ASSET MANAGEMENT PLAN

WATER

2024

GREAT LAKE TAUPŌ
Taupō District Council
fresh thinking

Document Control Record

Project Asset Management Planning

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Document Asset Management Plan -Water

REVISION RECORD

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WATER ASSET MANAGEMENT PLAN

EXECUTIVE SUMMARY

Introduction

A Water Asset Management Plan serves as a strategic document that outlines how a Council manages, operates, maintains, and plans for the improvement or replacement of its water infrastructure assets. The primary purpose of this plan is to ensure the effective management of water assets to provide the infrastructure to enable growth, meet regulatory requirements, and met the levels of service expected by the community.

Taupō District Council provides water for use by individuals, households, commerce, industry and firefighting across the district. The function of Councils drinking-water systems is to protect public health though provision of safe water in sufficient quantities and at the required pressure and flow.

This Asset Management Plan provides information on:

Asset Data	A high-level inventory of all water assets, including pipes, treatment facilities, pumps,reservoirs and other infrastructure.
Level of Service	Ensuring the reliability of water services is a key objective. WAMPs help prevent disruptions in service due to asset failures by prioritising maintenance and replacements.
Future Demand (Planning for Growth)	Understanding growth and planning to meet the demands of growth on infrastructure.
Risk Management	Identify potential risks and vulnerabilities associated with water assets, such as aging infrastructure, environmental factors, and regulatory changes. By identifying risks, the plan can help prioritise maintenance and upgrades.
Lifecycle Management (Long-Term Planning)	An asset management plan helps establish a long-term plan for the maintenance, repair, replacement, or expansion of water assets. It sets priorities based on asset condition, criticality, and available resources.
Financial Planning	It aids in financial planning by estimating the costs associated with asset maintenance, repair, and replacement over the planning period. This helps ensure that adequate funding is available to support the water system.
Asset Management Practices	The systems Council uses to manage assets.
Regulatory Compliance	An asset management plan helps water utilities comply with environmental regulations and standards. By planning for the maintenance and upgrades of assets and consents as needed.

Water supply assets

Council operates 17 water schemes for its communities, servicing most of the district's population. Collectively the assets for water supply have a replacement value (excluding land value and excluding assets that have reached end of life) of approximately $211 million. The water supplies and properties connected are displayed below.

Scheme / Zone	Properties Connected
Atiamuri	77
Bonshaw Park	68
Centennial Drive (treated and untreated)	67
Hatepe	111
Kinloch / Whakaroa	1249
Mangakino Township	724
Motuoapa	431
Motutere (campground only)	1
Omori/Kuratau/Pukawa	1217
River Road	117
Taupō / Acacia Bay / Mapara	13130
Tirohanga	107
Turangi Township/Tokaanu	2251
Waihaha	32
Whakamaru	79
Whakamoenga Point	50
Whareroa	173
Total	**19884**

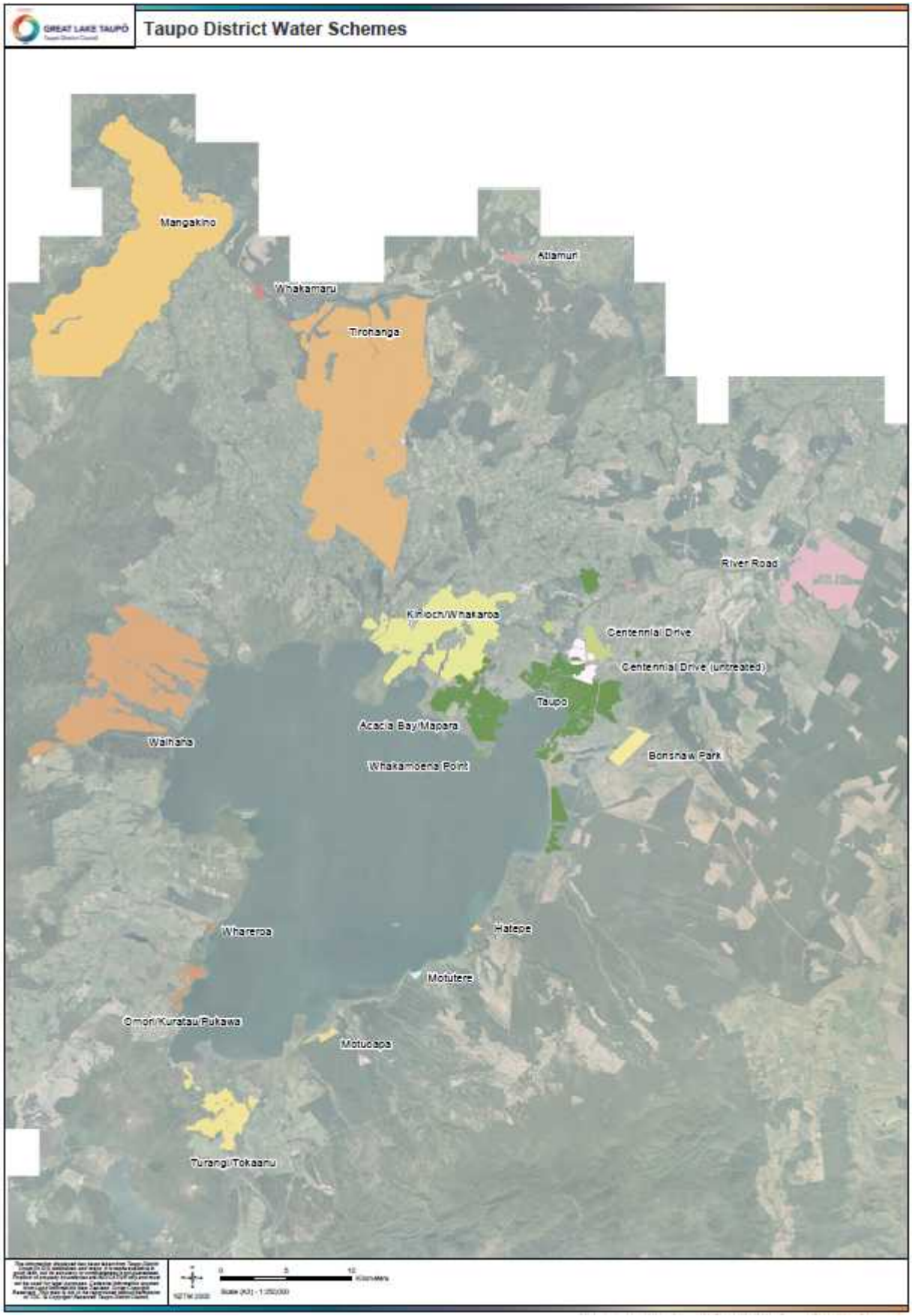
There are a further 1,169 properties who have connections installed but have not yet connected or using the supply.

Communities that do not receive Council water supply within the District include: Waihi Village, Waitetoko, Te Rangiita, Orutaua, Motutere Point, Mission Bay, areas of Motuoapa, and some rural households with their own supplies. The unconnected area of Motuoapa is planned for connection to Council water supply. Council has no plans to expand its supply network to the remaining communities within the next 10 years.

Levels of Service

Council owns and operates its water assets so that it can provide water to its various communities to the required level of service:

- Drinking water provided by Council is safe to drink (compliance with drinking water regulations)
- There is sufficient capacity to meet current demands and future growth
- The reticulation system is maintained (water loss analysis)
- System failures are addressed in a timely fashion (response times)
- Users are satisfied with water supply
- Demand will be managed efficiently
- Water for fire-fighting in urban supply areas meets volume and pressure standards


Taupo District Water Schemes
Mangakino
Whakamaru
Tirohanga
Atiamuri
River Road
Kinloch/Whakaroa
Centennial Drive
Centennial Drive (untreated)
Taupo
Acacia Bay/Mapara
Waihaha
Whakamoenia Point
Bonshaw Park
Whareroa
Hatepe
Motutere
Omori/Kuratau/Pukawa
Motuoapa
Turangi/Tokaanu

Water Supply Strategy

In 2019 Council adopted a new Water Supply Strategy. The Water Supply Strategy sets the direction on how Council will manage our drinking water supplies. The strategy sets 5 outcomes including:

1. We ensure the protection of public health
2. We recognise Te Mana o Te Wai
3. We use water responsibly and sustainably
4. We support the Communities Growth aspirations
5. We ensure that our water supply system is financially sustainable

The Asset Management Plan looks to deliver on the outcomes of the Water Supply Strategy along with the direction set within other Council strategic planning documents such as the Infrastructure Strategy.

