drains	11,888	10,012
Sump Leads	676,156	508,655
Service Connections	34,864	29,888
Sumps	42,463	37,359
Wingwalls	26,966	24,847

4.26.1.5 Historic Data

Data confidence for Marton is shown in Figure 149. Although most data has "Excellent" confidence attached to it, there are more than $3 million worth of Marton stormwater assets that have "Very Poor" information. Many of our stormwater pipes for Marton are of unknown diameter or material, according to our asset register. The nature of the stormwater system is that it is not contiguous, as a water supply system is. Assets are disparate, not always connected to other parts of the reticulated system, and can be difficult to locate. In addition, many stormwater assets are of a necessity located on private property. There is good information on our newer stormwater assets, but it is lacking for the older ones.

Figure 149: Data Confidence – Marton Stormwater



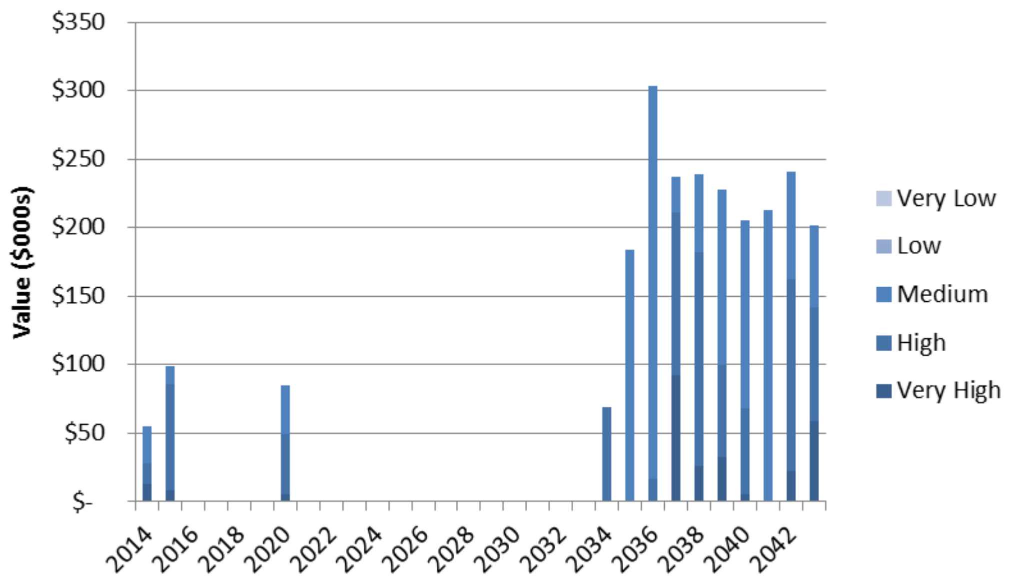
4.26.2 Renewal/Replacement Plan

Renewal work on the Marton stormwater system has been carried out recently at the Water Treatment Plant, Frae-Ona Park, Main Street/Potaka Street, and the Skerman Street/Bond Road corner.

Upcoming renewals for Marton include urgent work to address flooding issues at Hammond Street and Russell Street. The Hammond Street work is expected to cost $50,000, while the Russell Street work could cost as much as $200,000.

The major renewals which are included in the 30-year projections are shown in Figure 150.

Figure 150: Renewal Forecast by Criticality – Marton Stormwater



4.26.3 Creation/Acquisition/Augmentation Plan

There are no new works planned for the Marton stormwater system in the predicted future. Some of the renewals work discussed above does however have a component of increasing levels of service.

4.27 Ratana Stormwater

4.27.1 Background Data

The Ratana urban stormwater scheme collects stormwater runoff primarily from the urban area with only a small rural catchment, conveys it through the town and discharges to the Waipu Stream. Ratana is situated on mildly rolling terrain, which gradually slopes toward the Waipu Stream.

The key issues relating to the scheme are:

- More data collection is required to ascertain the condition and performance of pipes and fittings for this scheme is a high priority.
- Open channels are owned and maintained by owners whose property through which they pass. Coordination of maintenance or upgrading works is very difficult and needs to be lead by Council.
- The lack of administrative linkage between public reticulation, private pipes and open drains, road sumps and discharge pipes is an area of confusion.
- The community would benefit from a fully reticulated stormwater system due to the lack of permeability of the soil. Based on the community size this is uneconomic at this point in time.

The Ratana stormwater system is shown in Figure 151.

Figure 151: Extent of Ratana Stormwater Scheme

Key data for the scheme is given in Table 92.

Table 92: Background Data - Ratana Stormwater

Parameter	Data
Population Served	347
Total urban catchment area	2.2 km^2
Number of catchments	3

4.27.1.1 Physical Parameters

The reticulation comprises just over 1 km of pipes. Table 93 summarises some of the data on our Ratana stormwater assets.

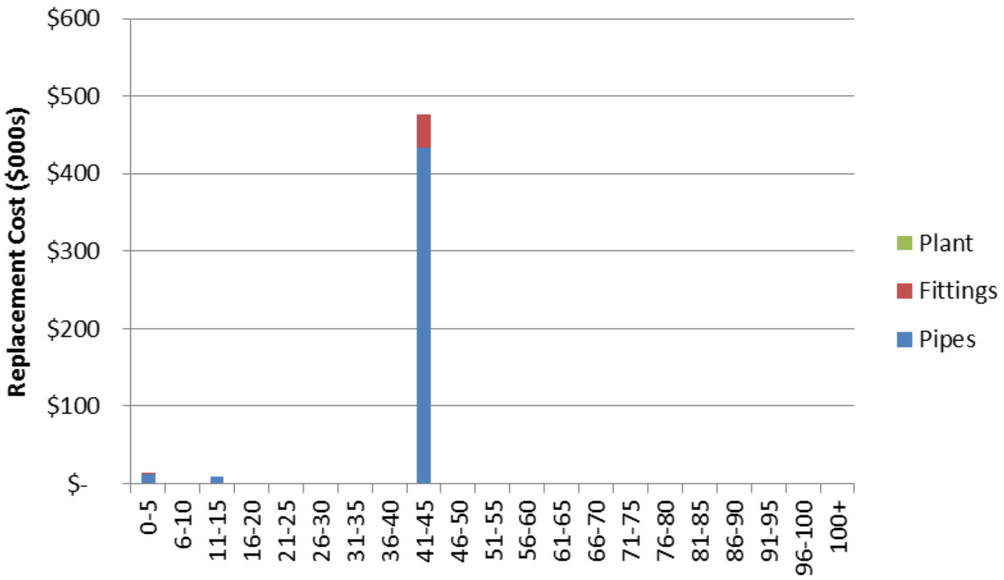
Table 93: Asset Data – Ratana Stormwater

Asset Type	Asset Parameters
Gravity Mains	1.3 km
Manholes	15
Sump Leads	3
Sumps	2

Secondary stormwater or road drainage system characteristics are included for completeness but do not form part of this plan.

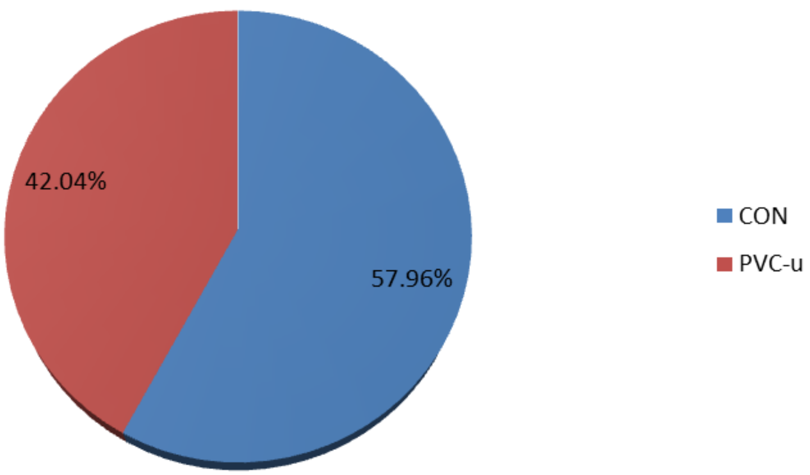
Figure 152 gives an indication of the age of stormwater assets at Ratana. They are almost entirely 41-45 years old.

Figure 152: Asset Age - Ratana Stormwater



Stormwater pipes in Ratana are either concrete (57.96% of the network) or uPVC plastic (the remaining 42.04%).

Figure 153: Pipe Material - Ratana Stormwater



4.27.1.2 Asset Capacity/Performance

There have been no documented reports of flooding due to under capacity of the pipes.

The system generally is capable of carrying a 10% AEP storm.

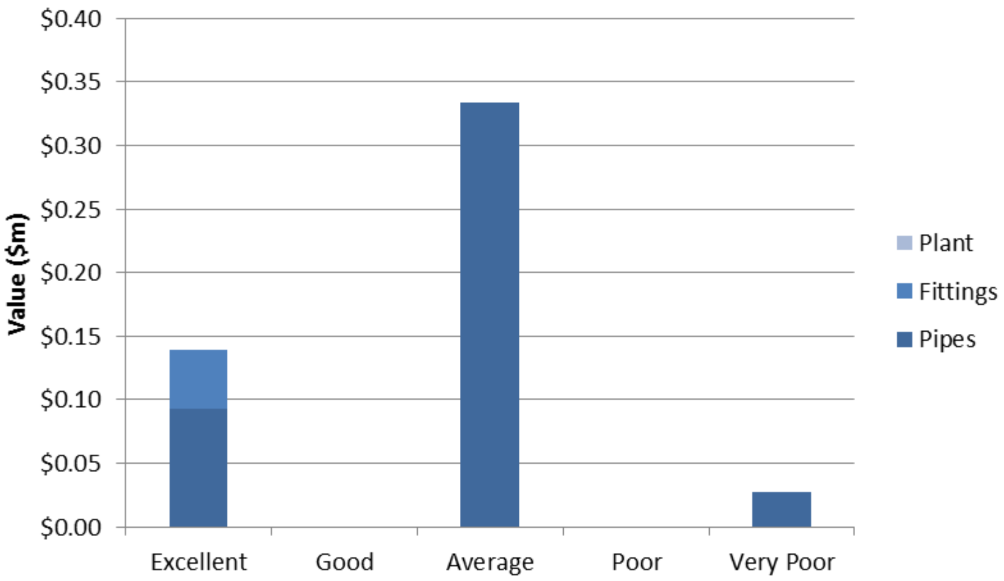
Catchments meet the requirements for carrying a 1% AEP storm, with minor flooding not exceeding floor heights as required under the Building Act.

The Ratana system is considered to be efficient for the current state of development but is reliant on the maintenance of private property drainage.

Reliability is solely restricted by the occurrence of blockages in the system caused by the ingress of vegetation (lawn clippings, leaves, and deadfall wood), solid waste (rubbish bags, plastic bottles) and tree root intrusions. Regular servicing of sumps and grit traps, and the clearance of pipes subject to root damage or debris, repair of failed pipes, should ensure the free passage of stormwater, subject to the system's capacity to handle the volumes of water envisioned.

Figure 154 shows the performance ratings that have been assigned to stormwater assets in Ratana. The majority of the network is only "Average" when it comes to performance. There are some assets rated as "Excellent", in particular fittings, but some are giving only "Very Poor" performance.

Figure 154: Asset Performance - Ratana Stormwater



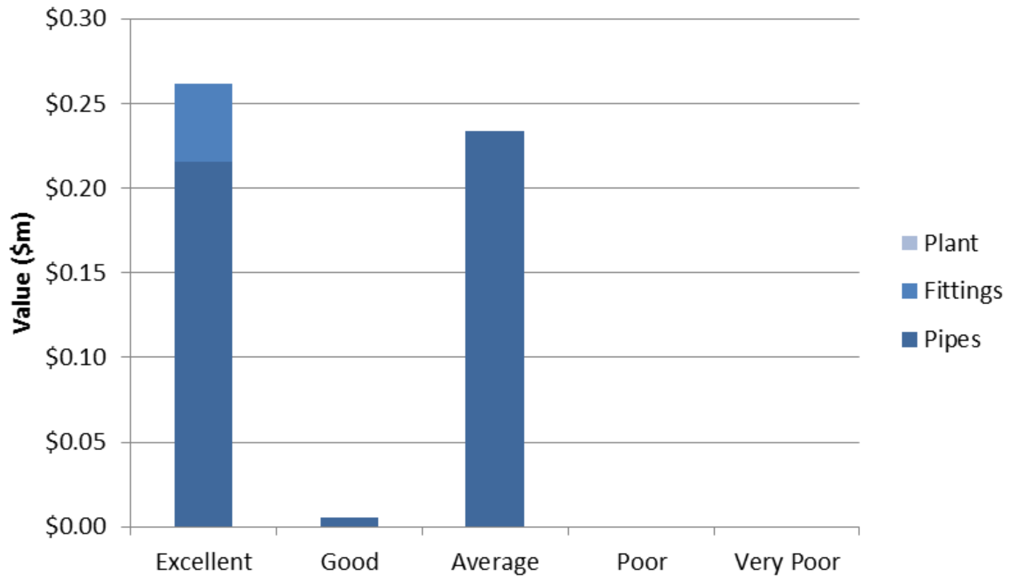
The proposed 60-lot subdivision at Ratana is a prime example where the developer is being asked to deal with stormwater within the boundaries of the subdivision, to avoid placing extra strain and expense on the town's stormwater system. This is in line with the principle of hydrological neutrality discussed in Section 3.2.3.

4.27.1.3 Asset Condition

The asset register holds some information about the stormwater layout and is considered to be of good accuracy. However, information is lacking in terms of the capacity or condition of the network. There are few maintenance records for this system indicating it is in good condition. With the age of the network (circa 1970) it would be expected that most pipes are in good condition.

Condition grading following CCTV inspections and more accurate dates of installation will allow the Council to complete an accurate assessment. Some reprioritisation is expected following this work. Current condition information for Ratana stormwater assets is shown in Figure 155. Most are in "Excellent" condition, but a large proportion are only "Average".

Figure 155: Asset Condition - Ratana Stormwater



4.27.1.4 Asset Valuations

Table 94 shows the value of stormwater assets Council owns in Ratana.

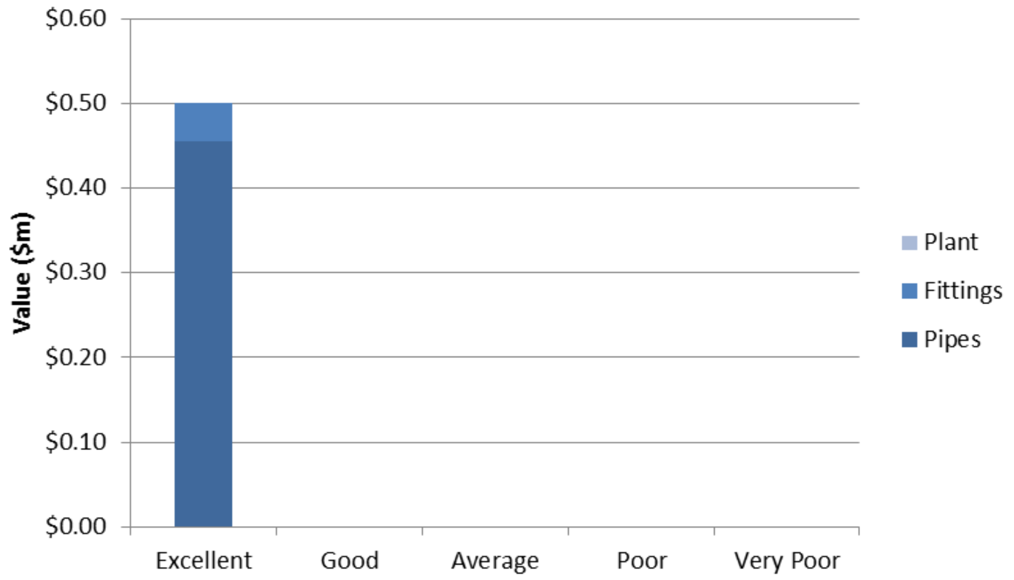
Table 94: Value by Asset Group – Ratana Stormwater (29 Jan 2015)

Asset Group	Replacement Cost ($)	Written Down Value ($)
Gravity Mains	447,223	242,550
Manholes	40,788	25,256
Sump Leads	1,046	470
Sumps	5,438	3,230

4.27.1.5 Historic Data

Stormwater assets that have been given a confidence rating are all considered to have "Excellent" quality of information. The Ratana stormwater system is small in area, and installed in recent history. It is predominantly composed of PVC pipes installed in the 1990s. For this reason, information is generally complete and of good quality. There have however been some assets discovered only recently, for example a 225 mm diameter pipe running down the length of the rugby grounds. This could mean that additional investigation is warranted to find any other unrecorded stormwater assets.