State of the assets

Water

Council's single-most important strategic asset is its water which is allocated by WRC, via consents. Council has water take consents to abstract water from lakes, rivers, streams and bores within the district for each of its supplies. Each consent has its own conditions, which must be met, monitored and reported.

Taupo District has relatively abundant natural water resources including rainfall averaging 1,100 mm/yr, the country's largest lake, significant rivers and easily tapped groundwaters and springs.

As water resources become fully allocated, there is a requirement to show water is being utilised efficiently. There will be increasing pressure to justify water take consents and increasing requirements to show the allocated water takes are being well managed.

Hence, with the growing regional and central government focus on efficient use of water resources, the responsibility falls on local authorities to demonstrate prudent management. Council has developed a Water Demand Management Plan (WDMP) as required under the Waikato Regional Plan.

Peak day water demand across the district is high, mainly because of large increases in population during events and holiday periods, as well as due to irrigation (gardens, golf courses, other recreation), and leaks from the system, (which may be on private property as well as within the public network).

While current consents provide sufficient water for the district, increasing demand for fresh water across the country means that new consents or increases to water takes within consents may be more difficult to acquire and demonstration of efficient use will be required.

Water treatment, reservoir and pump stations

The water regulator for New Zealand Taumata Arowai has set drinking water standards, requiring communities to have demonstrably safe drinking water by managing contaminations risks.

Taupo, Turangi, Mangakino, Whakamaru and River Road have appropriate treatment to enable full compliance with the drinking water standards. Atiamuri, Kinloch, Omori, Motuoapa, Hatepe, Waihaha, Bonshaw Park and Whakamoenga all have projects underway in the 2021/2031 LTP to enable compliance.

The remaining 4 water supplies require a solution to enable compliance with the requirements of the drinking water standards. Projects to achieve compliance have been scheduled across years 1 to 4 of the LTP. Operational cost changes have also been planned as these upgrades occur.

In October 2023 Taumata Arowai wrote to Taupo District Council requesting a confirmed and funded plan for provision of protozoa barriers at all sites to be provided by 30 June 2024. The expectation from Taumata Arowai is that the plan would be implemented by December 2024 for surface water sites and December 2025 for bore water sites. This request has resulted in further accelerate of treatment upgrade projects at Hatepe, Motuoapa, Motutere, Tirohanga and Whareroa.

Council also has a significant number of reservoirs and pump stations across the District. Many of the reservoir assets in particular are nearing end of life and an increased level of condition assessment is expected in coming years to enable maintenance and renewals programmes to be better informed.

Water reticulation

Reticulation assets include pipes (both gravity and pumping), fire hydrants, valves, water meters, and supporting infrastructure such as chambers and manholes. Water reticulation age and condition across the District is variable. There remains significant quantities of asbestos cement and galvanised pipelines, and associated infrastructure estimated to be beyond their useful life. The current construction backlog value is estimated at in excess of $26M. A large water reticulation renewals programme is planned in the LTP to reduce the construction backlog, corresponding potential for asset failures and the disruption and risks associated.

Demand forecast

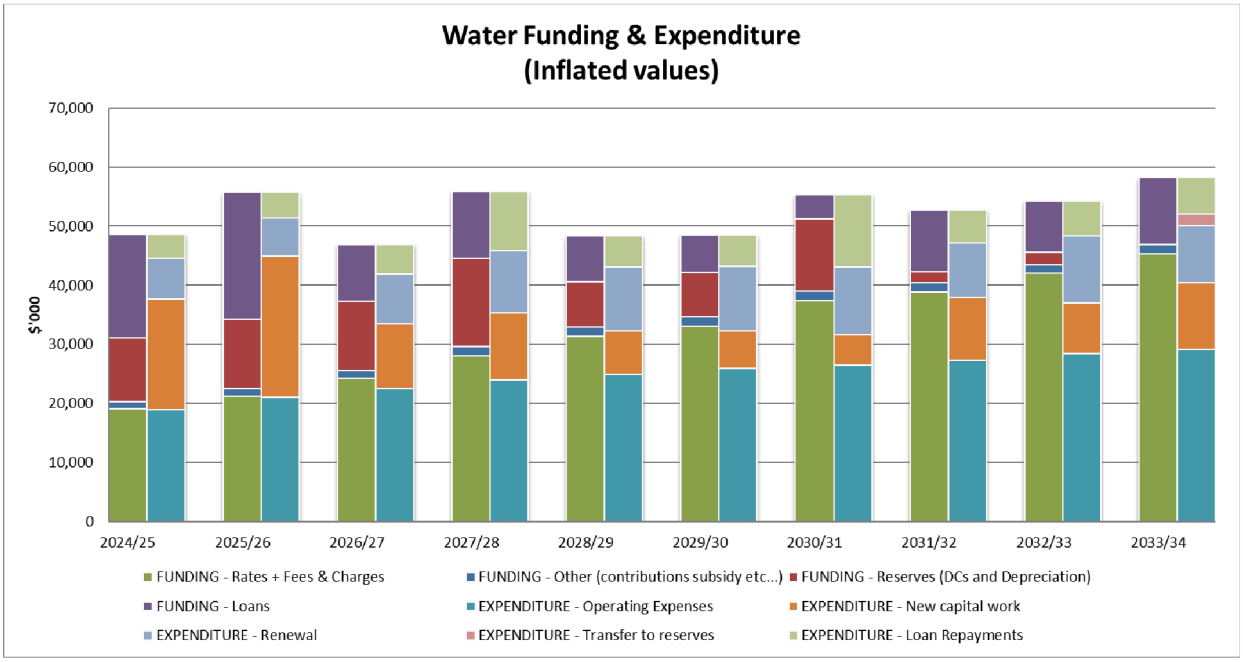
The recent review of the Council's growth model (water) projects at Council will be supplying water to a further 2,841 properties in the next 10 years. In the past couple of years growth has exceeded expectations and may continue to do so. As growth occurs Council is required to invest in the infrastructure to support this growth. Therefore, Council must act to meet these demands and has done so by including specific growth projects within the LTP. Growth projects include new reservoirs, pipeline upgrades and universal water metering.

Financials

The financial projections (most likely scenario) contained in the graph below for capital, renewal and operational expenditure are based on the following influences:

- The need to upgrade water treatment plants to comply with the drinking water standards.
- Ongoing growth and corresponding investment in infrastructure to support this growth.
- Significant renewal spending for underground assets and reservoirs.
- Tables and graphs below allow for inflation projections that are in line with those forecast by BERL for LGCI over the 10 years.

The total projected spend over the next 10 years for water is outlined in the following graph.



New works

The significant portion of new works is associated with meeting drinking water standards compliance for our water supplies. This includes membrane plant upgrades at Kinloch, Omori, Hatepe, Motuoapa and Motutere; UV plant upgrades at Tirohanga and Whareroa; connection of Centennial to the Taupo water scheme; cyanotoxin treatment at Taupo; and pH dosing upgrades at Turangi and Mangakino.

There will also be significant new works required to keep up demand on services due to growth. These projects include; new reservoirs in Kinloch and Taupo, pipeline upgrades in Kinloch, Mapara, Omori and Whakamaru and District wide water metering.

Renewal

Of the $95 million dollars allocated to water renewals over the next 10 years approximately $75 million is for water pipe renewals with the remaining being primarily treatment plants, pump stations and reservoirs.

Operations & maintenance

A new operations and maintenance contract has been signed with contractor Downer who manage the network, reservoirs and pump stations across the District. Internal treatment staff manage intakes and treatment plants. Operations and maintenance costs are projected to average $10.5 million per year for the next 10 years, which is approximately 50% higher than the previous LTP. The increased operations costs are due to:

- Significant inflation that has occurred over the past 3 years.
- Increased costs to operate and maintain more sophisticated treatment facilities.
- Growth and the associated increase in expenditure across consumables (e.g. chemicals) and the increase in assets created through growth projects.