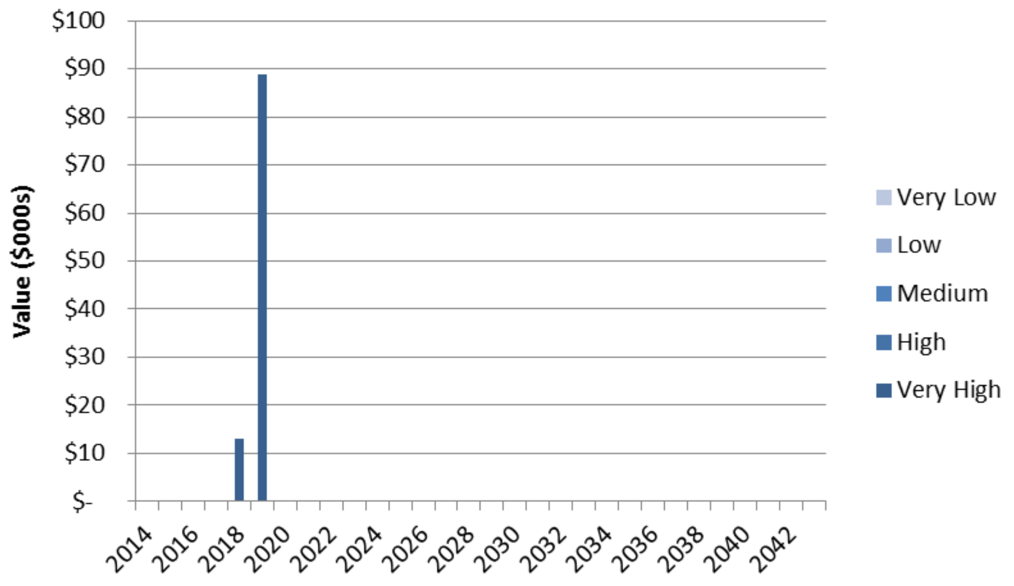
Figure 156: Data Confidence – Ratana Stormwater



4.27.2 Renewal/Replacement Plan

The renewal forecast for the next 30 years is shown in Figure 157. There is expected to be a need to renew almost $90,000 worth of stormwater assets around 2019. The only renewals currently forecast for Ratana stormwater assets are in the long term.

Figure 157: Renewal Forecast by Criticality - Ratana Stormwater



4.27.3 Creation/Acquisition/Augmentation Plan

There are not currently any new works planned for Ratana stormwater. The proposed 60–lot subdivision will be required to contain stormwater within its site boundaries. This is in line with the principle of hydrological neutrality that is being applied in cases across the District and the Region. The requirement for the subdivision will be that post-development stormwater flows from the site must not be any greater than pre-development flows.

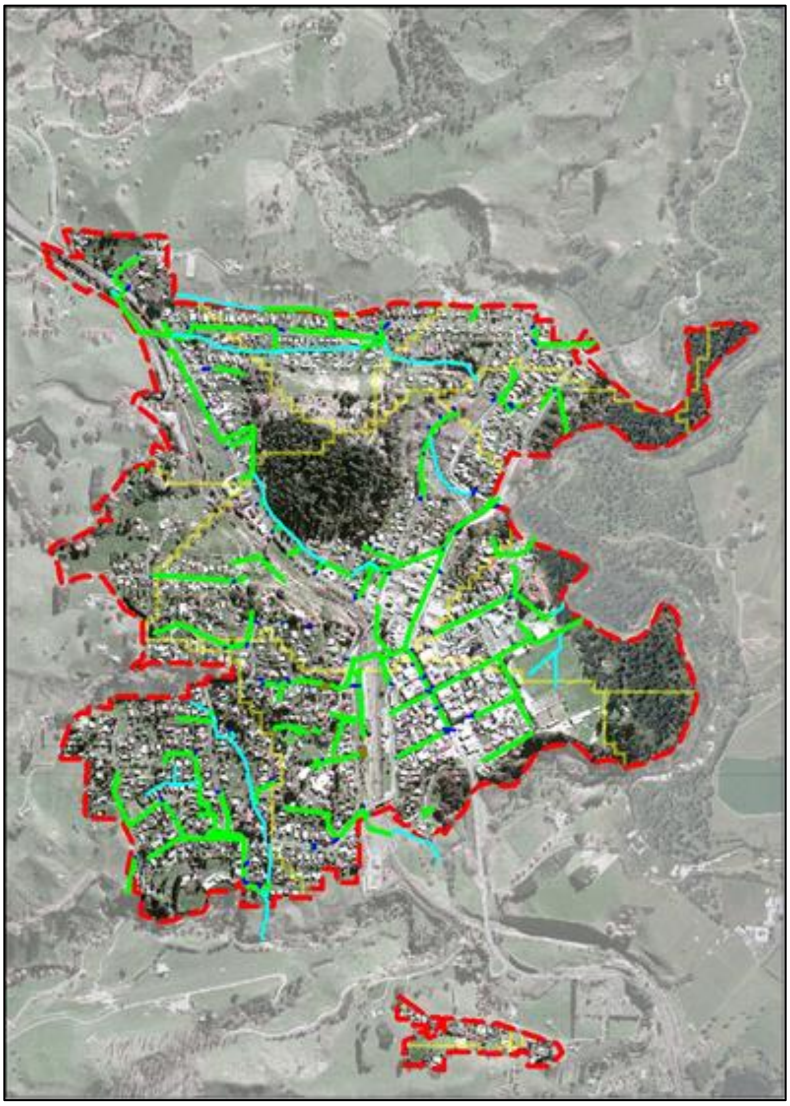
4.28 Taihape Stormwater

4.28.1 Background Data

The Taihape urban stormwater scheme receives stormwater runoff from a relatively small surrounding rural area, conveys it through the town collecting runoff from the urban environment on the way and discharges to the Hautapu River and its tributary catchments. The topography is steep with pipe and drain gradients having significant slopes and high flow velocities. As a result, Taihape has a greater density of reticulated stormwater pipes.

The extent of the scheme is shown in Figure 158.

Figure 158: Extent of Taihape Stormwater Scheme



Background data on the scheme is given in Table 95.

Table 95: Background Data – Taihape Stormwater

Parameter	Data
Population served:	1,759
Total urban catchment area	0.5 km^2
Number of catchments	3

The key issues relating to the scheme are:

- More data collection is required to ascertain the condition and performance of pipes and fittings for this scheme is a high priority.
- Open channels are owned and maintained by owners whose property through which they pass. Coordination of maintenance or upgrading works is very difficult and needs to be lead by Council.
- Road surface drainage requires collection by kerbs and directed to existing stormwater reticulation. Possible upgrading of pipes is required to carry the increased runoff.
- The Taihape West zone, although showing fewer signs of land movement is an area which requires more regular and intensive inspections and prompt follow up of reticulation faults, either condition or performance.
- The lack of administrative linkage between public reticulation, private pipes and open drains, road sumps and discharge pipes is an area of confusion.

4.28.1.1 Physical Parameters

The reticulation comprises approximately 12 km of pipeline of assorted sizes, materials, and age. Asset data for Taihape stormwater is summarised in Table 96.

Table 96: Asset Data – Taihape Stormwater

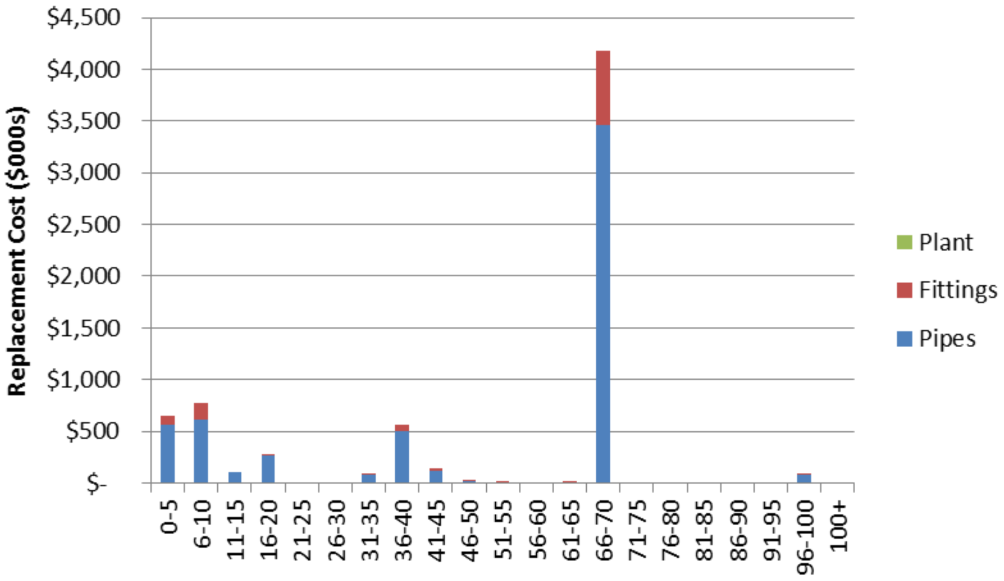
Asset Type	Asset Parameters
Gravity Mains	12.0 km
Manholes	309
Open Drains	0.7 km
Sump Leads	1.8 km
Service Connections	0.1 km
Sumps	12

Asset Type	Asset Parameters
Wingwalls	11

Secondary stormwater, private or road drainage system characteristics are included for completeness but do not form part of this plan.

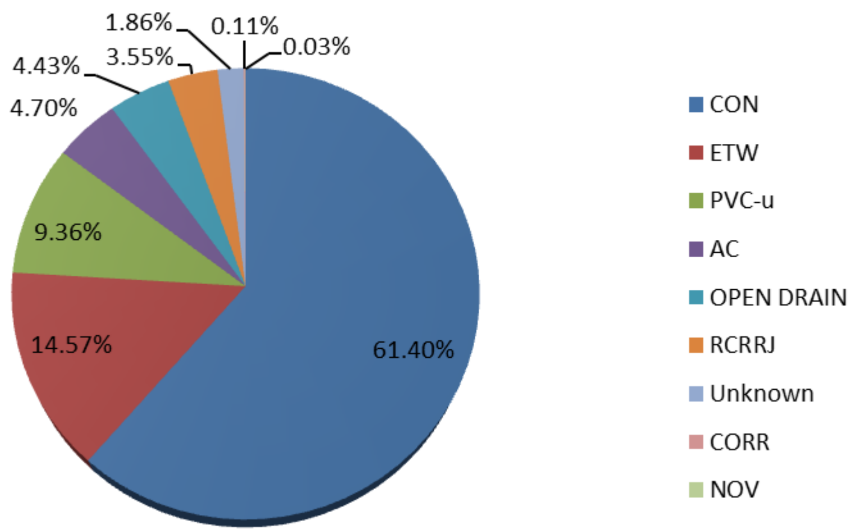
The age of the assets in the Taihape stormwater scheme is indicated in Figure 159. Most of the assets are ageing, at 66-70 years old.

Figure 159: Asset Age – Taihape Stormwater



The most commonly found stormwater pipe material in Taihape is concrete (see Figure 160). There are also significant amounts of glazed earthenware (14.57%) and uPVC (9.36%).

Figure 160: Pipe Material – Taihape Stormwater



4.28.1.2 Asset Capacity/Performance

Changes in rainfall patterns result at times in parts of the system being under capacity, although these occurrences are limited and not of serious enough nature to cause concern from a network perspective they are to the affected property owners at the time.

The system is generally capable of carrying a 10% AEP. Development improvements of the reticulation have increased the performance of the assets in critical catchments.

Catchments meet the requirements for carrying a 1% AEP storm with minor flooding not exceeding floor levels as required in the Building Act. A programme of development will improve on areas of known restrictions in the system.

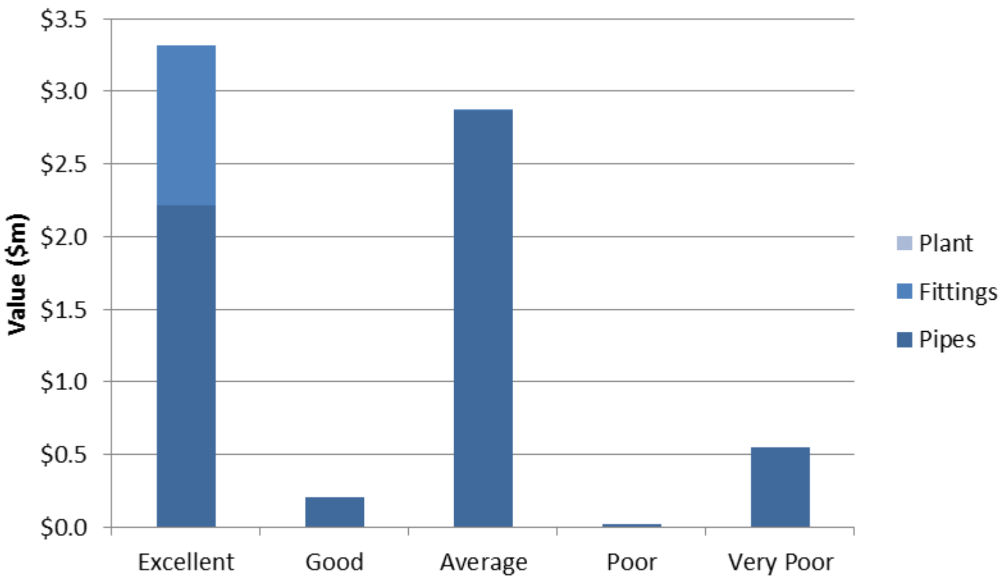
The Taihape stormwater system is considered to be efficient for the current state of development.

Most reports of flooding are generally caused by poor control and remedied by removal of debris from open drains and pipe inlets.

Reliability is solely restricted by the occurrence of blockages in the system caused by the ingress of vegetation (lawn clippings, leaves, and deadfall wood), solid waste (rubbish bags, plastic bottles) and tree root intrusions. Regular servicing of sumps and grit traps, and the clearance of pipes subject to root damage or debris, repair of failed pipes, should ensure the free passage of stormwater, subject to the system's capacity to handle the volumes of water envisioned.

The performance of Taihape stormwater assets has been graded, and is shown in Figure 161 below. The performance of stormwater pipes is highly variable, with most "Average", a high proportion "Excellent" and a significant amount "Very Poor".

Figure 161: Asset Performance – Taihape Stormwater



4.28.1.3 Asset Condition

In general the knowledge of the stormwater layout is good. In-house surveys have incorporated employee knowledge and field inspections into GIS. Some of the older areas of the town, and some renewals work carried out before Council amalgamation are of variable accuracy.

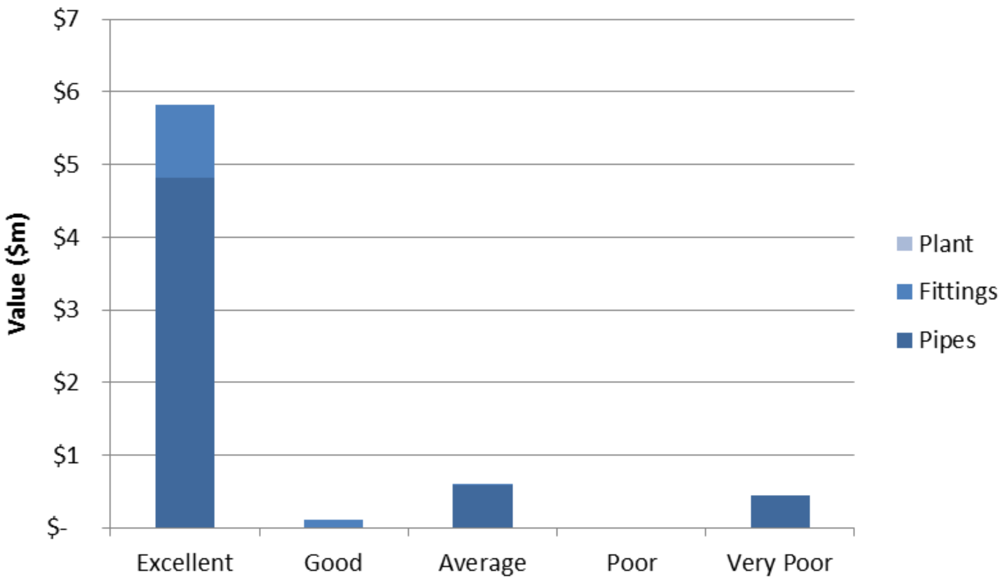
Reticulation is generally constructed from concrete pipe. A programme in 2009-2010 to inspect the most critical drains has improved confidence in the accuracy of data. Additional inspections are planned over the next five years so that 100% of the network will have condition data from CCTV inspections.

Where the age of an asset is in question, a note has been included in the database declaring this to be an estimate only. Research of archived drawings has improved the detail of the electronic database, with discovery of previously unknown pipes.

More than 25 manholes have been discovered either through use of archives or CCTV inspections.

The condition of our stormwater assets in Taihape is shown in Figure 162. Mostly, the condition of the assets has been assessed as "Excellent".

Figure 162: Asset Condition – Taihape Stormwater



4.28.1.4 Asset Valuations

The value of stormwater assets in the Taihape scheme is shown by Table 97.

Table 97: Value by Asset Group – Taihape Stormwater (29 Jan 2015)

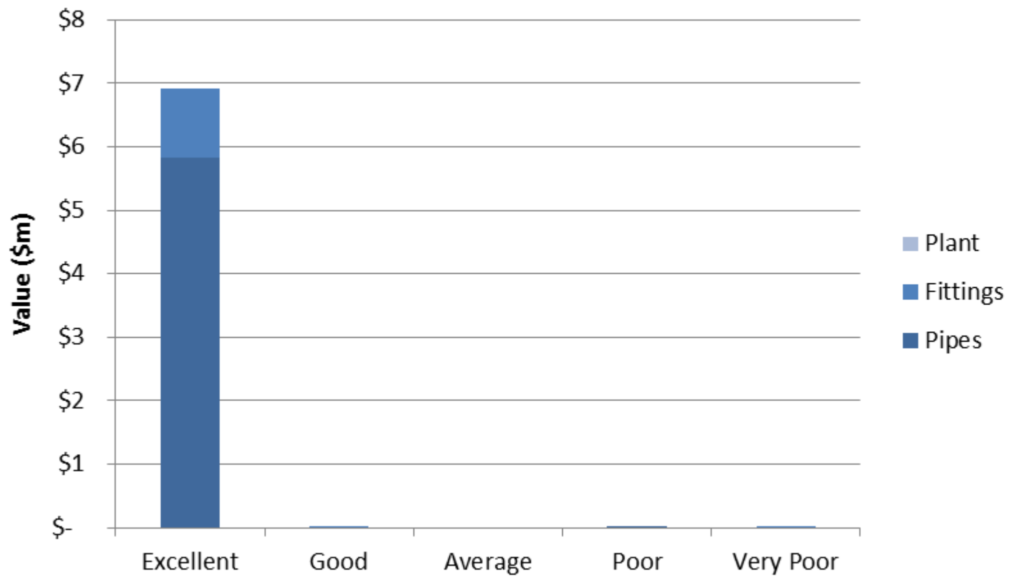
Asset Group	Replacement Cost ($)	Written Down Value ($)
Gravity Mains	5,214,833	2,725,917
Manholes	985,403	507,865
Open Drains	12,938	2,857
Sump Leads	518,678	263,519
Service Connections	21,823	15,749

Asset Group	Replacement Cost ($)	Written Down Value ($)
Sumps	12,713	10,009
Wingwalls	79,589	51,418

4.28.1.5 Historic Data

Because of the age of the town, there is a significant quantity of older assets that we do not hold current information on. As these assets are renewed, the overall quality of information held is improving. Where we have asset information for Taihape, the confidence we have in it is generally "Excellent". See Figure 163. Taihape was originally built with a combined stormwater/wastewater system. This means there will be interconnections between the systems for which information is lacking. The two systems are gradually being separated by renewal work.

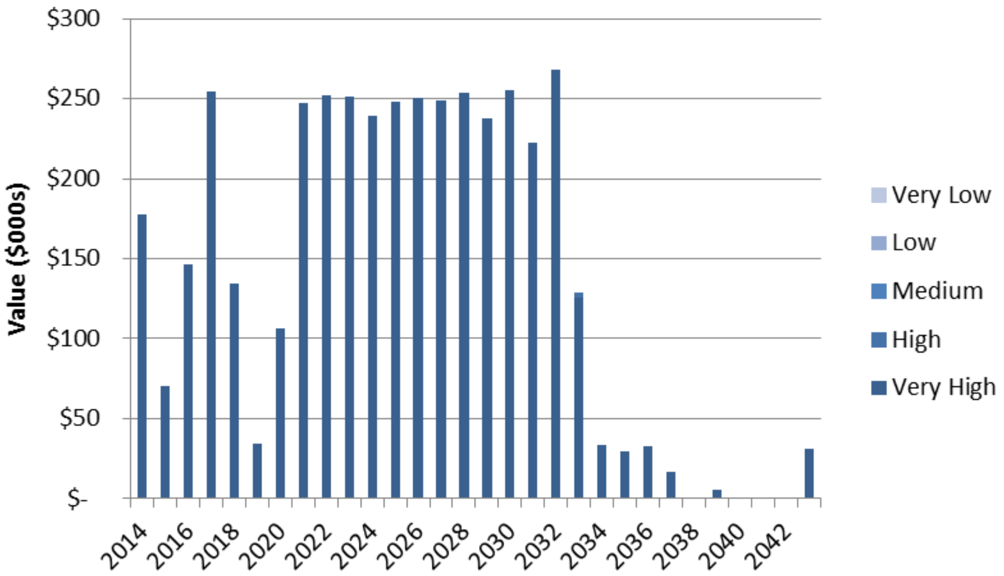
Figure 163: Data Confidence – Taihape Stormwater



4.28.2 Renewal/Replacement Plan

Forecast renewal expenditure in the long-term for Taihape is indicated in Figure 164. Roughly $200,000 of renewal work is projected to be necessary every year for the next 20 years. This forecast will be examined in greater detail to see whether there are any renewals necessary in the short-term.

Figure 164: Renewal Forecast by Criticality – Taihape Stormwater



4.28.3 Creation/Acquisition/Augmentation Plan

There are no growth projects or levels of service projects identified for Taihape stormwater.

4.29 Rural Stormwater

There is a budget for rural stormwater systems, which includes small systems in areas such as Utiku, Koitiata, Rakautaua and Scotts Ferry. These are not considered to be fully reticulated systems, but there are Council stormwater assets in these locations that need to be maintained, and have associated records kept.

Scotts Ferry has a network of 1.3 km of gravity mains, while Koitiata has some 300 metres of piped stormwater collection, and Rakautaua has 4.6 km of open drains downstream from Whangaehu. However, the extent of these systems, and the level of expenditure on them, does not warrant their being considered as separate schemes to the extent that systems in larger towns are.

Dudding's Lake is another locality where there is a small stormwater system. The infrastructure here, which includes a wastewater system as well, is managed by a community trust. Currently, Rangitikei District Council has no involvement with the infrastructure in this locality.

5 Risk Management

5.1.1 Risk Management Framework

The Council faces a range of business risks inherent in the functions of being a local authority. The Council's objective is to integrate risk management practices and procedures that are targeted to (and appropriate for) Council's strategic and operational goals, and also appropriate for Council's business functions. Council is committed to the identification, evaluation, prioritisation and management of these risks, in order to:

- Reduce, mitigate, transfer or eliminate threats.
- Allow for the most effective use of resources.
- Protect Council's corporate image and reputation as a responsible and ethical organisation.
- Capitalise on opportunities.

The risk management process is designed to ensure that:

- All significant operational and organisational risks are understood and identified.
- The highest risks that should be addressed in the short to medium term are identified.
- Risk reduction treatments that best meet business needs are applied.
- Responsibilities for managing risk are allocated to specific staff.

This section looks at the risk management framework set up by the Council for assessing and managing risk.

5.1.2 Risk Management Context

The framework for successfully identifying, analysing, evaluating and managing risk was established based on the joint Australian Standard AS 4360. This standard has since been replaced by the Joint Australian New Zealand International Standard – Risk management – Principles and guidelines (AS/NZS ISO 31000-2009)

The overall process framework for records management is unchanged:

- Establish the context (i.e. the external and internal parameters to be taken into account when managing risk);
- Assess the risk – identification, analysis (in terms of consequence and likelihood) and evaluation; and
- Treat the risk.

These are in the context of ensuring communication and consultation and undertaking monitoring and review.

The new standard offers a list of attributes of enhanced risk management to assist organisations measure their own progress. These derive from 11 principles, most of which are general management principles – creates and protects value, an integral part of all organisational processes, part of decision-making, systematic, structured and timely, based on the best available information, transparent and inclusive etc. This is intended to embed risk management as part of an organisation's management. The unique principle is that risk management explicitly addresses uncertainty, the nature of that uncertainty, and how it can be addressed.

While the current risk management matrix sits comfortably alongside the new standard, the next phase of work is to consider ways of ensuring that the matrix is able to inform discussions of both management and Council (in addition to the periodic evaluations of progress and the relevance of the risk management framework). To this end, a working party was established in March 2011 to review the framework, reporting back in June 2011.

5.1.3 Risk Management Process

The major elements of the risk management process are:

- Risk management context: establishes criteria against which risk can be evaluated.
- Risk identification: identifies the risks the Council may encounter and helps explain the impact of those risks on the business.
- Risk assessment: establishes a risk rating for all assets or asset groups, and describes which assets represent the greatest risk to the business.
- Risk treatment: identifies what actions are available to reduce risk at asset or asset group level to an acceptable level, and identifies the most cost effective treatment option.
- Monitor and review: the ongoing process to ensure risk levels remain acceptable even if risks change.

5.1.4 Risk Types

There are a number of different risk types considered in determining overall risks. These risk types represent the major groups of risks that could be present and must be considered in our risk management practices. Council has used the following risk types:

- Compliance (including legal).
- Operational.
- Environmental.
- Financial.
- Health & Safety.
- Reputation.

5.1.5 Risk Score

For each risk event identified, the consequence of failure and the likelihood of failure is assessed using the tables below. The risk cost is evaluated for each risk event identified using the following formula:

Risk cost = probability of event occurring x consequence of event

The likelihood of a given risk occurring is assessed using the following ratings:

Table 98: Likelihood Ratings

Likelihood	Rating	Description	Frequency
Rare	1	May occur in exceptional circumstances	1 in 100 years
Unlikely	2	Could occur very occasionally	1 in 10 years
Moderate	3	Might occur from time to time	1 in 5 years
Likely	4	Will probably occur often	1 in 2 years
Almost Certain	5	Is expected to occur in almost all circumstances	Every year

The consequences of a given risk, assessed against each of the risk types from Section 5.1.4, are given in the table below:

Table 99: Consequence Ratings

Factor	Catastrophic	Major	Moderate	Minor	Insignificant
Score	**5**	**4**	**3**	**2**	**1**
Financial / Economic	Loss of $10 million or greater	Loss between $1 million and $10 million	Loss between $250,000 and $1 million	Loss between $50,000 to $250,000	Loss less than $50,000
Health and Safety	Loss of life	Injury with 3+ months' time-off	Injury with 2 weeks to 3 months' time-off	Injury with less than 2 weeks' time-off	Nil
Human Resource	Permanent staff turnover exceeds 30% p.a.	Permanent staff turnover 20% to 30% p.a.	Permanent staff turnover 15% to 20% p.a.	Permanent staff turnover 10% to 15% p.a.	Permanent staff turnover 0% to 10% p.a.
Legal	STDC sued or fined for more than $10 million or greater	STDC sued or fined for between $1 million and $10 million	STDC sued or fined for between $250,000 and $1 million	STDC sued or fined for between $50,000 and $250,000	STDC sued or fined less than $50,000

Factor Score	Catastrophic 5	Major 4	Moderate 3	Minor 2	Insignificant 1
Reputation / Image	Insurmountable loss in community confidence Negative multi-media nation-wide coverage for 2 weeks + Nation-wide one week adverse political comment	Large loss in community confidence that will take significant time to remedy Negative multi-media nation-wide coverage for up to 2 weeks Nation-wide several days adverse political comment	Manageable loss in community confidence Negative multi-media nation-wide coverage for several days Regional several days adverse political comment	Loss of confidence among sections of the community Negative multi-media nation-wide coverage for 2 days Local 1 week adverse political comment	Negative feedback from individuals or small groups in the community Negative regional multi-media coverage for up to 2 days Local one day adverse political comment
Operational	Serious loss of operational capability for over 4 weeks and serious disruption to service levels	Serious loss of operational capability for over 2 weeks and major disruption to service levels	Serious loss of operational capability for over 1 week and disruption to service levels	Loss of operational capability in some areas and some disruption to service levels	No loss of operational capability or negative disruption to service levels
Natural Environment	Widespread, irreversible damage to aquatic and/ or terrestrial ecosystems. Permanent loss of one or more species	Widespread, long-term reversible damage to aquatic and/ or terrestrial ecosystems. Significant reduction in one or more species	Localised, medium term reversible damage to aquatic and/ or terrestrial ecosystems. Moderate reduction in one or more species	Localised minor reversible damage to aquatic and/ or terrestrial ecosystems. Temporary reduction in one species	Localised short term reversible damage to aquatic and/or terrestrial ecosystems. No noticeable species reduction

The matrix below is used to assess the level of risk, depending on both the likelihood of that risk occurring and its consequences.

Table 100: Risk Matrix

Likelihood	Consequence				
	1	**2**	**3**	**4**	**5**
1	L	L	L	M	M
2	L	L	M	M	H
3	L	M	M	H	H
4	M	M	H	H	E
5	M	H	H	E	E

The risk levels indicated are defined below:

Table 101: Risk Levels

Abbreviation	Risk Level	Description
L	Low Risk	Manage by routine procedures
M	Moderate Risk	Management responsibility must be specified
H	High Risk	Risk and management strategy identified in AM Plan Failure management plans available
E	Extreme Risk	Risk and management strategy identified in AM Plan Failure management plans specifically addressing event in place

5.1.6 Corporate Risk

The Council evaluates risk at the corporate and at an activity level. Once the risk cost is known, the organisation can then evaluate the risk reduction opportunities available. Risk treatments are the management practices and processes to eliminate the probability and/or lessen the consequences of the risk event.

Council adopts risk treatments on the basis of cost/benefit, where a reduction in risk exposure is seen as an organisational benefit. In some cases Council may choose to accept the risk, whereas in other cases it will choose to do all it can to reduce the risk cost.

The four general corporate risks identified for the built assets are:

- Inability to provide services to stakeholders following damage to assets.

- Adverse impact from failure to assess risks to assets.
- Poor asset design/maintenance resulting in potential safety and/or environmental issues.
- Poor management of assets.

5.1.7 Risk Register

A risk register has been established to communicate, report and monitor the implementation of the risk policy for each activity.

5.1.7.1 Water

A summary of risks assessed for each water scheme is given in the following table.