Risk management

Risk management is essential for management of Council assets so that essential services such as water supply can be provided consistently. Council imposes high health and safety standards for its plant and network, especially where water treatment plant or pump stations are built on low-lying land near lakeshores or riverbeds, or volcanic and/or seismically unstable areas lie just offshore. Using a likelihood and consequence matrix to assess risks, the following high risks have been identified:

- Public safety matters related to inadequate water treatment,

- Fire, damaging the reticulation network due to structural/electrical damage to the water treatment plants or pump stations,
- Earthquake, damaging water treatment plants, and possibly also causing electrical or electronic failures, and/or structural and mechanical damage,
- Flooding, making water treatment plants inaccessible or making them inoperative because of damage or tank contamination,
- Tomos, causing breaks in the reticulation system,
- External contractor failure, leading to failures in the network, service failures, and /or drinking water standard failure.

Technical Notes

Asset Management Practices

Council uses a range of decision making tools to establish its maintenance, renewal and new works expenditure, including: process, analysis and evaluation techniques for life cycle asset management; information systems to store and manipulate data; and data and information analysis from a number of sources (technical, financial, customer service)

International Infrastructure Management

The plan is considered an intermediate plan based on the requirements of the International Infrastructure Management Manual. This plan incorporates recommendations from the last review carried out by Waugh Infrastructure Ltd in 2018.

Changes Post Consultation

[This section is a place holder and will be updated following LTP consultation periods]

1.0 INTRODUCTION

1.1 Background

1.1.1 PURPOSE OF THE PLAN

Taupo District Council is responsible for managing a range of community owned assets such as the Water supply network. To ensure all these assets are managed in an efficient and affordable way asset management plans are required.

This Water supply Asset Management Plan (WAMP) details how the water supply infrastructure assets that are owned by the community will be managed in a conscientious manner to cost effectively meet the needs of the community.

Council manages water assets with a replacement value (excluding land value and excluding assets that have reached end of life) of approximately $211 million on behalf of the community. These assets are summarized in asset data section. The value of assets is based on the valuation completed June 2023.

The size of the water supply network investment, importance of water supply services to the community and requirements of legislation, drives a demand for excellence in the management of these assets. The community expects the water supply network to be managed optimally, to provide secure and safe water, within the agreed levels of service, while minimising costs of the service.

The overall purpose of asset management planning 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".

This asset management plan (AMP) 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.

The main benefits derived from asset management planning are:

- Improved understanding of service level options and standards.
- Minimum lifecycle (long term) costs are identified for an agreed level of service.
- Better understanding and forecasting of asset related management options and costs.
- Managed risk of asset failure.
- Improved decision making based on costs and benefits of alternatives.
- Clear justification of forward works programmes and funding requirements.
- Improved accountability over the use of public resources.
- Improved customer satisfaction and organisational image.

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

The overall responsibility for water supply asset management and the update of the Asset Management Plan at TDC, sits with the Asset Manager Water (AM). The AM plans and implements the capital programme as well as renewals programmes across network assets. Lifecycle management plans for each water scheme are updated by the AM for inclusion in the AMP document.

The AM works closely with the Operations Manager 3 Waters (OM) who manages the operation and maintenance of all water assets as well as renewal planning and implementation for water treatment assets.

Senior Leadership and Elected Member (Councillor) involvement is through the review and approval of the AMP document, LTP and annual plan process. All AMPs are formally updated on a 3-yearly basis, which coincides with the LTP review cycle.

This Asset Management Plan has been updated internally by the Asset Manager Water, building on the existing 2021 AMP document. Data has been collated and updated using the AMS and recent asset valuation data. Contributions for this plan have also been made from water team staff, asset managers from other service areas & other engineering officers within the 3 Waters division. Financial updates have been provided by TDCs finance team.

1.1.2 LEGISLATIVE REQUIREMENTS FOR ASSET MANAGEMENT PLANNING

Section 10 of the LGA states the purpose of local government is to:

- to enable democratic local decision-making and action by, and on behalf of, communities; and
- to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future.

The recent focus on AM planning, results from the Local Government Amendment Act 2002, November 2013 amendment and subsequent amendments. The Act places an emphasis on strategic financial planning and requires local authorities to:

- Prepare and adopt a Long-Term Plan (LTP) with a 10-year planning horizon every three years, taking into account asset creation, realisation, and loss of asset service potential.
- In determining their long-term financial strategy, consider all relevant information and assess the cost/benefit of options.
- Manage assets prudently, in the interests of the district and its inhabitants and ratepayers.
- Clearly identify significant forecasting assumptions and risks underlying financial estimates.
- Identify any significant negative effects that any activity within the group of activities may have on the social, economic, environmental, or cultural well-being of the local community.

The preparation and implementation of an AMP from which long-term financial strategies will be developed, is a means of TDC complying with these requirements.

It is also important to highlight Section 17A of the LGA which requires local authorities to review the cost-effectiveness of current arrangements for meeting the needs of communities within its district or region for good-quality local infrastructure, local public services, and performance of regulatory functions. This section applies to the regular review of for instance the delivery of 3 waters services.

1.1.3 THE HAVELOCK NORTH OUTBREAK, GOVERNMENT 3 WATERS REVIEW AND REFORM

The outbreak of gastroenteritis in Havelock North in August 2016 shook public confidence in the fundamental service provision of safe drinking water. Approximately 5,500 of the town's 14,000 residents were estimated to have become ill with campylobacteriosis. Some 45 were subsequently hospitalised and the outbreak contributed to four deaths. A number of residents continue to suffer health complications.

A Government Inquiry was established to investigate and report on the outbreak. The final reports of the Inquiry contained comprehensive, wide-ranging and powerful recommendations for improvement to water supplies across New Zealand.

The Three Waters Review, a cross-government initiative led by the Minister of Local Government began in mid-2017 and was run in parallel to the Inquiry. The findings of the Review were consistent with many of the Havelock North Inquiry's findings and raised broader questions about the effectiveness of the regulatory regime for the three waters, and the capability and sustainability of water service providers.

At the time of writing the following three water reform actions have occurred:

- Establishment of new drinking water regulator (Taumata Arowai) and the Water Services Act 2021 which provides the regulator legal powers and tools to manage water suppliers.
- Water Services Entities Act
    - The Water Services Entities Act establishes new water services entities so they are ready to provide services from their 'go live' dates.
- The Water Services Entities Amendment Act
    - The Water Services Entities Amendment Act gives effect to the Government's refocus of water services reforms announced in April 2023. The Act amends the Water Services Entities Act 2022 to establish 10 water services entities based on existing regional boundaries, and introduces a staggered timeframe for establishing the entities, with all entities going live between 1 July 2024 and 1 July 2026.
- Water Services Legislation Act
    - This Act establishes the detailed powers, functions and duties of the new water services entities which are necessary for them to deliver water services to communities.
- The Water Services Economic Efficiency and Consumer Protection Act
    - The Water Services Economic Efficiency and Consumer Protection Act implements Cabinet's agreement to establish an economic regulation and consumer protection regime as part of water services reform.
- The preliminary recommended go-live date for Entity B which includes Taupo District Council has been communicated as 1 July 2025.

The three waters reform programme is very much at risk with the upcoming national election. For the purposes of this Asset management Plan we have assumed services remain with Council for the 10 year period of the plan.

Update March 2024: Following the New Zealand general election in October 2023, the National party formed a coalition government with ACT and New Zealand First. The new government plans to repeal Three Waters legislation and replace it with a Local Water Done

Well plan. It plans to ensure that drinking water, stormwater and wastewater remain in local control, with strict water quality standards and a requirement for councils to invest in the ongoing maintenance and replacement of their vital water infrastructure. While the Local Water Done Well Plan is being established, the assumption that services remain with Council for the 10 year period of the plan is considered appropriate.

1.1.4 LEGISLATIVE DOCUMENTS

The key legislative documents relating to the management of water service assets are listed in the following table.

Table 1.1: Relevant Legislation

Local Government Act 2002 and Amendments	The LGA empowers local authorities to carry out various water works but does not require them to do so. The Act requires public consultation. Regular review of service delivery is required, as stipulated on Sect 17A
Health Act 1956	Requires Council to: • provide 'sanitary works', the definition of which includes waterworks and includes all lands, buildings, machinery, reservoirs, dams, tanks, pipes and appliances used in connection with any such works. • ensure the provision in any dwelling house of an adequate and convenient supply of water that is potable, and available for the inmates of the dwelling.
Water Services Act 2021	The Water Services Act 2021 ('Act') commenced 15 November 2021.This Act is part of the Three Waters Reforms. It establishes drinking water standards and regulates all persons and organisations that supply drinking water. Suppliers will have significant new duties including: - Registering their supply; - Complying with drinking water standards, including aesthetic standards; - Providing sufficient quantities; - Having a drinking water safety plan; - Notifying the new authority (Taumata Arowai) and local authorities of any risk or hazard to the water; - Maintaining records of supply, compliance and monitoring (that will need to be done via an accredited lab); - Providing specified information and a complaints process for those consuming the water; and - Paying fees and levies as Taumata Arowai requires. These duties are imposed on a wide range of people, and can extend to those working or volunteering for the supplier. There are significant penalties for breaching the Act. For example, a failure to register a drinking water supply can result in a maximum fine of $50,000 for the individual and $200,000 for a body corporate. Private criminal prosecution is also allowed under the Act.
Taumata Arowai–the	The purpose of this Act is to establish Taumata Arowai–the Water Services Regulator and provide for its objectives, functions, and governance

Water Services Regulator Act 2020	arrangements.
Water Services Entities Act and Amendmnet Act	The Water Services Entities Act establishes new water services entities so they are ready to provide services from their 'go live' dates. The Water Services Entities Amendment Act gives effect to the Government's refocus of water services reforms announced in April 2023. The Act amends the Water Services Entities Act 2022 to establish 10 water services entities based on existing regional boundaries, and introduces a staggered timeframe for establishing the entities, with all entities going live between 1 July 2024 and 1 July 2026.
Water Services Legislation Act	This Act establishes the detailed powers, functions and duties of the new water services entities which are necessary for them to deliver water services to communities.
The Water Services Economic Efficiency and Consumer Protection Act	The Water Services Economic Efficiency and Consumer Protection Act implements Cabinet's agreement to establish an economic regulation and consumer protection regime as part of water services reform.
Resource Management Act 1991	Requires Councils to: ▪ sustain the potential of natural and physical resources to meet the reasonable foreseeable needs of future generation ▪ comply with District and Regional Plans ▪ 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 ▪ Comply with resource consents issued by the Waikato Regional Council for abstraction of water, protecting & maintaining source structure and maintain daily volume of water taken as per variation 6.
Other Acts and Regulations	• Hazardous Substances and New Organisms Act 1996 • Building Act 2004 • Food Act 1981 • Public Works Act 1981 • WorkSafe NZ Act 2013 • Health & Safety at Work Act 2015 • Heritage Pouhere Taonga Act 2014 • Civil Defence Emergency Act 2002 • Public Bodies Contracts Act 1959 • TDC Water Supply Bylaw 2015 • Fire and Emergency Act 2017 • Utilities Access Act 2010 • NZ Firefighting Water Supplies CoP SNZ PAS 4509:2008 • NZ Metadata Standards 2017

1.1.4.1 Water and Sanitary Assessment

A Water and Sanitary Assessment was undertaken in 2008 and 2017.

1.1.5 RELATIONSHIP WITH PLANNING AND STRATEGIC DOCUMENTS

The way in which asset management planning links the strategic planning process with operations and annual plans is illustrated below.

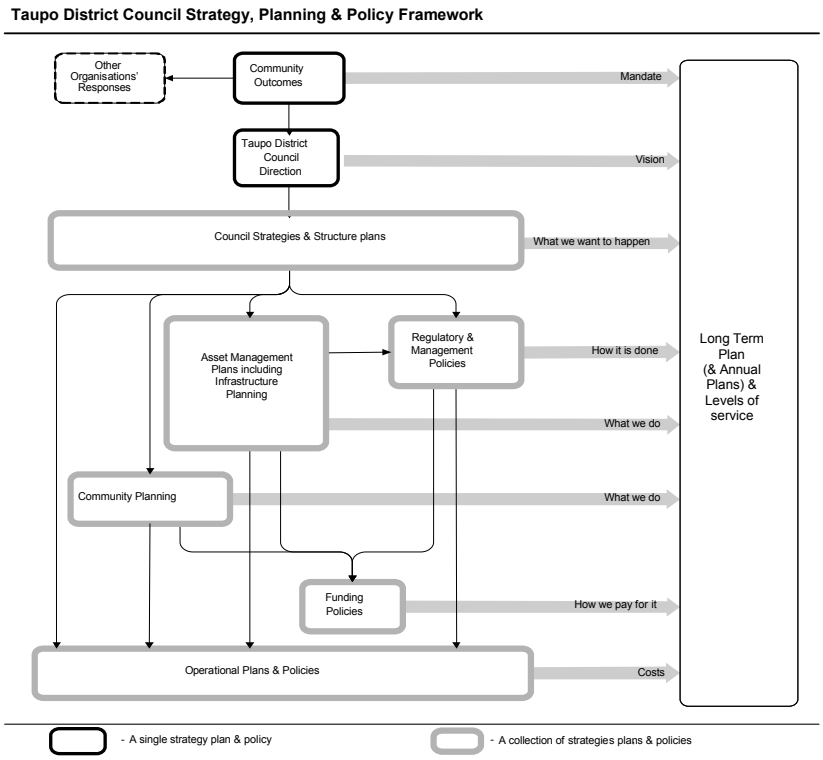


Figure 1.1: Council Planning Framework

AMP's are tactical plans for achieving strategies resulting from the strategic planning process. AMP's are a key component of the council planning process linking with the following documents.

LTP: LTP sets the strategic direction for the Council and is the overarching planning tool which describes the activities the Council will undertake to deliver. It identifies the outcomes the community would like to achieve. It also contains the financial forecast for the next 30 years. This financial forecast is drawn from the AMP.

Annual Plan: This is prepared for year two and three of the LTP period and sets out how Council will undertake its strategic goals and details the specific activities and functions. The works identified in the AMP should automatically become the basis on which future LTP's and annual plans are prepared.

District Plan: The District plan incorporates policies and objectives for land use in Taupo district and is an implementation tool used to protect values and outcomes important to the community. This plan provides a policy framework to guide where and how the future growth should occur. The water supply network is essential services and people into, out of and through the District and provides for the economic and physical wellbeing of the community. The water supply network and treatment plants including boosting pump stations provide the principal water infrastructure for the District and are physical resources of strategic importance which need to be protected from activities which may have an adverse effect on their safe and efficient operation.

Business/Activity Plans: The service levels policies, processes and budgets defined in AMPs are incorporated into business plans as activity budgets, management strategies and performance measures.

Contracts: The service levels, strategies and information requirements contained in AMPs are translated into contract specifications and reporting requirements.

Legislation: The AMP 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 AM tactics.

Waikato Regional Council Policy: These references give the policy framework and give effect to the preferred strategic direction for implementation of Resource consent conditions and what level of water demand management plan the region wants, in meeting RMA objectives. Other consent conditions such as screen sizes at source and monitoring of source water abstraction rates and volumes are linked also. The Waikato Regional Council prepared and notified a variation to the Waikato Regional Plan to manage the allocation and use of freshwater over the entire Waikato region. The impact of variation 6 on council would result in more complex conditions for reporting to demonstrate the efficient allocation and use of water, so that WRC can manage water shortage conditions fairly in entire region.
The regulation requires to take continuous measurement and also keep daily records of water take in auditable format. The data provided to WRC should be in a form suitable for electronic storage.