Table 102: Risk Assessment – Water

Scheme	Risks
Marton	There are no medium high or high risk assets identified at this time for this community. Reticulation assets with the most risk are the trunk main, the secondary mains that service key industrial or business areas, and their associated strategic valves. The condition of the trunk main was assessed in 2009 to be better than expected. The level of risk is deemed acceptable and there are no mitigation plans in place.
Taihape	The medium high risk assets identified at this time are the old steel pipelines and the supply main sections subject to operation pressures in excess of 160m head. Reticulation assets with the most risk are the trunk main, the secondary mains that service key industrial or business areas, and their associated strategic valves.
Bulls	The rising mains are high risks due to their location within State Highway No. 1 & 3 and their material types asbestos cement and spiral welded steel. Reticulation assets with the most risk are the trunk main, the secondary mains that service key industrial or business areas, and their associated strategic valves.
Mangaweka	The most significant risk is that the supply becomes uneconomic to operate due to a decline in demand. Reticulation assets with the most risk are the trunk main, the secondary mains that service key industrial or business areas, and their associated strategic valves.
Hunterville Urban	The most significant risk is that the supply becomes uneconomic to operate due to a decline in demand. Reticulation assets with the most risk are the trunk main, the secondary mains that service key industrial or business areas, and their associated strategic valves.
Ratana	This water supply has significant risks in that it is uneconomic (in its current form) to upgrade to meet the NZ Drinking Water standards and fire fighting requirements are marginal.
Erewhon	Reticulation assets with the most risk are the pipe bridge, air valves, "maric" restrictor valves and storage tanks.
Hunterville Rural	Reticulation assets with the most risk are the pipebridge, air valves, "flow" restrictor valves and storage tanks.

Scheme	Risks
Omatane Rural	There are no medium high or high risk assets identified at this time for this scheme.
Putorino Rural	There are no medium high or high risk assets identified at this time for this scheme.

The Building Act 2004 (Sub Part 7 Sections 133 to 162) places numerous obligations on dam owners in relation to dam safety. Rangitikei District Council has conducted a Comprehensive Safety Review of the earth dams that form part of the Marton water supply. This Review classified the two dams as a High Potential Impact Category (PIC). PIC is a function of the Population at Risk (PAR), as well as the impact upon residential houses, critical or major infrastructure, the natural environment and the community recovery time. Due to the dam locations in relation to the centre of Marton, the consequences of a potential dam break is significant. The PIC defines the necessary standards to be adopted for the dam investigation studies, design, construction, commissioning and operational phases. In accordance with Section 139 of the Building Act 2004 the dam classification requires review every 5 years.

The assets mentioned in the following table have been assessed as critical to the delivery of water supply services.

Table 103: Critical Assets - Water

Water Scheme	Asset Component
Marton	Impoundment Dams Treatment Plant Supply mains
Taihape	Supply main Treatment plant &storage Old steel reticulation
Bulls	Rising main to reservoir Security of bores Treatment plant & storage
Mangaweka	Security of intake Rising main to treatment plant
Hunterville Urban	Security of supply (from Rural Water Scheme)
Ratana	Economic viability of current assets
Erewhon Rural	Pipe bridge
Hunterville Rural	Intake Storage
Omatane Rural	Intake Reticulation
Putorino Rural	Storage dam Reticulation

5.1.7.2 Wastewater

In Marton, only 1% of sewer reticulation is rated as being of medium high risk. These occur at stream crossings or where they pass under the railway corridor, where environmental consequences are highest, or where there is significant disruption to business.

The anaerobic pond at Marton WWTP has been identified as medium high risk due to the potential for odour complaints. A review of plant asset criticality is required since the significant capital improvements of the last few years.

The highest criticality for Taihape wastewater is associated with the pump stations at Papakai Road and the Memorial Park, as well as the pumping main the crosses beneath the Hautapu River to the oxidation ponds.

All assets in the West Taihape area have been assessed as higher criticality than the rest of the township, due to the land instability there. Because of their increased criticality, they are inspected more frequently by CCTV than other pipes in the District.

The Taihape wastewater reticulation crosses the North Island Main Trunk Railway Line in two places, and there are substantial sections of reticulation laid within the State Highway One corridor, which would have a disruption to traffic when they require servicing/renewal.

The highest criticality for Bulls wastewater is associated with the pump station at Domain Road and those sections of pipework that traverse State Highway One and Three.

At Koitiata, the wastewater reticulation pipes located in the rear of properties will impair access of future repair works (when they are eventually required). Identifying the long term sustainability of the community is a critical issue as failing septic systems leave the home owners with unsanitary conditions.

Treatment plant assets have not been assessed. This will change once the upgrades have been completed and criticality scores have been evaluated for this group. Wastewater treatment plants hardly ever operates in steady state. Hence, preventing of such disturbances must be the major goal. This involves manipulating operating conditions about their average values in order to compensate for the effects of varying influent conditions and to maintain consistent effluent quality.

Pump stations are monitored for their performance with pager alerts to plant operators.

No other critical assets or significant risks have been identified as yet.

5.1.7.3 Stormwater

Stormwater reticulation assets with the most risk are the inlet structures, root intrusion and channels in private property. In general, the level of risk is deemed acceptable and there are no mitigation plans in place.

For Ratana stormwater, a culvert in Kiatere Street is known to direct drainage under two houses (piped) before returning to a natural watercourse. This is a high risk if this pipe blocked. Repair would be difficult as it is located within the properties concerned. Implementation of a proactive inspection regime to check inlet structures will assist in minimising this risk. All other drainage enters via catch pits or road sumps and is therefore screened of debris already. The level of risk is deemed acceptable and there are no mitigation plans in place.

5.1.8 Risk Treatment Options

Options for mitigating risks considered to reduce the cause, probability or impact of failure are:

- Do nothing – accept the riskManagement strategies – implement enhanced strategies for demand management, contingency planning, quality processes, staff training, data analysis and reporting, reduce the target service standard, etc.
- Operational strategies - actions to reduce peak demand or stresses on the asset, operator training, documentation of operational procedures, etc.
- Maintenance strategies - modify the maintenance regime to make the asset more reliable or to extend its life.
- Asset renewal strategies - rehabilitation or replace assets to maintain service levels.
- Development strategies - investment to create a new asset or augment an existing asset.
- Asset Disposal/Rationalisation - divestment of assets surplus to needs because a service is determined to be a non-core activity or assets can be reconfigured to meet business needs better.

For many risks, there are a number of options available to treat the risk. All available options should be assessed for 'significant' and 'high' risks as follows:

- Identify the available options.
- Determine the relative benefits and costs associated with these options.
- Carry out a benefits - costs analysis of all options.
- Adopting the most cost effective options in terms of the total business needs.

5.1.9 Risk Management Improvements

The following risk management improvements have been noted for water and stormwater assets (2012):

- Identification of non operational risks eg fencing at plants.
- Risk analysis including documented criteria for evaluation.
- Treatment options identified, costed and prioritised.
- Identification of risk exposure during programmed treatment projects, including changes in risk exposure.
- Communication and consultation procedures relate to Corporate requirements.

The following risk management improvements have been noted for wastewater assets (2012):

- Treatment Plants – Lack of disturbance rejection.
- Pump Stations – Well storage volume and pumping capacity (The risk of overflows).
- Pipes – Mains- Lack of capacity during storm events/corrosion problems.
- Manholes-Safety risk.
- Pipes – Laterals – Root intrusion.
- Telemetry – Process Control - Reliability and Redundancy requirements.
- Electrical – Mechanical- Outage.
- Buildings and Grounds-A lack of a complete record of all inspections, observations and repairs. (safety equipment).

5.1.10 Provision for the Effects of Failure

This plan recognises that the impact of failure in one activity of Council can have impacts on and be influenced by other activities. Accordingly Council plans for Disaster recovery and Business Continuity are completed corporately.

5.1.11 Environmental Impacts

Environmental initiatives for Water Assets are listed below:

- Trend to source water from below ground reserves taking pressure off natural waterways.
- Promoting water conservation in homes eg dual flush toilets.
- Optimising use of chemicals.
- Energy management. Reduce electricity use through plant efficiencies.
- Maximise the use of remote monitoring to reduce travel requirements.

Environmental initiatives for Wastewater Assets are listed below:

- Reducing wastewater loadings.
- Reducing organic loads.
- Creating a more treatable wastewater entering the wastewater treatment plant.
- Removing pollutants at source rather than the treatment plant.
- Reduce Infiltration/inflow.

Further energy management initiatives for Wastewater Assets are listed below:

- New separation technologies.

- Water reuse.
- Reduce infiltration/inflow.

5.1.12 Engineering Lifelines Risks

Engineering lifelines are infrastructure that support life and business in our community. Lifelines projects aim to minimize the impact of natural hazards on infrastructure networks and reduce the time that networks may be out of services. Lifeline Risks considered here are:

- Earthquake.
- Meteorological Events.
- Mass Movement.
- Coastal Hazards.
- Climate Change.

Rangitikei District is subject to a wide range of natural hazards. Several significant natural events have been recorded in the last 15 years. Some of these are as follows:

- Mt Ruapehu Eruption 1995 & 1996.
- Snow storm in 2003.
- Manawatu/Rangitikei floods of 2004.
- High wind storms of 2011 (x2).

Through responses to and rebuilding after these events Council has gained considerable experience. It is important that the knowledge gained is captured, integrated and shared for future response and recovery operations, should they likely occur again. Lifeline exercises provide an opportunity for such experience to be shared.

Lifelines work for Rangitikei will feed into Business Continuity Planning (BCP) arrangements in place for the District. Business Continuity Planning is a progression of disaster recovery, aimed at allowing an organisation to continue functioning after (and ideally, during) a disaster, rather than simply being able to recover after a disaster, rather than simply being able to recover after a disaster.

5.1.12.1 Introduction

The term natural hazards covers situations where water, air and ground movement have the potential to adversely affect human life and property. They can also have adverse effects upon structural assets and the natural values of areas. The hazards most relevant to the Rangitikei District are flooding, earthquakes, land slippage, coastal erosion/deposition and tsunamis (tidal waves). Events such as storms, tornadoes, and volcanic ash showers may also happen, but land use planning could do little to reduce their effects. The potential threats to the Rangitikei District are outlined more fully in the Council's Civil Defence Plan.

The first way of reducing adverse effects on people, property and natural values from hazard events is to reduce the severity of the event itself, for example by planting stream catchments to reduce the speed of water runoff. The second is to avoid damage by keeping residents and development away from the hazard. The third method is to try and modify the effects of the hazard, eg by constructing stopbanks to confine floodwaters.

When it comes to hazard avoidance, the level of risk determines the amount of development which is "acceptable". For example most people would agree that houses should not be built in places which flood every year, but the risk may be acceptable on a property which is flooded every two hundred years.

5.1.12.2 Natural Hazards in the Rangitikei District

The hazards most relevant to the Rangitikei District are flooding, earthquakes, land slippage, coastal erosion/deposition and tsunamis (tidal waves). These may result in natural hazards occurring at two levels:

- District wide – Large-scale natural hazards which affect all or large parts of the District e.g. a major earthquake.
- Localised – Natural hazards which affect a smaller area of the District, e.g. flooding in a township or a landslip.

5.1.12.3 Flooding

Flooding can be caused from stormwater ponding in low-lying areas; or waterbodies overflowing their normal channel in high rainfall events. A flooding risk assessment was included as part of the Manawatu-Wanganui Lifelines project and included in the table following. The assessment considered major lifeline services and the effects of Natural Hazards on them.

5.1.12.4 Earthquakes

In central New Zealand, motion of the Pacific Plate relative to the Australia Plate occurs at approximately 40 mm/year in the direction of approximately 260°. The forces involved in plate movement are immense and cause rock of the Earth's crust to buckle (fold) and fracture (fault) in the general vicinity of the boundary between the plates. There are four known active faults in the vicinity of the Manawatu Region and all have the potential to cause strong shaking.

These active faults are:

- Wellington Fault – laying 27km southeast of Feilding.
- Ruahine Fault – laying 24km southeast of Feilding.
- Northern Ohariu Fault – laying 28km southwest of Feilding.
- Mt Stewart-Halcombe Fault – laying 4km to the south of Feilding.

A Seismic Earthquake risk assessment was included as part of the Manawatu-Wanganui Lifelines project. The assessment considered major lifeline services and the effects of Natural Hazards on them.

5.1.12.5 Volcanic Activity

Volcanic activity can include the following:

- Gases.
- Lahars.
- Tephra.
- Earthquakes.
- Landslips.
- Pyroclastic falls.

New Zealand is characterised by both a high density of active volcanoes and a high frequency of eruptions. Volcanic activity in New Zealand occurs in six areas , five in the North Island and one offshore to the northeast in the Kermadec Islands. The volcano's of note to the Rangitikei District is the cone volcanos of Mt Ruapehu, Mt Tongariro, Mt Ngauruhoe, Mt Egmont/Taranaki, and the caldera volcano of Lake Taupo.

Typically, a number of types of hazards will result from a volcanic eruption. Each hazard posesdifferent risks affecting different areas. This is the key difference between eruptions and the other principal natural hazards, floods and earthquakes. The most threatening hazards include pyroclastic falls, pyroclastic flows and surges, lava extrusions (flows and domes), lahars, debris avalanches and volcanic gases.

Pyroclastic fall deposits consist of material which rains out from an eruption column. Large fragments (blocks and bombs) follow ballistic trajectories and are highly damaging. These fragments rarely land more than two kilometres from the vent. Finer material (ash and lapilli) is convected upwards in the eruption column before settling out downwind to form pyroclastic fall deposits. Fine ash can be deposited hundreds to thousands of kilometres from its source, and volcanic ash is the product most likely to affect the largest area and the most people during aneruption. These particles commonly have sharp broken edges and volcanic ash is therefore highly abrasive. Volcanic ash clouds will block out sunlight and total darkness may result where moderate to heavy falls of ash occur.

A community's infrastructure provides the services and linkages which allow society to function. These 'lifelines', such as electricity, water, wastewater and roads are vulnerable to damage from ash falls. Falls of volcanic ash, for example, have the potential to disrupt electricity supply. Loss of supply commonly occurs when ash is wet, as a result of rain during or immediately after the ash fall.

Contamination of open water supplies occurs, even in relatively small ash falls. Both turbidity (suspended material) and acidity are the most common problems affecting water supplies but they will usually return to normal levels within a few hours or days unless ash falls are prolonged. Hazardous chemicals from ash can mix with small volumes of water such as roof-fed water tanks, stock water troughs and shallow surface water bodies, causing chemical contamination above safe guidelines for drinking water. Volcanic ash falls can cause severe damage to wastewater and stormwater systems. Ash is easily washed off impervious surfaces, such as roads, carparks and buildings, into these systems.

Volcanic ash falling on roads is extremely disruptive to transportation, reducing visibility. The ash is easily raised in clouds by passing vehicles and this presents an ongoing visibility hazard.

Wet ash can turn into mud, causing further problems with vehicle traction. Fine ash causes clogging of air filters resulting in cars overheating. Vehicle brakes are susceptible to damage and ash may also enter the engine causing wear on moving parts, which reduces vehicle life. Even minor ash fall (<1mm) will close airports.

Ash has damaging affects on other electrical or mechanical systems.

A Volcanic risk assessment was included as part of the Manawatu-Wanganui Lifelines project. The assessment considered major lifeline services and the effects of Natural Hazards on them.

5.1.12.6 Lifelines Services – Risks of Natural Hazards Report

This report undertaken by the Manawatu-Wanganui Lifelines Advisory Group examined the effects of direct damage by known major natural hazards to lifeline services. It:

- Assesses the vulnerability of lifeline services to damage from hazards.
- Identifies interdependencies amongst the lifeline services.
- Identifies practical strategies for reducing risk.
- Helps project participants identify and implement mitigation and response strategies for their own networks and co-ordinate these with the plans of other lifelines.

6 Financial Summary

6.1 Financial Statements and Projections

Taking a sustainable, long term approach to asset planning requires the preparation of a long term financial forecast. This enables issues such as deferred maintenance, and intergenerational equity to be addressed by infrastructure planners. This plan forecasts for a 30 year period.