Water Supply Strategy: In 2019 Council adopted a new Water Supply Strategy. The Water Supply Strategy sets the direction on how Council will manage our drinking water supplies. The strategy aims to clearly set out; how the Water Supply Strategy will help to achieve the Council vision; the outcomes that we want to achieve for our drinking water supplies; goals and responses which describe how we will achieve the outcomes. The strategy sets 5 outcomes including:

1. We ensure the protection of public health
2. We recognise Te Mana o Te Wai
3. We use water responsibly and sustainably
4. We support the Communities Growth aspirations
5. We ensure that our water supply system is financially sustainable

Specific asset management goals and responses are included within the strategy including to ensure that robust forward planning is in place, to have in place an asset management plan and practises that achieve Intermediate Status by 2022, and to ensure that Asset Condition data is collected, stored and utilised in line with best practise.

Infrastructure Strategy: The Infrastructure Strategy helps the Council and community to make informed choices about major decisions and investments that will need to be made for its infrastructure. The strategy presents key themes and issues facing our infrastructure and then discusses options available to respond to the issues. Of importance for the water supply AMP the infrastructure strategy selects options that support growth and development, supports water safety and water demand management planning.

Water Demand Management Plan: Council recognises the importance of managing water demand. The Water Demand Management Plan was reviewed in 2021 and is planned for review during the 2024 financial year, to meet the resource consent conditions.

Water Safety Plans: Council also has prepared Water Safety Plans for each water supply and these plans outline the upgrades required for each scheme to meet the drinking water standards. These plans are updated every 5 years or following any major change to a scheme as required by legislation.

Stormwater and Wastewater Asset Management Plan: The Stormwater and wastewater assets are vaguely interlinked with water assets. The boundary between these assets types are clearly defined within the respective asset management plan. Water intake pump station soak pits and leads are considered to be water assets. All costs associated with those catch-pits and leads, e.g. operational costs of cleaning sediment from pump station soak pits are included in the Water AMP. Catch-pits and leads outside these areas are included within the Stormwater AMP. Similarly, backflow preventers installed at the boundary of wastewater facilities are considered water assets, whereas backflow preventers inside these facilities are considered wastewater assets.

Parks and open space Asset Management Plan: Community facilities have three areas where assets overlap and these are: reticulation pipes / valves; reservoirs; and pump stations on reserve land.

Growth Management Strategy 2050: At the core of Taupo District 2050 are 12 Strategic directions. These provide the framework of interrelated policies that guide decision making and growth-related issues. Strategic direction 4.5 and 8 relate to Water AMP (refer page 5,6 & 7 of GMS). The growth model was updated for the 2024 LTP.

Structure Plans: Adopted and proposed structure plans outline how growth is to be managed within areas - Taupo Urban Structure Plan (TUSP), Taupo Town Centre Structure Plan (TTCSP), Commercial Industrial Structure plan (CISP), Kinloch Community Structure Plan (KCSP), Mapara Valley Structure Plan and Southern Structure Plan.

1.2 Key Stakeholders

This AMP recognises the following as key stakeholders:

Table 1.2: Key Stakeholders

External	Internal

• The community, including citizens, ratepayers, hapu and Iwi
• Residential, commercial and industrial water service users
• Large Water Users (>50m3/day)
  ○ Tenon
  ○ DOC
  ○ TDC
  ○ Hautu-Rangipo Ltd
  ○ Contact Energy
	• Councillors and community boards
	• Senior Leadership Group
	• Asset Management staff
	• Treatment Plant Operations staff
	• Senior compliance officer
	• Development Engineer
	• Corporate Finance Team including rates staff
	• Policy staff
	• Roading/ Transportation staff

○ Fletcher Building ○ Rotarangi Anthony Ralph Matara ○ L&P Lusty ○ BUPA Retirement • Waikato Regional Council • Ministry of Health • Taumata Arowai • District Health Board (DWA) • Fire and Emergency New Zealand • After hours response contractors • Government agencies (e.g. MBIE, Ministry for the Environment, Audit NZ, Department of Conservation) • Tangata Whenua, Tuwharetoa Maori Trust Board, Taupo Nui-a-Tia Management Board • Lakes and Waterways Action Group • Water NZ • IPWEA	• Facilities management staff • Parks and reserve staff • Information Technology Team • Strategic Relationships Manager • Corporate Communication Team • Internal auditor • Maintenance contractors • Council consultants/ professional service providers

1.3 Purpose of Ownership

One of the biggest contributors to public health is having a clean reliable supply of water for drinking and cleaning purposes. Water supply is a core council service, and TDC has historically developed and taken ownership of water supply assets to meet the public health outcomes desired by the community and or legislation. More details of the historical ownership of water supply assets are included in the life cycle section of this WAMP.

In addition to the public health benefit, the water supply assets also provide the Fire and Emergency New Zealand with a source of water for fire fighting, thereby improving public safety and minimizing property damage as a result of fire. The fire classification is continually assessed and reviewed based on the cost to service.

The water supply assets are owned by the community they serve. The Local Government Act 2002 (LGA) has clearly signaled that such an ownership arrangement should be retained for the foreseeable future. It is likely that asset ownership will change as part of water reform in the coming years. The government has made it clear that new water service entities would be asset owning and publicly owned, with a preference for collective council ownership.

1.3.1 TDC ORGANISATIONS VISION, MISSION, OBJECTIVES, GOALS

Taupo District Council Vision

We will be a district of connected communities who thrive and embrace opportunities.

Taupo District Council Community Outcomes

Our community outcomes describe what we aim to achieve for our community, to promote the present and future social, economic, cultural and environmental wellbeing of our district. They are part of the rationale for the delivery of our activities. There are five key ouctomes as follows:

Figure 1.2: Council Community Outcomes

Taupo District 2050 District Growth Management Strategy

TD2050 provides a policy framework to guide where and how future growth should occur and identifies a series of actions to achieve this desired pattern of urban growth. These provide the framework of interrelated policies that guide decision making on growth related issues.

1.3.2 ASSET MANAGEMENT'S CONTRIBUTION TO CORPORATE OBJECTIVES

Council's goal, as set out in the LTP relating to the water supply scheme is to provide safe, cost effective, sustainable and reliable drinking water, which is compliant with the DWSNZ.

1.4 Assumptions

1.4.1 FINANCIAL

The following financial assumptions have been made. Further information can be found in the LTP document.

Table 1.3: Financial Assumptions

Assumption	Potential risk	Mitigation measure
1. Asset valuations used though out are as at June 2023.	Time between AMP completion and last revaluation	Council undertakes an annual price variance assumption report
2. The revenue received from Rates meets the expectation. • Investment Returns eventuate as predicted.	Not the required funds to undertake capital works	Councils LTP and annual plan spend can be adjusted annually to meet Councils revenue and finance policy
3. Interest Rate on	Not the required funds to	Councils LTP and annual plan

Assumption	Potential risk	Mitigation measure
borrowings remains as predicted within the financial model.	undertake capital works	spend can be adjusted annually to meet Councils revenue and finance policy
4. Expenditure of capital projects occurs, and estimated debt levels are as predicted	Potential under performance in capital spend reflected in Council revenue	Councils LTP and annual plan spend can be adjusted annually to meet Councils revenue and finance policy
5. No allowance has been made for inflation adjustment within this AMP. The source of funds for the future replacement of significant assets is stated in the revenue and Financing Policy.	Under funding of cost centre	Finance team make allowances for GST and inflation in funding plan and policy
6. The useful lives of significant assets are as per the accounting policies documented in the TYP. Depreciation is charged at 50% for the first year and 100% in subsequent years.	Asset lives have been incorrectly calculated meaning a funding shortfall	Council has asset depreciation checked externally. Asset lives are compared to the latest asset information nationally
7. Levels of service and funding has been based on historic data	The community desires changes to level of service which are not reflected in this document.	Council undertakes pre LTP consultation to gauge the community for different service level needs. Council undertakes consultation with the community as part of the development of this LTP document
8. Allowance has been made for vested assets	The level of allowance for vested assets is incorrect.	Councils LTP and annual plan spend can be adjusted annually to meet Councils revenue and finance policy
9. Assume that the revenue received from Rates is as per expected.	A shortfall in rates funding	Councils LTP and annual plan spend can be adjusted annually to meet Councils revenue and finance policy
10. Assume no costs associated with infrastructures on the lakebed	An increase in unbudgeted operational cost	Councils LTP and annual plan spend can be adjusted annually to meet Councils revenue and finance policy.
11. Development Contributions will continue to be collected.		