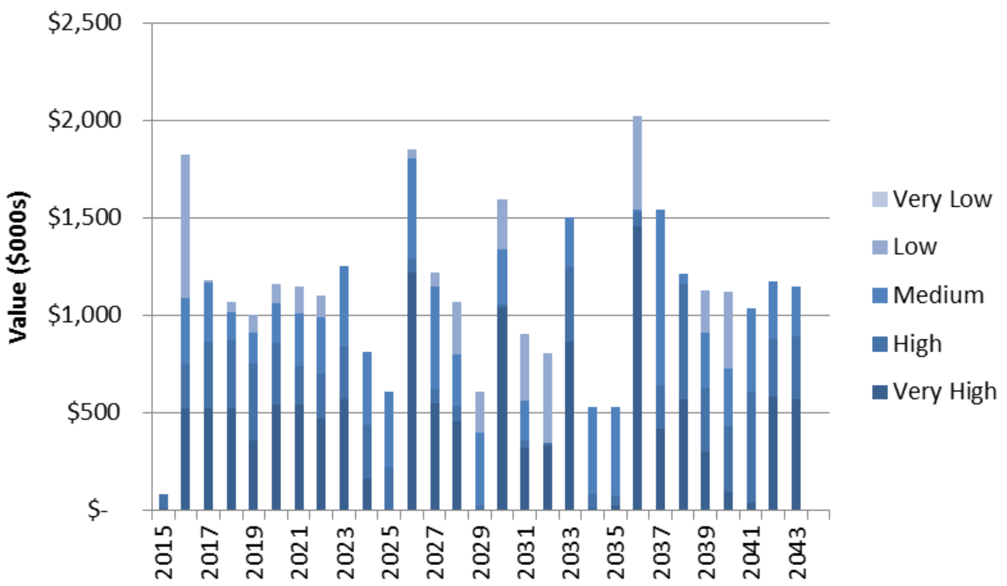
The information provided in this section is a summary for the Group of activities/ activity. Detailed financial information pertaining to each asset scheme is contained within Section 5

6.1.1 Water

Scheduling of asset renewals is performed with reference not only to risk, but also to available budgets and alignment with the renewal of other services in the same location. Where upon first cut there are major differences in expenditure between adjoining years and the depreciation reserves value the projects are reviewed to ascertain if they can be staged to balance out expenditure.

Figure 165 shows the projections after applying a risk based deferment of asset renewals. The draft renewal indicates the volume of renewals required if no smoothing of expenditure was imposed.

Figure 165: Renewal Forecast by Criticality – Water

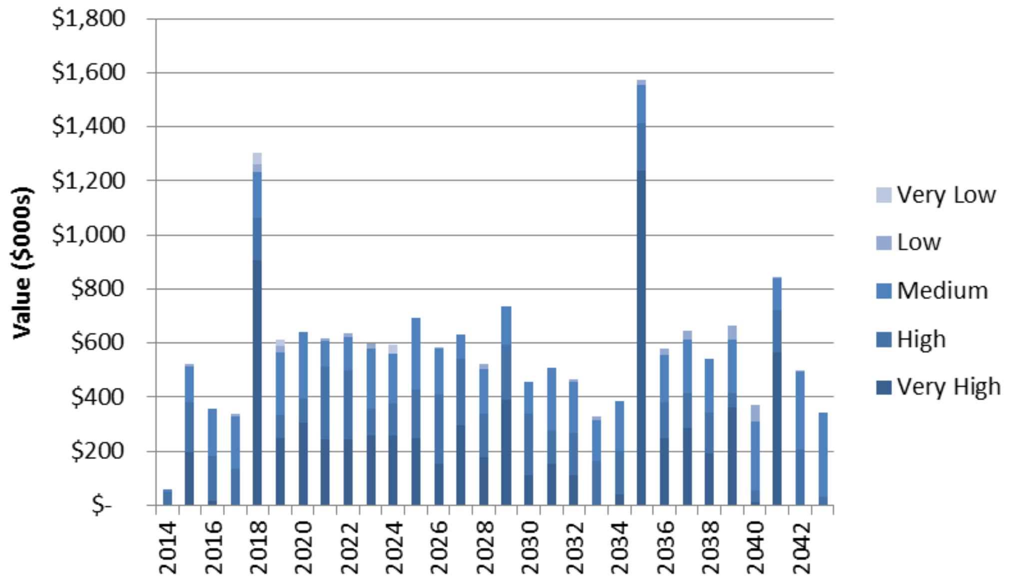


The summary financial statement for water for the next ten years will be copied into this section of the Asset Management Plan once approved through the Long Term Plan process. .

6.1.2 Wastewater

The total renewal forecast for wastewater across all schemes is given below.

Figure 166: Renewal Forecast by Criticality - Wastewater

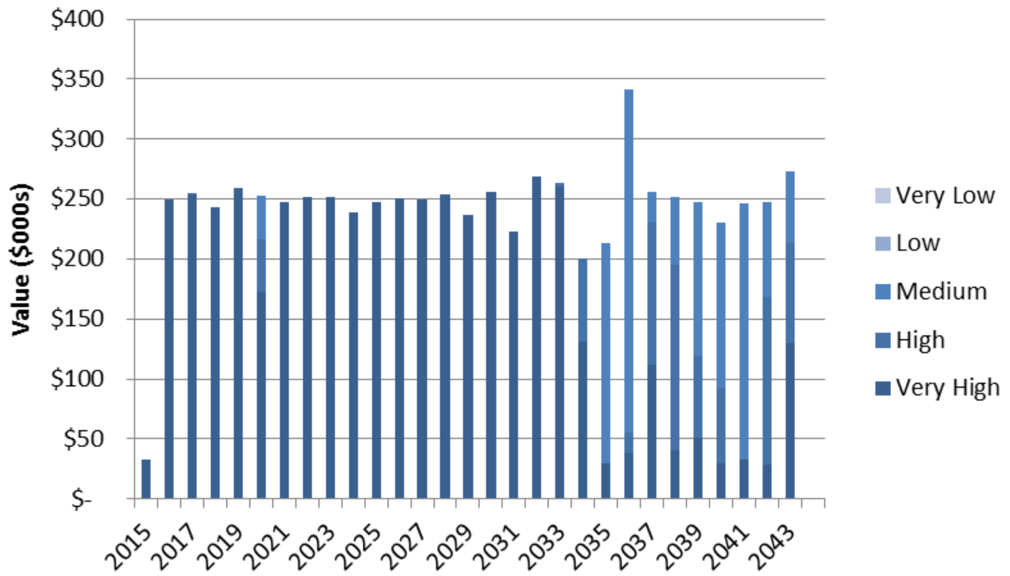


Tthe finances for wastewater over the next 10 years will be copied into this section of the Asset Management Plan once approved through the Long Term Plan process. .

6.1.3 Stormwater

Forecast expenditure, and a financial summary, for stormwater will be copied into this section of the Asset Management Plan once approved through the Long Term Plan process. .

Figure 167: Renewal Forecast by Criticality - Stormwater



The graph above shows the projections after applying a risk based deferment of asset renewals. The draft renewal indicates the volume of renewals required if no smoothing of expenditure was imposed.

Scheduling of asset renewals is performed with reference not only to risk, but also to available budgets and alignment with the renewal of other services in the same location. Where upon first cut there are major differences in expenditure between adjoining years and the depreciation reserves value the projects are reviewed to ascertain if they can be staged to balance out expenditure.

The majority of capital projects are expected to be in the rural areas.

6.2 Funding Strategy

6.2.1 Revenue and Financing Policy

Council's Revenue and Financing Policy

6.2.2 Operating Expenditure

Council funds operating expenditure from the following sources:

- General rates.
- Targeted rates.
- Fees and charges.
- Interest and dividends from investments.
- Grants and subsidies towards operating expenses (grants and subsidies towards capital expenditure are applied to the related capital expenditure only).
- Other operating revenue.

Council may choose not to fund fully the operating expenditure in any particular year, if the deficit can be funded from operating surpluses in the immediately preceding or subsequent years. An operating deficit will only be budgeted when beneficial to avoid significant fluctuations in rates, fees or charges.

Council may choose to fund from the above sources more than is necessary to meet the operating expenditure in any particular year. Council will only budget for such an operating surplus if necessary to fund an operating deficit in the immediately preceding or following years, or to repay debt. Council will have regard to forecast future debt levels when ascertaining whether it is prudent to budget for an operating surplus for debt repayment.

Rangitikei District Council does not collect Development Contributions.

6.2.3 Funding of Capital Expenditure

Council funds capital expenditure from borrowing and then spreads the repayment of that borrowing over several years. This enables Council to match best the charges placed on the community against the period of benefits from capital expenditure. Borrowing is managed within the framework specified in the Liability Management Policy. Asset managers provide advice on smoothing out variations in cash flow.

6.2.4 Water

For potable water supplies, the current funding mechanism is a combination of a targeted rate and user charges.

25% of the total cost of the activity is charged to all separately used or inhabited rateable properties (whether connected or unconnected), funded 33% through the general rate with the balance funded through a fixed charge. This is the 'public good' component, to reflect the community-wide benefit. Varying this percentage has a consequential impact on the other components of the funding mechanism.

In 2012/13, this targeted rate was the same for all rateable properties; the current mechanism dates from 2013/14 to assist with achieving a consistent level of rate increase across all properties.

65-70% of the cost of this activity (excluding Hunterville Urban supply) is charged to all connected properties, other than those metered in Hunterville or as extraordinary users. It is a fixed charge (i.e. same for all properties). This is effectively a consumption charge.

5-10% of the cost of this activity (excluding Hunterville Urban supply) is recovered from charges to extraordinary users and bulk supplies.

75% of the cost of the Hunterville Urban supply is recovered through meter charges

In the 2009/19 LTCCP, costs for Bulls, Mangaweka were funded through meter charges. For the other urban supplies (Ratana, Marton, and Taihape), a cap was set (initially $580). Any shortfall in scheme income ('spillage') was met one third by a targeted rate (fixed charge) on rural ratepayers and two thirds from the general rate on urban ratepayers based on capital value. In the 2006/16 LTCCP spillage was recovered from the general rate, meaning higher-value properties (including rural properties) paid more than lower-value properties.

The operational expenses of the rural water schemes are funded by charges on each subscriber. However, since 2013/14 overhead costs funded through the general rate. Depreciation costs for each scheme are currently not funded. This means any renewals or capital expenditure must be loan funded, which could mean significant fluctuations in the funding requirements.

6.2.5 Wastewater

The current funding mechanism for wastewater is a combination of a targeted rate and user charges.

25% of the total cost of the activity is charged to all separately used or inhabited rateable properties (whether connected or unconnected), funded 33% through the general rate with the balance funded through a fixed charge. This is the 'public good' component, to reflect the community-wide benefit.

In 2012/13, this targeted rate was the same for all rateable properties; the current mechanism dates from 2013/14 to assist with achieving a consistent level of rate increase across all properties.

65-70% of the cost of this activity is charged to all connected properties, except for properties subject to an agreement under the Trade Waste Bylaw.

5-10% of the cost of this activity is recovered from charges levied under the Trade Waste Bylaw and septage disposal (on the basis of the rate set in the Council's annual Schedule of Fees and Charges or as separately agreed).

6.2.6 Stormwater

The current funding mechanism for the stormwater activity is a combination of a targeted rate and user charges.

25% of the total cost of the activity is charged to all separately used or inhabited rateable properties (whether connected or unconnected), funded 33% through the general rate with the balance funded through a fixed charge. This is the 'public good' component, to reflect the community-wide benefit. Varying this percentage has a consequential impact on the other components of the funding mechanism.

In 2012/13, this targeted rate was the same for all rateable properties; the current mechanism dates from 2013/14 to assist with achieving a consistent level of rate increase across all properties.

75% of the total cost is funded through a targeted rate on all rating units.

Previously, stormwater was funded by a targeted rate specific to each of the town-based stormwater schemes.

6.3 Valuation Forecasts

Rangitikei District Council (RDC) is required to revalue its infrastructural assets at least triennially. The most recent full valuation of the treatment facilities and reticulation systems for the 3 Waters was carried out for 1 July 2013. The previous valuation was dated 1 July 2011, although in general valuations have been carried out every 3 years.

RDC certify that the valuations summarised below have been completed in accordance with the following standards and are suitable for inclusion in financial statements.

- New Zealand Infrastructure Asset Valuation and Depreciation Guidelines – Edition 2.0.
- New Zealand Equivalent to International Accounting Standard 16; Property Plant and Equipment (NZ IAS 16).

RDC is not aware of any reason why auditors should not place reliance in the valuation prepared.

The valuations are based on accurate and substantially complete asset registers and appropriate replacement costs and effective lives. The basis of the data inputs is described in detail in the attached report.

A detailed valuation report is available, which describes the valuation methodology and results of the valuation process. The valuation results for the Marton water supply are tabled below:

The expected base lives in the reticulation for water, sewer and stormwater are reviewed as part of each valuation to align the expected lives, and the method of setting these with the renewal decision making practice. The review process and assumptions are detailed within the 2013 Asset Valuation.

6.3.1 Basis of Valuation

The method of valuation has been conducted in terms of the New Zealand Equivalent to International Accounting Standard 16; Property, Plant and Equipment (NZ IAS 16) and IAS 36 (Impairment of Assets) and as contained in the New Zealand Asset Valuation and Depreciation Guidelines – Edition 2.0.

The Replacement Value is the cost of building the asset "today". In arriving at the value, it is assumed that modern construction techniques and modern equivalent materials are used but that the physical result replaces the asset as it exists.

The valuation approach taken is the Depreciated Replacement Cost approach.

6.3.2 Scope of Valuation

The extent of the valuation for each of the 3 Waters is described below.

6.3.2.1 Water

This valuation encompasses all council maintained water reticulation and treatment plant assets. This includes all pipelines, treatment plants, reservoirs, service fittings and *buildings*. The valuation *does not* include land costs.

The Putorino Rural Water Scheme provides farm water supply for a handful of properties, which is maintained by the beneficiaries of the scheme. No asset register is currently held for the Putorino Scheme and it is not included in the valuation forecasts.

6.3.2.2 Wastewater

This valuation encompasses all wastewater collection mains and lateral connections up to the customer boundary. This includes all valves, manholes, pumping stations and other fittings such as flow meters and testing points.

The valuation of treatment plants includes not only the treatment plants themselves, but also the earthworks, fencing, access tracks, power supplies and buildings. It does not include the land valuation however which is listed under the Property Asset Management Plan.

6.3.2.3 Stormwater

This valuation encompasses all stormwater mains and service connections up to the customer boundary. This includes all structures and fittings.

6.3.3 Data Sources

Council has used the AssetFinda Asset Management System as its primary register for plant and reticulation assets. The System allow analysis and valuation of asset data by directly accessing the attributes (both physical and geospatial) held in council's Geospatial Information Systems.

Since 2001 all new capital and renewal data has been incrementally added to the AssetFinda system, and is generally considered accurate in terms of spatial and physical attributes. Dates for assets before 2002 have been substantially verified through visual inspections or paper records.

Capital costs are recorded against assets from actual contract rates, and valuation process.

Given that most of the spatial data has come off as-built plans and that day-to-day operation has not highlighted major concerns with the integrity of the attributes of the reticulation network, the data confidence in such assets is good.

Where errors have been identified they have been corrected. Reticulation maintenance staff are requested to submit asset reports about reticulation repairs. These reports add to the data confidence of each asset's physical attributes.

The site reviews by the operational managers has created a new asset register for treatment plant from scratch, using their specialist knowledge of the industry and familiarity with the assets at those facilities.

AssetFinda records data confidence of each asset on a 1-5 scale with 1 being most reliable and 5 is very uncertain. This is comparable to the NZ Infrastructure Asset Valuation and Depreciation Guidelines – Edition 2, Table 4.3.1: Data confidence grading system. Where the accuracy has not yet been assessed, the accuracy is set to zero.