1.4.2 NON-FINANCIAL

Table 1.4: Non-Financial Assumptions

Assumption	Potential risk	Mitigation measure

Assumption	Potential risk	Mitigation measure
1. Assume that growth is going to occur (creation of dwellings) as per the Growth Model predictions.	Changes in growth will impact capital and operational spending	Councils LTP and annual plan spend can be adjusted annually to meet Councils revenue and finance policy
2. The Water abstraction volumes requirements will remain within the framework of the resource consent conditions. TDC shall be successful in environment Court hearing processes to provide adequate water to all users of Municipal water supplies, including securing capacity for growth in commercial and industrial sectors. In general, RPV6 will not impact on our ability to supply for all users of the Municipal Supply network	Changes to abstraction volumes through the resource consent will require an increase in operational and capital expenditure	Councils LTP and annual plan spend can be adjusted annually to meet Councils revenue and finance policy
3. Contractors will be available for the development and construction of projects.	A shortage on contractors for project completion will mean an increase in project cost	Council can extend tender periods to enable contractors more time to schedule in works.
4. There will be continued growth in public participation in the democratic process and Council will need to respond to this growth.	Increased growth in participation could result in changes in levels of service delivery.	Councils LTP and annual plan spend can be adjusted annually to meet Councils revenue and finance policy
5. There will be no unforeseen legislative changes or central government policy changes that will affect this asset.	Changes in legislation could impact on the funding levels	Changes in legislation have an implementation period to enable Councils to plan
6. Economic and labour market constraints may have a direct effect on recruitment.	If Council is unable to recruit to the required level to complete the works program for the year this could have impact on Councils credibility	Council may have to hire consultants to provide support; this could increase the cost of service delivery which will need to be funded through the annual plan process.
7. That Councils resource consents for its activities will be renewed as required.	The renewal of resource consents will depend on Councils prior performance in meeting the conditions of the existing consent and any changes in legislation	Council works closely with the Regional council to achieve consent compliance. Compliance is also a staff performance criterion, so Council is focused on consent compliance and it is considered that any consent related issues can be resolved.

1.5 Significant Negative Effects to Providing the Water Service

In general, providing safe drinking water to the community has both public health and environmental benefits.

There are however negative effects in providing this service, these include;

Table 1.5: Negative Effects to providing the Service

Negative Effect	Mitigation measure
• The risk of contamination and or loss of supply of a water source.	Water safety plans and water demand management plans kept up to date. Operational procedures, trained staff, business continuity and emergency planning.
• Risk of water abstraction volumes getting reduced and difficulty in managing the implementation of demand management plans.	Clear justification of water take volume requirements to match growth forecasts. Water demand management planning in place. Good customer communications.
• The cost of providing the service on rate payers, especially smaller communities	District wide rating implemented in 2021
• The cost of keeping up with DWSNZ compliance requirements, requiring significant capital investment.	Public health projects are prioritised District wide rating implemented in 2021

•

To mitigate the significant negative effects council undertakes proactive planning for all aspects of delivery of the service.

1.6 Asset Management Plan Complexity

1.6.1 OUTLINE OF APPROACH

Core asset management practice is basic technical asset management planning undertaken at a level designed to meet minimum legislative and organisational requirements for financial planning and reporting. 'Core' practice provides technical management outputs for current levels of service, demand management, asset lifecycles, asset forward replacement programmes, new capital expenditure and associated cash flow projections.

Intermediate asset management practice is undertaken at a level between 'Core' and Advanced'practice. The focus is to build on the basic technical asset management planning of Core practice by introducing improved maintenance management and more advanced asset management techniques (as appropriate). Further use is made of risk management, asset lifecycle management, and service standard optimisation techniques.

Advanced AMP's identify processes to optimise lifecycle AM strategies and provide a greater degree of confidence in the resulting cash flow predictions. Advanced AM functions include predictive modelling, risk management, optimised renewal decision making (ORDM) and service level reviews. Advanced AMPs include the following:

- Prediction of future demand
- High knowledge of assets owned, including condition assessment and performance
- Knowledge of current utilisation and ultimate capacity
- Ability to predict failure modes
- Ability to analyse alternative options
- Ability to optimise maintenance and operational activities.

The Water Asset Management Plan 2024 follows the IIMM framework and it has been developed and collated internally by the Infrastructure team. It is considered to reflect an "Intermediate" level of development while additionally including the use of some more advanced tools relating to long term programming and pricing renewal projects.

1.6.2 AMP REVIEW BY COUNCIL

The involvement by councillors, including the reviewing and approving of the AMPs is briefly outlined below:

- Workshops are held with the council for group of activities including AMPs which gives them following information
    - What we do
    - Key issues
    - The service(s) we provide
    - Levels of service, performance measures and targets
    - Key projects over the next three years
    - Who pays?
    - Fees and charges
    - Financials
        - Capital expenditure (including renewals)
        - Operating expenditure

- Draft AMPs are provided to councillors to view
- Council finally adopts the AMP

1.6.3 LIMITATIONS OF THIS AMP

As it currently stands, this AM Plan has limitations in the following areas:

- Council funding constraints is likely to result in adjustment to proposed capital programme timeframes.
- Level of service has not been consulted on for this AMP
- The asset register is still split between Assetfinda and spreadsheets
- Uncertainty around growth numbers and possibility for more zoned land to be released as part of the District plan review.

1.7 Organisational Structure

Taupo District Council has a flat organisational structure. The water services in the District are managed as follows:

- The General Manager Operations and Delivery reports direct to the CEO and has overall responsibility for District infrastructure planning and service delivery.
- The Three Waters Manager has responsibility of the Three Water's Management in the District and reports to the Head of Operations and Delivery. This includes Asset management and Operations.
- The Asset Manager is responsible for the strategic planning, asset management, policy planning, and review and improvement planning for meeting compliance with legislation for the service.
- The Development Engineer(s) ensures all vested assets including reticulation, treatment plants, and pump stations conforms to TDC's Code of Practice. The Development Engineer(s) also manage the delivery of engineering advice information to internal and external customers.
- The Senior Monitoring and Compliance officer is responsible for collating all operational and analytical data required for reporting to Taumata Arowai and Waikato Regional Council to demonstrate compliance for three waters, in consultation with the 3 Waters Operations Manager and Asset Manager.
- The 3 Waters Operations Manager, has responsibility for operation and maintenance of treatment plants and the supply network including pump stations and reservoirs, some of which is delivered through service delivery contracts. Developing and reviewing operational management plans are also part of the Operations Managers responsibility.
- The Network Engineer(s) is responsible for monitoring KPI of maintenance contractor(s) and responding to service requests and maintenance queries. The responsibility extends from the treatment plant outlet to the connection point. The Network Engineers(s) manage the approval process for all connections to the Three Water's asset network.

In addition to the Three waters, Infrastructure and Operations Team members above, the water supply activity is also able to utilise the following in-house resources:

- The Finance Team assists with the development of Asset Management Plan financials;
- IT Team for assisting with development, management & maintenance of communication, geospatial and database systems.
- Customer Service Team for assisting with front line calls, requests and complaints.
- The Policy Team assists with LTP development, public consultation activities, and policy advice and guidance.
- The Facilities Team assists with the management of water supply building maintenance activities.
- The Parks Team provide maintenance services for some of the water supply reserves and provide additional resources when required for emergencies e.g. support with door knocking following water incidents.

The organisational structure of the Infrastructure and Operations teams is illustrated in the following figures.