The Districts wastewater assets were originally detailed on 'block sheet' plans and in 1997/98 they were digitised and imported into Council's GIS (MapInfo). The block sheets contained some information on pipe diameters and materials and this detail was also captured.

The GIS data was exported to an Excel spreadsheet for the 1998 valuation. Where attribute data was missing, as-built plans, sub-division records and operator knowledge were used to populate the database. Above ground data was obtained from plans, inspections and operator knowledge.

In 2001/2002, Council committed to implementing the AssetFinda Asset Management System. The asset registers allow analysis and valuation of asset data by directly accessing the geospatial data held in Mapinfo. During the implementation period the asset register spreadsheets and the GIS database were synchronised and renewed assets were added to the GIS and obvious errors were corrected.

All new capital and renewal data has been incrementally added to the AssetFinda system since 2002, and is considered very accurate. Dates for assets before 2002 have been substantially verified.

The data for all the infrastructural assets has been collated into the AssetFinda digital database. These tables utilise standard lookup tables to define the replacement costs or in the case of the plant register, a capitalised cost for each unique component using financial records.

6.3.4 Significant Assumptions

The assumptions used in valuing assets for each of the 3 Waters are detailed in this section.

6.3.4.1 Water

The following assumptions have been made when preparing the valuation related to asset registers:

- All polyvinyl chloride (PVC) and polyethylene (PE) water pipes have been laid to manufacturer's standards. No information has been received to indicate that faults could be attributable to poor construction.

- Although anecdotal evidence suggests that AC water pipes may have reduced remaining useful lives. Recent failures of this material may be exacerbated by high operating pressures. Where pressures have been reduced (Marton), the number of mains faults has decreased.

- Most below ground assets are not in an aggressive environment so it is assumed that this is not having a detrimental affect on the condition of the assets

- No discount rate has been applied. It is considered that the volume of replacements would not be significant or in sufficient quantities that could generate savings.

- Council maintenance is demarcated at the property boundary. Asset registers contain lateral information where known. Where spatial information on service laterals is not available, the replacement value for each connection is estimated at 10 metres of standard domestic connection pipe. This is recorded as an aggregated asset for each community within the plant register. As more and more service connections are added to the GIS system, a corresponding reduction in the aggregated assets occurs by reviewing rating information sources. Service connections contribute approximately 16% of the total reticulation value.

6.3.4.2 Wastewater

Given that most of the data has come off as-built plans and that day-to-day operations has not highlighted major concerns with the integrity of the data, it can be safely assumed that the data is materially correct. Where errors have been identified they have been corrected. Procedures are in place to collect verification data during routine maintenance work.

AssetFinda holds fields for recording data accuracy against each asset. Each attribute that has a degree of uncertainty about its accuracy is recorded on a 1-5 scale with 5 being most accurate. Summary information for each scheme can be found in Section 5.

For wastewater, Council maintenance is demarcated at the property boundary. Asset registers contain lateral information where known. Where spatial information on service laterals is not available, the replacement value for each connection is estimated at 10 metres of standard domestic connection pipe. This is recorded as an aggregated asset for each community within the plant register. As more and more service connections are added to the GIS system, a corresponding reduction in the aggregated assets occurs by reviewing rating information sources. Service connections contribute approximately 16% of the total reticulation value.

6.3.4.3 Stormwater

Given that most of the data has come off as-built plans and that day-to-day operations has not highlighted major concerns with the integrity of the data, it can be safely assumed that the data is materially correct. Where errors have been identified they have been corrected. Procedures are in place to collect verification data during routine maintenance work.

AssetFinda holds fields for recording data accuracy against each asset. Each attribute that has a degree of uncertainty about its accuracy is recorded on a 1-5 scale with 5 being most accurate. Summary information for each scheme can be found in Section 5.

The following assumptions have been made when preparing the valuation related to asset registers:

- All stormwater pipes have been laid to manufacturer's standards. No firm evidence has been received to indicate that faults could be attributable to poor construction.

- Most below ground assets are not in an aggressive environment so it is assumed that this is not having a detrimental affect on the condition of the assets.

- No discount rate has been applied. It is considered that the volume of replacements would not be significant or in sufficient quantities that could generate savings.

- Council maintenance is demarcated at the property boundary. Asset registers contain lateral information where known. Where spatial information on service laterals is not available, the replacement value for each connection is estimated at 10 metres of standard domestic connection pipe. This is recorded as an aggregated asset for each community within the plant register. As more and more service connections are added to the GIS system, a corresponding reduction in the aggregated assets occurs by reviewing rating information sources. Service connections contribute approximately 16% of the total reticulation value.

6.3.5 Valuation Process

A description of the overall process used to value our water, wastewater and stormwater assets follows.

6.3.5.1 Water

Construction rates for water reticulation pipes have generally decreased by 12% for urban networks since 2008 according to available contract data. There has been a reduction in supervision and design costs as Council develops its in-house engineering staff rather than relying on external consultants for its smaller projects. The reticulation standard rates are based on construction expenditure of $575,000 over the last three years. This is only about 16% of the expenditure anticipated, and may not be truly representative of the market conditions.

The Rangitikei Council recognises that with a small expenditure on water construction, that other methods for determining unit rates may be more appropriate such a benchmarking with neighbouring Councils, creating model unit rates from supplier information or using the labour and producer price indices to adjust historical rates. While unable to provide such methods for this report, the Asset Management Improvement Plan will be updated to see that necessary data collection is undertaken for the next triennium.

Plant assets were completely re-evaluated as the previous register had become inaccurate over time. The evaluation was undertaken in May 2011. The new register does not provide the same level of detail as the original, with many components aggregated into a single record. However the information for the register is collated by experienced staff and is considered adequate for valuation purposes. It is a Council objective to identify all the sub-component assets and supersede this new basic register to manage assets at a more appropriate level of detail, within 12 months of this report.

The following assumptions have been used in the establishment of unit replacement rates:

- Replacement cost for pipes is a function primarily of diameter.
- All water pipes and fittings are grade PN12 rated.

With regard to location:

- Urban – No distinction between berm and carriageway in the AMS. Replacement costs assumed to be open trench in carriageway.
- Rural – Pipe replacement costs are adjusted from urban rates to account for the general Greenfield situation.

The GIS system calculates all lengths, areas and point features automatically, and therefore valuation quantities are based on the accuracy of the GIS system.

Not every property's service lateral has been digitised. Information from the rating database allows an estimate of the number of connections yet to be digitised into the Asset Management system, and a single asset for each community is used as a proxy to quantify the value of these 'missing' connections. These quantities are re-evaluated before valuations are conducted.

AssetFinda uses a status field for each record. This field allows the system to determine the ownership of the asset (Vested, private, railways, highways, or council). Council assets are further categorised by department responsibility (Water, Sewer, Drainage, Roading, Parks) . Valuations therefore exclude non-council assets, and segregates department assets into appropriate categories. This is particularly pertinent for drainage assets where sumps and roadside drains are valued as road assets and not the responsibility of the Stormwater Group.

For pricing the following methodology has been used:

- Costs based on installation costs from contracts where and latest known material prices. Prices also include all design and supervision rates associated with the construction.
- Unit rates are comparable with neighbouring local authorities of similar demographic profiles and size.
- No discount rate has been applied. It is considered that the volume of replacements would not be significant or in sufficient quantities that could generate savings.

6.3.5.2 Wastewater and Stormwater

The following assumptions have been used in the establishment of unit replacement rates:

- Replacement cost for pipes is based primarily on diameter.
- All pipes are manufactured to the relevant NZ Standards.

For location of wastewater and stormwater assets:

- Urban – No separation between berm and carriageway in Asset Management Replacement costs assumed to be open trench in carriageway.
- Stormwater Rural – Pipe replacement costs are adjusted from urban rates to account for the general Greenfield situation.

The following process has been used for pricing:

- Costs based on latest known material prices (including discounts) and installation costs from contracts where applicable. Prices also include all design and supervision rates.
- Comparison of unit rates with other local authorities.
- No discount rate has been applied. It is considered that the volume of replacements would not be significant or in sufficient quantities that could generate savings.
- Council maintenance is demarcated at the property boundary. Asset registers contain lateral information where known. Where spatial information on sewer laterals is not available, the replacement value for each connection comprises an average of 5 metres of pipe.

6.3.5.3 Asset Impairment

Rangitikei District Council has not experienced any natural events, or operational damage, (malicious or accidental) that would cause asset impairment to any part of the assets covered by this report.

6.3.5.4 Useful Lives

The standard useful lives for the assets has been guided by Table 5.3.1 in the NZ Infrastructure Asset Valuation and Depreciation Guidelines, but has been adjusted and aligned with the customised asset component hierarchy used by the Asset Management system.

The useful lives were based on the value assigned to individual assets by previous valuers and RDC staff. A complete list of standard base lives can be found in the AssetFinda database or electronically attached to this report under the file BSE_LF_MAT.mdb in MS Access format.

The following tables show the base useful life used for various asset groups across water, wastewater and stormwater.

Table 104: Useful Lives

Asset Group		Useful Life (Years)
Pipes	Plastic	80 – 90
	Ceramic	50 – 80
	Steel	30 – 90
Manholes		100
Civil		50 – 100
Mechanical		10 – 20
Electrical		5 – 25
Reservoirs/Tanks		50
Hydrants		50
Valves		25 – 50
Tobys/Meters		25 – 50
Earth Swales/Drains		Indefinite
Sumps/Catchpits		100

6.3.5.5 Quality Assurance Processes

The databases used in this valuation are continually being updated as part of the normal day to day operations. As such their integrity and robustness is continually being enhanced. Up until now random informal quality assurance checks have been made, which included checks with as built data and with the assets in the field. It is proposed that this will continue. Asset attributes are cross referenced with asset repair sheets filled in by operational staff and contractors as part of their service level agreements with the Assets Department.

6.3.5.6 Depreciation Forecasts

The depreciation methodology adopted is the straight line method. This has been applied to all infrastructure assets covered in this plan.

Assets have been depreciated on a straight-line basis (residual values are not depreciated) to determine Optimised Depreciated Replacement Cost (ODRC).

$$ODRC = Optimised\ Replacement\ Cost \times \frac{Remaining\ Useful\ Life}{Total\ Useful\ Life} \times Unit\ rate\ Factor$$

The calculation for annual depreciation used is:

$$Annual\ Depreciation = \frac{Optimised\ Replacement\ Cost}{Total\ Useful\ Life}$$

Total useful life is calculated differently depending on whether condition and performance factors are used in the valuation or if it is dependent on age alone. Condition factors are used where the manager is confident that suitable condition data is available to produce a more accurate valuation than by age alone.

$$Total\ Useful\ Life = Age + Remaining\ Useful\ Life$$

$$Remaining\ Useful\ Life = \begin{cases} f(Baselife, condition, performance), if\ condition\ based\ valuation \\ or\ Baselife - Age, if\ age\ based\ valuation \end{cases}$$

The condition grading system used is described earlier in this Asset Management Plan.

6.3.6 Valuation Summary

A summary of the water assets owned by Rangitikei District Council is given in Table 105.

Table 105: Asset Summary - Water (2013 Valuation)

Scheme	Replacement Cost ($)	Written Down Value ($)
Bulls	8,920,181	3,312,017
Hunterville Urban	2,327,094	1,683,199
Mangaweka	2,051,975	728,570
Marton	34,463,034	19,942,839
Ratana	1,720,437	943,554
Taihape	13,596,577	5,025,182
Erewhon Rural	5,293,846	3,312,017

Scheme	Replacement Cost ($)	Written Down Value ($)
Hunterville Rural	8,856,199	5,792,451
Omatane Rural	698,882	452,460
Putorino Rural	174,016	157,959
Total	**78,102,241**	**41,146,858**

Table 106 gives a summary of valuation information for our wastewater assets.

Table 106: Asset Summary - Wastewater (2013 Valuation)

Scheme	Replacement Cost ($)	Written Down Value ($)
Bulls	7,939,442	4,595,174
Hunterville	2,927,083	1,834,621
Koitiata	219,623	147,972
Mangaweka	1,188,382	618,242
Marton	22,990,242	13,401,622
Ratana	1,445,755	983,399
Taihape	10,320,902	4,259,574
Total	**47,031,429**	**25,826,272**

A summary of the stormwater assets is shown in Table 107.

Table 107: Asset Summary - Stormwater (2013 Valuation)

Asset Description	Replacement Cost ($)	Written Down Value ($)
Bulls	2,796,022	1,750,537
Hunterville	1,268,569	1,036,762
Koitiata	100,614	98,285
Mangaweka	255,146	161,641
Marton	11,019,841	7,658,942
Ratana	500,625	277,415

Asset Description	Replacement Cost ($)	Written Down Value ($)
Scotts Ferry	292,423	223,502
Taihape	7,259,842	3,724,463
Rakataua Drainage	46,680	42,012
Total	**23,539,763**	**14,973,558**

6.4 Insurance

Rangitikei District Council is a member of LAPP (the Local Authority Protection Programme), which is a cash accumulation mutual pool that members use to assist with the cost of infrastructure repairs resulting from natural disasters. LAPP covers underground assets, but not aboveground assets such as Water Treatment Plants, reservoirs, or open drains.

Losses on assets covered by LAPP are recovered through a split of 40% LAPP and 60% central government, with a deductible of $260,000. From a membership of 40 Councils, LAPP now consists of only 26. Wellington City Council is one of the authorities that have left. There is now less risk of LAPP funds being drained by a major disaster, as happened in the aftermath of the Canterbury quake.

Council carries insurance policies itself for our aboveground assets, through brokers AON.

6.5 Key Assumptions

The Council has made a number of corporate assumptions, which underpin the development of this Asset Management Plan and the Long Term Plan. A full list of these assumptions is included within the 2015 Long Term Plan.

Assumptions specific to RDC 3 Waters assets are included in the following table.

Table 108: Key Assumptions – 3 Waters

Forecasting assumption	Risk	Level of uncertainty	Reasons and Financial Effect of Uncertainty
Activities- Council will not exit any of the activities covered by this plan during the term of the Asset Management Plan	Council may chose to exit activities due to constrained finances	Low	Council has listed the assets covered by this plan as strategic assets, demonstrating its intention to continue with them
Lives of assets- predictions contained in the Asset Management Plans are realistic	Asset lives are over stated and assets fail to deliver levels of service earlier than forecast	Low	Asset lives are reviewed regularly as part of condition assessment process

Forecasting assumption	Risk	Level of uncertainty	Reasons and Financial Effect of Uncertainty
Levels of service – predictions of demand trends form a sound basis for the upgrading of assets	Council may renew or build new assets which do not meet user needs	Low	Council keeps regularly updated on National and International utility management trends

Operations and Maintenance assumptions made were that:

- Depreciation is fully funded by Council. Interest is funded by rates while loan repayment is funded from reserves.
- Expense increases of 25% in first year reducing to a constant rate of 15% from year three. Based on current price increases in energy and consumables (such as chemicals).
- The figures above do not include inflation.

6.6 Forecast Reliability and Confidence

Both capital and operational forecasts are built up from zero-based budgets where possible. This means starting from first principles and calculating costs, for example calculating chemical usage from dose rates and expected flows, then determining costs based on contract rates for those chemicals.

Operational budgets are checked against historic expenditure over a period of several years to ensure that they are comparable and realistic.

7 Improvement Plan

7.1 Status of AM Practices

7.1.1 Introduction

This section of the AMP describes how the Council manages the activity on a day-to-day basis. It covers the strategies employed by Council to ensure that levels of service are delivered to the agreed level in a sustainable and cost effective manner.

7.1.2 Organisational Structure and Asset Responsibilities

The Manawatu District Council and Rangitikei District Council are responsible for providing services to their respective communities through the operation and sustainable management of infrastructural activities.

In November 2007 the two Councils signed a Memorandum of Understanding that outlined the framework for a shared services arrangement. The shared services arrangement recognises that there are advantages to both Councils in working together to provide asset and contract management services.

The activities covered by the shared services arrangement are:

- Roads.
- Water utilities.
- Solid waste.