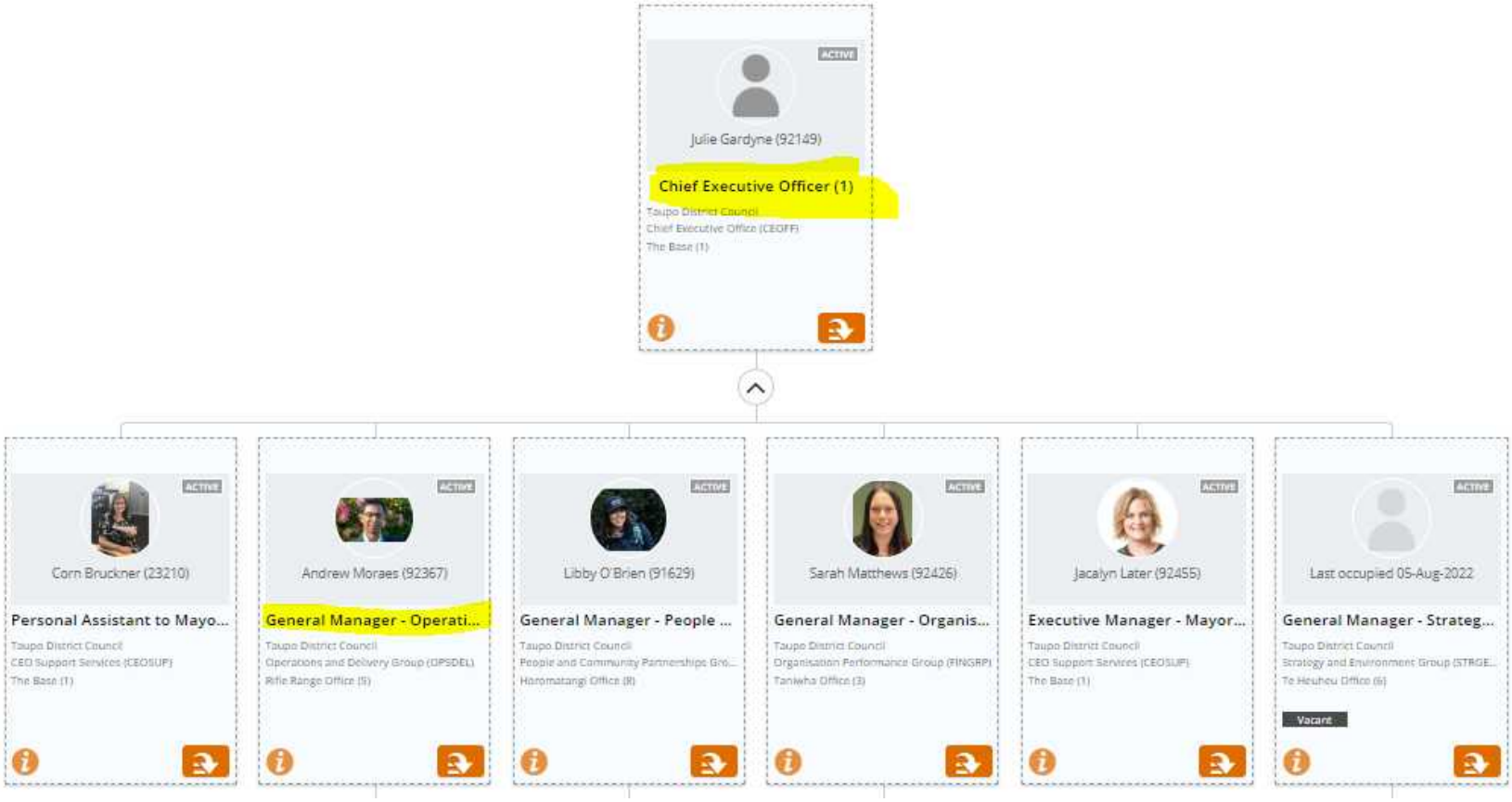


Figure 1.3: TDC General Management Organisational Structure as at September 2023

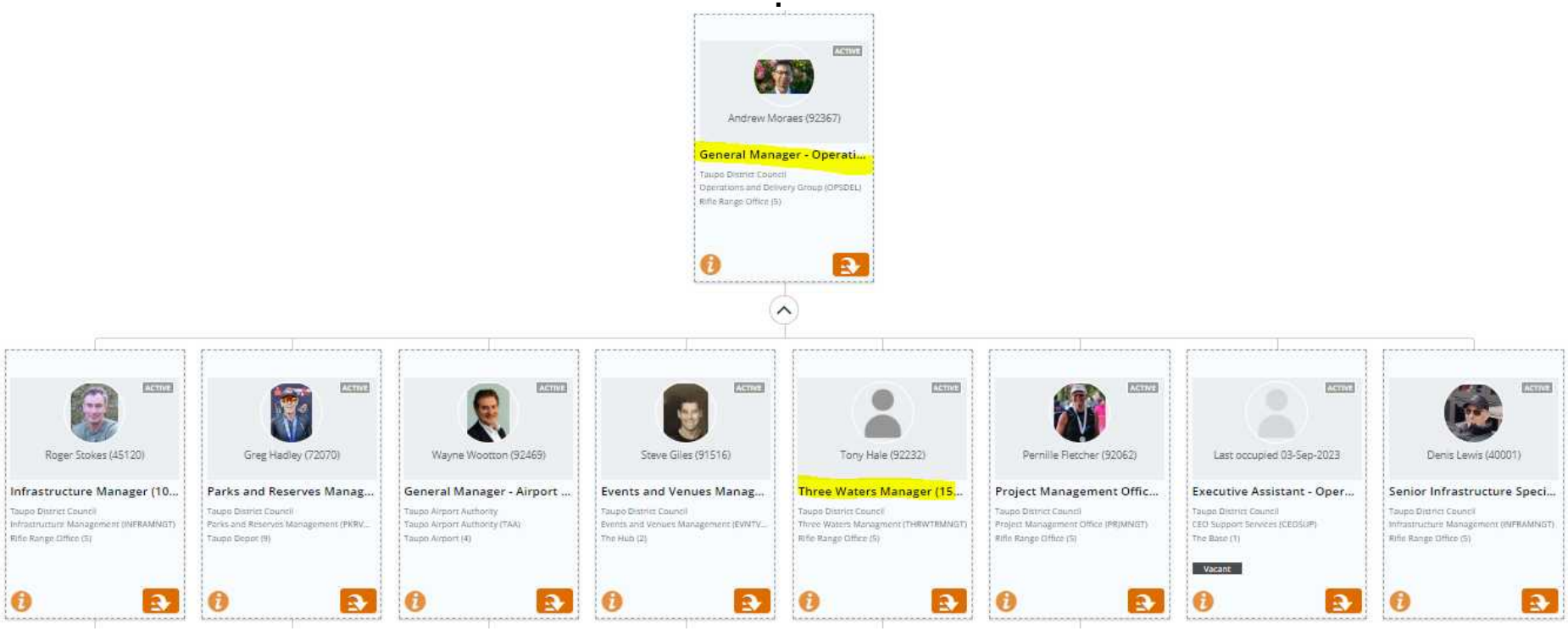


Figure 1.4: Operations and Delivery Organisational Structure as at September 2023