As part of the implementation, the Manawatu District Council established an Assets Group, with responsibility for the provision of services to each Council. In 2011 the Group was retitled the Infrastructure Group. Property, parks and cemeteries remain under the direct management control of the Rangitikei District Council. Asset Management practices for these activities are closely aligned to those observed in the shared services arrangement.

The functions provided by the Infrastructure Group are:

- Asset Management (all activities).
- Project management (all activities).
- Contract management (all activities).
- Technical expertise and skills (all activities).
- Operation and maintenance of the water and wastewater treatment plants (water and wastewater activities only).
- Operation and maintenance of the water, wastewater and stormwater reticulation networks (water, wastewater and stormwater activities only).

These functions are undertaken to ensure that:

- Each Council’s statutory obligations are met and not compromised; and
- Each Council’s commitments with their respective communities are delivered, as outlined in the Long Term Plans, Asset Management Plans and other relevant plans.

7.1.3 Infrastructure Group Structure

The 3 Waters activities are managed under a shared services agreement by the Infrastructure Group of the Manawatu District Council. Rangitikei District Council maintains relationships with Infrastructure Group staff of other Councils to facilitate the exchange of information and management practices.

The Group structure was developed with the shared services objectives in mind. The team structure recognises that the delivery approach for each activity will be influenced by:

- Differences in the management structures of each organisation.
- The nature of the various activities.
- The current level of performance with respect to each activity.
- The level of skills required to meet community expectations.

7.1.4 Asset Management Planning Group

The Asset Management Planning Group is the mechanism through which Council coordinates Asset Management. The purpose of the Asset Management Planning Group is:

“To provide a forum in which Asset Management practices are enhanced thereby giving a cohesive approach in the effective delivery of services”

Desired outcomes of the group are:

- Coordination of Asset Management Plan development.
- Focused training to match needs.
- Forum for raising and discussing specific challenges.

The group has representation from a wide range of Council functions, including Executive Team, finance, corporate planning, asset data system management as well as the asset managers. Wide representation ensures a whole of organisation approach is taken to Asset Management.

7.1.5 Procurement of External Services

The physical implementation of Asset Management strategies is largely implemented via the purchase of external goods and services. RDC staff follow a procurement policy, which is available through SharePoint. This policy sets out a framework for the procurement of goods and services that aligns with the strategic outcomes and objectives of Rangitikei District Council.

The policy recognises that Council has a responsibly to its community to manage its resources effectively and efficiently and to procure goods and services in a transparent and legally compliant manner.

The policy is a Council tool that delivers 'value for money' rather than a prescriptive document which dictates a single procurement process for all goods and services. The policy covers the full range of products and services procured by Council and it is intended that implementation of the policy will provide consistency in maximising value for money, in supporting the local market and in providing fair competition.

Staff have delegated authority for expenditure depending on their role within Council. For details, refer to the Delegations Manual.

7.1.6 MWLASS

Manawatu-Whanganui Local Authority Shared Services (MWLASS) is the vehicle through which regional territorial authorities secure shared services that provide benefits to all member Councils. To date the LASS has delivered efficiencies in the areas of GIS mapping, archive services and subscription to economic information and databases.

7.1.7 Asset Management Information

To help identify the Asset Management information needs it is helpful to break down business practice into three key Asset Management inputs:

- **Processes**. The necessary processes and the analysis and evaluation techniques needed for lifecycle management.
- **Data**. Data available for manipulation by information systems to produce the required outputs.
- **Information systems**. The information support systems used to store and manipulate the data.

7.1.8 Data Management and Information Systems

7.1.8.1 Asset Data

Council maintains its core Wastewater Treatment asset data within the AssetFinda System. The software allows for the data to be viewed in a variety of forms. It has extensive and advanced searching functions, as well as tabular and graphical reporting of search results.

This allows the manager to view records by location, commission date, overall condition, design life, critical (remaining) life, or any other parameter. AssetFinda is also capable of carrying out cost-based valuation calculations using straight-line depreciation.

Data management processes to ensure data accuracy and completeness are under continual review and are at present reasonably documented, although the opportunity exists to improve the identification linkages between systems.

Most asset attribute is contained in databases to a high degree of accuracy and completeness.

- **Land Identification:** Property land ID numbers are currently used with Council's GIS system.

- **Plans and Records:** Most design plans and some as-built plans are kept in hard copy form in the Professional Services Unit plan room. There is a move towards digitising these and linking them to a property land ID number.

- **Customer Requests:** All customer requests are received and logged by Council. The customer service officers then either escalate the call to the contractor (routine matters) or the officer responsible for the activity.

- There is no direct link between AssetFinda and the customer request system. AssetFinda has a distinct customer request module, but this is not the system used by Council to track requests.

- **Financial Data:** The financial system used is NCS. The system is entirely separate from the network database. The manager signs off all expenses and all costs (operation, maintenance, capex) are recorded against appropriate cost codes in the financial system. The actual costs of renewals are entered against the appropriate asset component within AssetFinda. A valuation is carried out every year by an external valuer, using the AssetFinda data.

- **Asset Accounting/Costing:** The asset accounting and costing practices are detailed below.

7.1.8.2 SCADA Data

Our water and wastewater networks are monitored or controlled using local SCADA systems. Due to the topography and geography of the District, there is no centralised collection point for our SCADA information. However, our operators can dial in to most of our plants remotely.

Each day, certain SCADA sites send a batch file of information to a report server, from where it is distributed to operational staff. This information is also sent daily by .csv file via an FTP site to our online Water Outlook software, which stores it separately by tag. Water Outlook gives our staff greater ability to query this data and run reports on the performance of our plants.

Sites that currently send reporting information are shown in the table below.

Table 109: SCADA Reporting

Site	Data
Water	
Bulls	Estimated bore & well abstraction (estimated due to faulty flow meters), Flow to Riverlands
Calico Line	Bore Abstraction
Hunterville Rural	Intake Flow
Hunterville Urban	Flow to Town

Site	Data
Mangaweka	Rising Main Flow and Flow to Town
Taihape	Gravity Flow, Plant Flow and the Bypass Flow
Wastewater	
Bulls	Outflow
Hunterville	Inflow, Outflow and Emergency Outflow
Marton	Inflow
Taihape	Inflow to Ponds, Inflow to Plant

7.1.8.3 Valuations

The valuations are based on AssetFinda Data. The basis of valuation and all assumptions are well documented in the Asset Management Plan. The valuation is undertaken by a suitably qualified independent valuer every year.

The AssetFinda software has provision for assigning modern equivalent asset (MEA) rates to components. In combination with age, condition and performance data, these rates are used to value the assets and to develop renewals forecasts

7.1.8.4 Whole of Life Costs

Cost information is held in the financial system at the major activity level. Maintenance and renewal activity expenditure is also held within AssetFinda. Froward work programmes are also being developed within AssetFinda, which will allow future maintenance and construction costs to be accurately estimated.

A future improvement is to assign capital expenditure to assets within AssetFinda.

The AssetFinda system can produce reports for any section of the wastewater collection network, which will show ages, material types, maintenance and renewal work and dates. The report will show whole of life costs as well as costs incurred to date.

7.1.9 Organisation/Commercial Strategies

The Shared Services structure ensures that Rangitikei District Council progress Asset Management practices in a consistent way.

Rangitikei District Council contracts out almost all physical works arising from the delivery of services. Some maintenance work, however, is completed by Council staff.

Project management is provided by the Project Team.

The role of the Asset Manager is to identify the outcomes to be delivered and manage the budget; the Project Team specify, procure, manage and monitor the delivery of the agreed outcomes.

The Asset Manager also has responsibility for the management of the service level agreement to the Community.

The Project Team manages contracts for renewal and capital works.

The contracting strategies are generally well developed and effective external contracts are in place with physical works and professional services providers.

7.1.10 Asset Categorisation/Hierarchy

Asset description classifications and standards are well documented for all significant assets and components.

Asset data is stored in various locations around the Council and maintained by various staff depending on ownership and usage of the data. A more centralised and consistent approach to collecting, storing and managing the data would be desirable and more efficient.

Several information management software systems are used by Council to store and manipulate Asset Management data but they are currently used to a limited extent only. The Geographic Information System (GIS) used is MapInfo. AssetFinda links to MapInfo to present asset data spatially.

The Asset Management Plan is a living document, which is relevant and integral to daily Asset Management activity. To ensure the plan remains useful and relevant the following on-going process of Asset Management Plan monitoring and review activity will be undertaken:

Formal adoption of the plan by Council:

- Review and formally adopt levels of service:
- Revise Asset Management Plan annually to incorporate and document changes to works programmes, outcome of service level reviews and new knowledge resulting from the Asset Management improvement programme.
- Quality assurance audits of Asset Management information to ensure the integrity and cost effectiveness of data collected.
- Peer review.

In 2009 Council commissioned MWH to undertake an independent review of Asset Management practices across all asset based activities. Following this review Council began the process of improving Asset Management practices and updating AMPs through the establishment of the Asset Management Plan update project. The project objectives are:

1 To address the Asset Management Planning weaknesses highlighted in the MWH report- April 2010

2 To undertake a review of the existing Asset Management Plans to ensure that:

- All asset based activities of Council are supported by an Asset Management Plan.

- All Asset Management Plans are easy to read, and follow the same agreed format.
- Asset Management Plans reflect the underlying Asset Management Planning processes occurring for each activity, including improvements made as a result of the MWH review.
- Asset Management Plans adequately describe levels of service, and show linkages to other Council planning documents.
- The plans are a robust reflection of the future intentions of Council with respect to asset based activities.
- The financials arising from the plans reliably forecast the lowest lifecycle cost to deliver agreed levels of service for a period of no less than 20 year.
- To compile the information needed for the development of the 2012-2022 Long Term Plan within agreed organisational timeframes.

Current Asset Management practice for wastewater is that:

- Lateral or service connections will be replaced rather than repaired.
- Initial reticulation renewals will be based on age/condition with reassessment by network modelling to identify possible capacity problems.
- Wastewater treatment schemes will meet the Resources Consent Conditions.
- Infiltration and Inflow studies will reduce wastewater entering the wastewater plants at the same time creating a more treatable wastewater.

7.2 Improvement Programme

7.2.1 Overview

In 2009 Council commissioned an external consultancy firm (MWH) to undertake an independent review of Asset Management practices across all asset based activities. Following this review Council began the process of improving Asset Management practices and updating Asset Management Plans through the establishment of the Asset Management Plan update project. The project objectives are:

- To address the Asset Management Planning weaknesses highlighted in the MWH report- April 2010
- To undertake a review of the existing Asset Management Plans to ensure that:
    - All asset based activities of Council are supported by an Asset Management Plan.
    - All Asset Management Plans are easy to read, and follow the same agreed format .

- o Asset Management Plans reflect the underlying Asset Management Planning processes occurring for each activity, including improvements made as a result of the external review.
- o Asset Management Plans adequately describe levels of service, and show linkages to other Council planning documents .
- o The plans are a robust reflection of the future intentions of Council with respect to asset based activities.
- o The financials arising from the plans reliably forecast the lowest lifecycle cost to deliver agreed levels of service for a period of no less than 20 year.
- o To compile the information needed for the development of the 2012-2022 Long Term Plan within agreed organisational timeframes.

This MWH review guided the production of the 2012 AMPs.

7.2.2 Current AM Practice

Subsequent to this, and in preparation for the production of the 2015 AMP's, Waugh Infrastructure Management were engaged in 2013 to complete a structured compliance review of all the RDC AMP's. A review of Appropriate Asset Management Practice was also completed for RDC and concluded that the 3 Waters AMP should be targeted at a Core level of Asset Management practice. This appropriate practice review guided the structured Asset Management compliance review.

This compliance review highlighted gaps and weaknesses in the 2012 AMP's and this anlaysis has fed into the production of this AMP.

Outstanding items highlighted in the compliance review have been listed in the improvement programme of this AMP

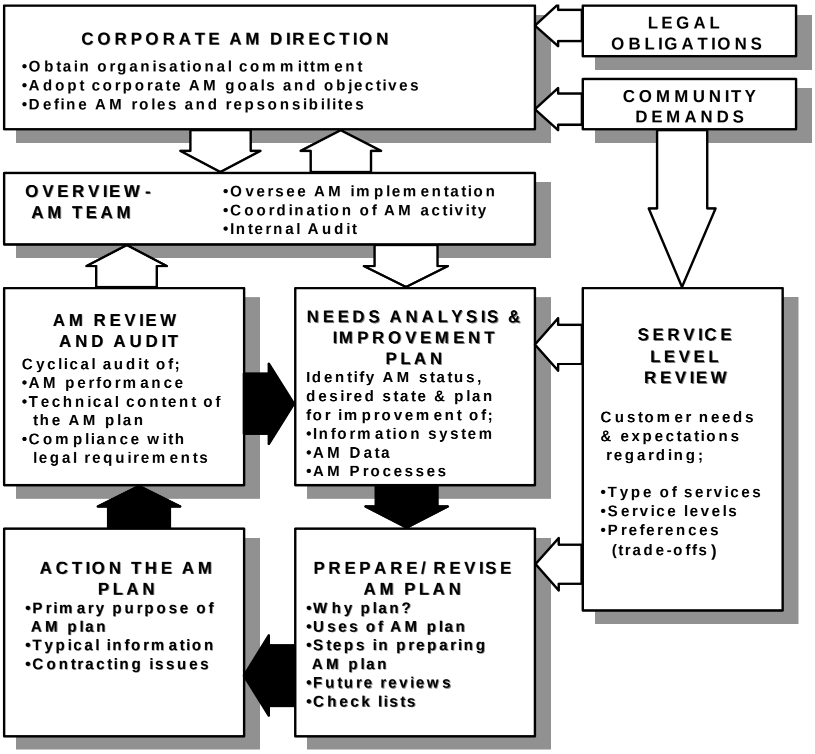
7.2.3 AM Improvement Process

The development of this plan is based on existing levels of service, the best available current information and the knowledge of Council staff. It is merely a snap shot in time of the underlying planning processes of Council. The Asset Management Plan will be the subject of on-going monitoring, review and updating to improve the quality of Asset Management Planning and accuracy of the financial projections.

This process involves using improved knowledge of customer expectations and enhanced Asset Management systems and data to optimise decision-making and activities, review outputs, develop strategies, introduce risk management and extend the planning horizon. The figure below illustrates the desired process for developing and reviewing Asset Management practices and the resulting Asset Management Plan.

Figure 168 shows the process that guides improvements in Asset Management Planning.

Figure 168: Improvement Process



The Asset Management improvement process involves:

- The cycle of Asset Management Plan monitoring, review, revision and audit to improve the effectiveness of Asset Management Plan outputs and compliance with audit criteria, legal requirements and good practice.
- The definition of service standards reflecting community desires through public consultation (service level review). The Asset Management Plan is used to identify service standard options and costs, and the delivery of the service standards adopted is a key objective of Asset Management Planning.
- The corporate Asset Management co-ordination role by the Asset Planning Group, which guides and audits the development of Asset Management Plans within the framework of Council's strategic direction.

7.2.4 Improvement Actions

The purpose of the Improvement Plan is to:

- Identify and develop implementation of Asset Management Planning processes.
- Identify and prioritise ways to cost-effectively improve the quality of the Asset Management Plan.
- Identify indicative time-scales, priorities, and human and financial resources required to achieve Asset Management Planning objectives.

The RDC 3 Waters AMP has been under on-going improvement actions since 2008. These are listed in the Table below. The current status of these improvement actions is also noted.

The improvement programme for this version of the Asset Management Plan was developed using the results of the July 2013 external review. The following table lists the improvement tasks identified for each of the practice areas reviewed.

The improvement action plan is given in Table 110.

Table 110: Improvement Action Plan

Improvement	Location	Target Completion	Resources	Current status
Overall				
Peer review of current AMP	District	Mar 2015	Waugh Infrastructure Management	In progress
Complete a gap analysis of specific parts of AMP against NAMS guidelines	District	Jun 2016	Asset Engineer	
Develop strategy and processes for planned maintenance	District	Jun 2016	Asset Team, Operations Team	
Develop SOP for depreciation calculations	District	Jun 2015	Asset Management Officer	
Update AssetFinda to track Replacement Cost and Optimised Replacement Cost separately	District	Dec 2016	Asset Management Officer	Currently ORC is used, but RC can be back-calculated using recorded modifiers
Implement mobile solution for updating AssetFinda information	District	Jun 2017	Asset Management Officer	
Ensure AMP aligns with District Plan	District	Jun 2015	Asset Engineer, Policy Analyst/Planner	Include information on growth areas e.g. Bulls
Water				
Radiological testing of Calico Line bore	Marton	Jun 2015	Operations Manager	Required to achieve secure bore status for this supplementary supply

Improvement	Location	Target Completion	Resources	Current status
Radiological testing of new bore	Ratana	Jun 2015	Operations Manager	Will be completed as part of water supply upgrade
Produce O&M manual for WTP	Marton	Jun 2015	Operations Manager	
	Taihape	Jun 2015	Operations Manager	
	Bulls	Jun 2015	Operations Manager	
	Mangaweka	Jun 2015	Operations Manager	
	Hunterville	Jun 2015	Operations Manager	
	Ratana	Jun 2015	Operations Manager	
Produce P&ID for WTP	Taihape	Jun 2015	Operations Manager	
	Mangaweka	Jun 2015	Operations Manager	
	Hunterville	Jun 2015	Operations Manager	
	Ratana	Jun 2015	Operations Manager	
Develop flushing programme	Marton	Jun 2015	Asset Team, Operations Team	
	Bulls	Jun 2015	Asset Team, Operations Team	
	Ratana	Jun 2015	Asset Team, Operations Team	
Review and improve linkages with the District Plan	District	Dec 2014	Asset Engineer	

Improvement	Location	Target Completion	Resources	Current status
Ensure that land designations related to water assets are correctly recorded in the District Plan	District	Jun 2015	Asset Engineer, Policy Analyst/Planner	
Review Levels of Service and performance measures	District	Dec 2014	LTP Project Team	In progress
Improve the linkage and integrated planning with other activity areas	District	Dec 2014	LTP Project Team	In progress
Review and improve risk management processes and practices	District	Jun 2015	Asset Team, Opus International	Forms part of Water Safety Plans
Review Water Safety Plan internally and seek DWA approval	Marton	Jun 2015	Operations Manager, Asset Engineer	
	Bulls	Jun 2015	Operations Manager, Asset Engineer	
	Taihape	Jun 2015	Operations Manager, Asset Engineer	
	Mangaweka	Jun 2015	Operations Manager, Asset Engineer	
	Hunterville Urban	Jun 2015	Operations Manager, Asset Engineer	
Implement condition assessment programme	District	Jun 2015	Asset Team	
Revise network models	District	Feb 2016	Asset Team, Jeff Booth Consulting	
Quantify water losses	District	Jun 2015	Asset Engineer	

Improvement	Location	Target Completion	Resources	Current status
Improve coordination in the works planning and budget development processes	District	Dec 2014	Asset Team, Project Team, Roading	In progress; forward works programme being developed between Assets and Projects teams
Forecast demand based on historic trends and future predictions	District	Jun 2016	Asset Engineer, Asset Manager	
Develop emergency response plans	District	Dec 2015	Operations Manager, Asset Engineer	
Assess utilisation of assets	District	Jun 2016	Asset Engineer, Asset Management Officer	Use InfoWorks modelling software. Prioritise areas where utilisation seems low e.g. Dixon Way, Taihape.
Componentise WTPs	District	Jun 2016	Asset Engineer, Asset Management Officer, Treatment Operators	
Ensure adequate backflow prevention is in place	District	Jun 2016	Reticulation Supervisor	
Investigate duplication of Tutaenui Rd trunk main	Marton	Dec 2015	Operations Manager, Asset Manager	Renewal of existing trunk main programmed; duplication considered historically
Wastewater				
Produce O&M manual for WWTP	Marton	Jun 2015	Operations Manager	
	Taihape	Jun 2015	Operations Manager	
	Bulls	Jun 2015	Operations Manager	
	Mangaweka	Jun 2015	Operations Manager	
	Hunterville	Jun 2015	Operations Manager	

Improvement	Location	Target Completion	Resources	Current status
	Ratana	Jun 2015	Operations Manager	
	Koitiata	Jun 2015	Operations Manager	
Review Levels of Service and performance measures	District	Dec 2014	LTP Project Team	In progress
Review and improve risk management processes and practices				
Improve coordination in the works planning and budget development processes	District	Dec 2014	Asset Team, Project Team, Roading	In progress; forward works programme being developed between Assets and Projects teams
Carry out I&I investigation	District	Jun 2016	Operations Team, CityCare	Hunterville completed; service offers received for Bulls and Taihape
Implement condition assessment programme	District	Jun 2015	Asset Team	
Forecast demand based on historic trends and future predictions	District	Jun 2016	Asset Engineer, Asset Manager	
Develop emergency response plans	District	Dec 2015	Operations Manager, Asset Engineer	
Assess utilisation of assets	District	Jun 2016	Asset Engineer, Asset Management Officer	Use InfoWorks modelling software. Prioritise areas where utilisation seems low e.g. Mangaweka
Componentise WWTPs	District	Jun 2016	Asset Engineer, Asset Management Officer, Treatment Operators	
Stormwater				

Improvement	Location	Target Completion	Resources	Current status
Review and improve risk management processes and practices				
Review and improve linkages with the District Plan	District	Dec 2014	Asset Engineer	
Review Levels of Service and performance measures	District	Dec 2014	LTP Project Team	In progress
Improve the linkage and integrated planning with other activity areas	District	Dec 2014	LTP Project Team	In progress
Implement condition assessment programme	District	Jun 2015	Asset Team	
Improve coordination in the works planning and budget development processes	District	Dec 2014	Asset Team, Project Team, Roading	In progress; forward works programme being developed between Assets and Projects teams
Forecast demand based on historic trends and future predictions	District	Jun 2016	Asset Engineer, Asset Manager	
Develop emergency response plans	District	Dec 2015	Operations Manager, Asset Engineer	
Complete collection of asset information on open drain network				

The structured compliance assessment gap analysis provides a sound basis for prioritising and monitoring improvements to current Asset Management practices.

A number of further improvement tasks were identified as part of the 2013 structured Asset Management Plan compliance review.

All tasks were then prioritised. Those tasks which will be completed over the next three years are listed in the improvement programme below.

These tasks have focus specifically on those areas where the gap is greatest and also where the risk is considered to be most critical.

Resourcing for the improvement tasks, have been included in the financial forecasts.

7.2.5 AMP Review

The Asset Management Plan is a living document, which is relevant and integral to daily Asset Management activity. To ensure the plan remains useful and relevant the following on-going process of Asset Management Plan monitoring and review activity will be undertaken:

- Formal adoption of the plan by Council.
- Review and formally adopt levels of service.
- Revise Asset Management Plan annually to incorporate and document changes to works programmes, outcome of service level reviews and new knowledge resulting from the Asset Management improvement programme.
- Quality assurance audits of Asset Management information to ensure the integrity and cost effectiveness of data collected.
- Peer review.

These processes will be undertaken as required throught the three year Asset Management updating cycle.

A number of further improvement tasks were identified as part of this Asset Management Plan development and the 2013 Waugh Infrastructure Management AMP Compliance review.

All tasks have been prioritised based on risk and impact on AMP. The table below details those tasks which will be completed over the next three years. These tasks have focus specifically on those areas where the gap is greatest and also where the risk is considered to be most critical.

Resourcing for the improvement tasks, have been included in the financial forecasts.

7.3 Monitoring and Review Procedures

Responsibilities have been allocated for each of the Improvement Plan actions listed above. Buy-in from each of the relevant parties will be sought, and completion dates for tasks agreed upon. These actions will be tracked, with milestones and progress. As each future Asset Management Plan is produced, the updated status of each improvement item will be included. In these ways, accountability for improving Asset Management practices will be demonstrated.

8 References

AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines

Brundtland Commission 1987

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Civil Defence Emergency Management Act 2002

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Hazard Risk Assessment for the Manawatu-Wanganui Region, 2009

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Health (Drinking Water) Amendment Act 2007

Horizons Regional Council One Plan 2013

Hunterville Rural Water Supply Scheme: A Review, The Catalyst Group, 2014

Infrastructure Asset Valuation and Depreciation Guidelines 2006

Landowner Barriers to Irrigation, The Catalyst Group, 2014

Land Drainage Act 1908

Local Government Act 2002

Local Government Amendment Act 2010

NAMS International Infrastructure Management Manual 2011

New Zealand Coastal Policy Statement 2010

Non-Financial Performance Measures Rules 2013

NRB Communitrak Survey – Rangitikei District, 2010

NZ IAS 16 Property, Plant and Equipment 2004

NZS 4404:2010 Land Development and Subdivision Infrastructure

Rangitikei Catchment: Groundwater Use and Availability, The Catalyst Group, 2014

Rangitikei District Council Annual Plan 2013-2014

Rangitikei District Council Long Term Plan 2012-2022

Rangitikei District Council Operational Guidelines – Stormwater

Rangitikei District Council Operational Guidelines – Wastewater

Rangitikei District Council Operational Guidelines – Water Supply

Rangitikei District Council Operative District Plan 2013

Rangitikei District Council Policy Manual 2013

Rating Powers Act, 1988

Reserves Act 1977

Resource Management Act 1991

SNZ PAS 4509: 2008 NZFS Firefighting Water Supplies Code of Practice

Soil Conservation and Rivers Act 1941

Appendices

Appendix I - Improvement Programme History

The history of previous AMP Improvement Programmes is included in this Appendix for completeness and to demonstrate progress that has been made. Items that have not been completed have been carried forward into the current improvement programme.

Improvement Action	Location	Completion Date	Resources	Comments
Overall				
AM Appropriate Practice Review	District	July 2013	Waugh Infrastructure Management	
AMP Compliance Review	District	July 2013	Waugh Infrastructure Management	
Water				
Develop A1 size poster to display summary valuation and production statistics of the network	District	2008	Asset Systems Engineer	Commitment (and Organisational Integration)
Complete P&ID for water treatment plant	Bulls	Sep 2014	Operations Manager	
	Marton	Sep 2014	Operations Manager	
Stormwater				
Review and document condition assessment programme (to support risk and predictive modelling)	District	2010	Asset Management Officer	Output is a programme of work, by priority, tailored to suit budget

Appendix II – 30 Year-Financial Forecasts

Appendix III – Resource Consent Summary

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Marton Water				
Abstraction - Bores	4901	11 Jul 2012	120 m^3/h Bore 1 60 m^3/h Bore 2	Bore 1 at Calico Line, Bore 2 at Totara St under normal conditions
			4,000 m^3/day 120 m^3/h Bore 1 60 m^3/h Bore 2	While maintenance carried out, for no more than 30 days
			Lesser of 1200 m^3/day or 25% of Marton demand	During periods of low rainfall for no more than six months per year
Abstraction – Tutaenui Stream	6929	11 Jul 2032	6,500 m^3/day	From “C” Dam and “B” Dam
Abstraction – Well 303029	106125	1 Jul 2027	3,500 m^3/day	Located within road reserve on Tutaenui Rd
Discharge	6853	14 Nov 2016	140 m^3/day	Discharge alum sludge and filter backwash to “B” Dam
Taihape Water				
Abstraction – Hautapu River	101722	31 May 2020	2,900 m3/day 126 m3/h 35 L/s	When Hautapu River flow at Alabasters > 0.69 m3/s
			2,225 m3/day 93 m3/h 26 L/s	When Hautapu River flow at Alabasters ≤ 0.69 m3/s
Bulls Water				
Abstraction – Bore	103868	16 Jan 2022	1,125 m3/day	Adjacent to Bulls WTP
Abstraction – Bore	6903	16 Jan 2022	1,700 m3/day (combined) 120 m3/h (combined)	Four bores adjacent to Rangitikei River
Mangaweka Water				

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Abstraction – Rangitikei River	103081	18 Dec 2017	170 m3/day 33 m3/h 9.2 L/s	Infiltration gallery at Mangaweka Campground
Ratana Water				
Abstraction - Bore	6350	6 Dec 2020	130 m3/day 14 m3/h	Two bores at Kaiteri St
			300 m3/day 14 m3/h	For several days during Ratana Religious Festival
Erewhon Rural Water				
Abstraction – Reporoa Stream	103986	1 Jul 2027	1,800 m3/day 21 L/s	East of Matawhero Rd
Abstraction - Dam	103987			Consent to dam stream using weir
Hunterville Rural Water				
Abstraction – Rangitikei River	103989	1 Jul 2037	2,500 m3/day 28.9 L/s	Riparian take (infiltration gallery)
Dam	RTK800737	6 Jan 2026	N/A	Consent to dam unnamed tributary of Porewa Stream
Disturb and Divert	106903, 106904	1 Jul 2037	≤ 25% of river flow diverted Gravel depth ≤ 200 mm over adjoining beaches	Disturb bed and divert water for maintenance of infiltration gallery
Omatane Rural Water				
Abstraction	103988	1 Jul 2027	300 m3/day 3.5 L/s	Unnamed tributary of Makino Stream at Makino Rd
Putorino Rural Water				
Abstraction	105370	1 Jul 2027	80 m3/day 29,200 m3/yr	Unnamed tributary of Rangitikei River off Rangatira Rd
Marton Wastewater				

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Discharge to Water	7312	31 Mar 2019	See comments	Shall not give rise to negative effects on receiving environment as detailed in consent
Discharge to Air	7313	31 Mar 2019	DO > 1.0 g/m3	
Taihape Wastewater				
Discharge	105518	1 Jul 2027	1,200 m3/day 14 L/s	Discharge onto land that enters Hautapu River when flow > 2.8 m3/s at Alabasters
			500 m3/day 5.8 L/s	Discharge onto land that enters Hautapu River when flow ≤ 2.8 m3/s at Alabasters
Bulls Wastewater				
Discharge	6406	1 Nov 2006	515 m3/day NH4N < 30 g/m3 CBOD5 < 12 g/m3 TSS < 120 g/m3 Enterococci < 2000/100 mL DRP < 10 g/m3	Discharge from Bulls oxidation pond to Rangitikei River; shall not give rise to negative effects on receiving environment as detailed in consent
Mangaweka Wastewater				
Discharge to Water	101726	19 Mar 2024	90 m3/day 20 m3/h	Discharge to Mangatera Stream
Hunterville Wastewater				
Discharge to Water	105833	1 Jul 2037	250 m3/day Max. 7 L/s Avg. 3 L/s scBOD5 < 2 g/m3 TSS < 26 g/m3 NH4-N < 3 g/m3 DRP < 0.010 g/m3 E. coli < 260/100 mL DO ≥ 2 mg/L	Discharge to land that enters Porewa Stream; shall not give rise to negative effects on receiving environment as detailed in consent

Consent	Consent Number	Expiry Date	Consent Limit	Comments
Discharge to Land	105834	1 Jul 2037	N/A	Discharge to land via pond seepage
Land Use	105835	1 Jul 2037	N/A	Construction of rock outfall within Porewa Stream bed; no instream works between 1 May and 31 December of any year
Ratana Wastewater				
Discharge to Water	7400	31 Jul 2018	136 m3/day NH4-N < 30 g/m3 NH4-N < 10 g/m3 avg. over 12 months cBOD5 < 80 g/m3 cBOD5 < 50 g/m3 avg. over 12 months TSS < 200 g/m3 TSS < 120 g/m3 avg. over 12 months Enterococci < 9000/100 mL Enterococci < 3000/100 mL avg. over 12 months DO ≥ 2 g/m3	Discharge to unnamed tributary of Waipu Stream
Koitiata Wastewater				
Discharge to Land	105079	1 Jul 2024	16.2 m3/day (based on inflow) Discharge area ≥ 940 m2	Discharge from oxidation pond to land
Land Use	106028	1 Jul 2024	N/A	Construction of land disposal area