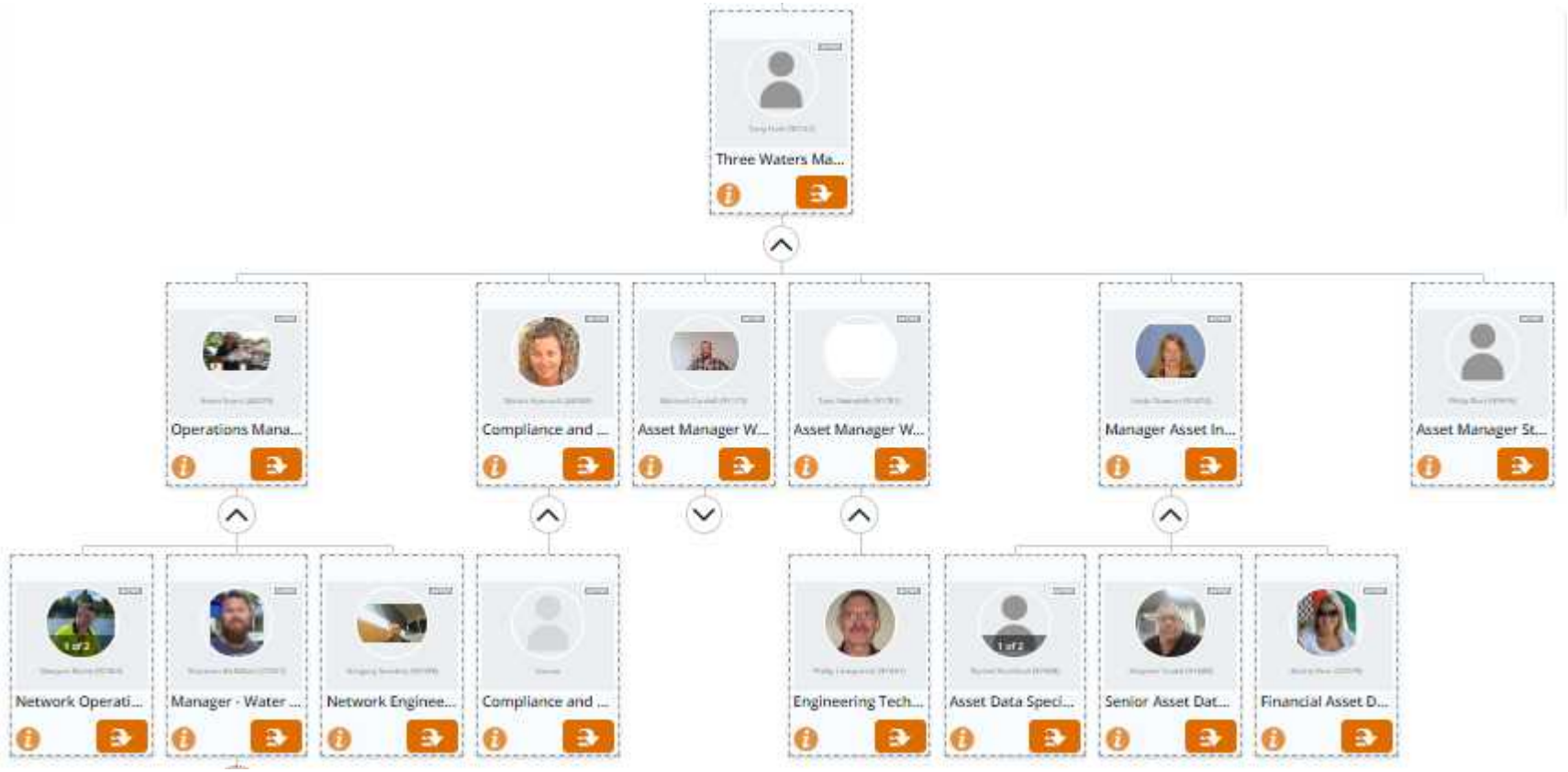


Figure 1.5: Three Waters Team (Part 1) Organisational Structure as at September 2023

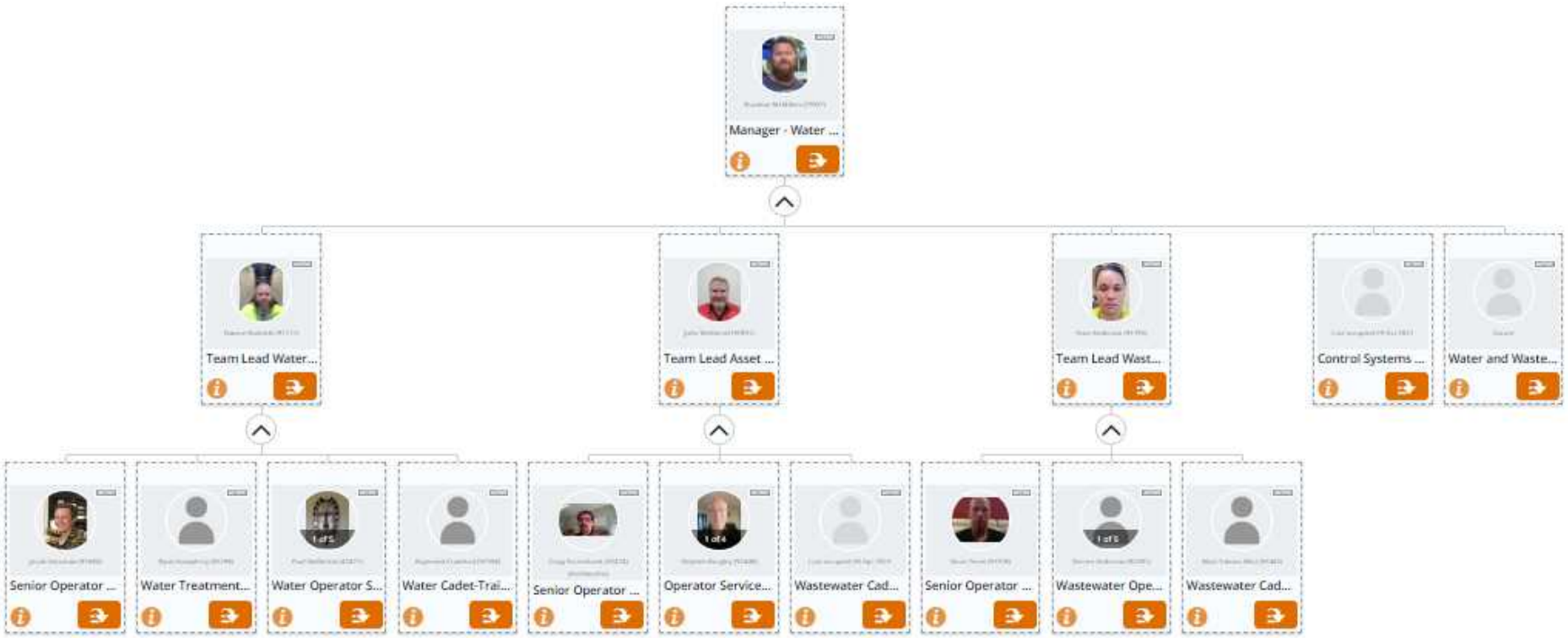


Figure 1.6: Three Waters Team (Part 2) Organisational Structure as at September 2023

2.0 DEFINITIONS

As built	Refers to a survey or drawing of the actual assets that have been constructed, recognising that they can sometimes vary from what was planned before work started on site. As-built drawings are needed to ensure that asset information systems contain data on the asset as it has been constructed, not how it was planned in theory.
Community Outcomes	Under section 5 of the Local Government Act 2002, a community outcome "means the outcomes for that district or region that are identified as priorities for the time being". Community outcomes are what New Zealanders want for their local community, now and in the future. Assets have a role in supporting the achievement of those aims.
Critical Assets	Those assets with a high consequence of failure. They are often found as part of a network, in which, for example, their failure would compromise the performance of the entire network.
Development Contributions	Funds paid, typically by developers, to local authorities to help with the cost of growth. These contributions are authorised by Part 8 of the Local Government Act 2002.
Vested Assets	Assets that are transferred to a public entity at nominal or zero cost. Typically, this might result from a situation where a developer has installed assets as part of developing a site and passes them to a public entity to manage, maintain, and deliver services through. The fair value of these assets has to be determined as they are integrated into the organisation's asset information system so that they can be appropriately managed.

3.0 ACRONYMS / ABBREVIATIONS

AM	Asset Manager
AMP	Asset Management Plan
AMS	Asset Management System
Audit	Audit New Zealand
CAPEX	Capital Expenditure
CAP	Capital Assistance Program
CEO	Chief Executive Officer
CIP	Cleaning in Place
CISP	Commercial & Industrial Structure Plan
Council	Taupo District Council
DC	Development Contribution
DWSNZ	Drinking Water Standards for New Zealand
DWA	Drinking Water Assessor
ES	Environmental Services Group at Taupo District Council
EW	Environment Waikato (Waikato Regional Council)
FDA	U.S. Food & Drug Administration
GFA	Gross Floor Area
GIS	Geographical Information System
GMS	Growth Management Strategy
LGA	Local Government Act
LoS	Level of Service
LTP	Long Term Plan (Council's ten-year planning document)
MAV	Maximum Acceptable Value
MoH	Ministry of Health
OPEX	Operational Expenditure
POU	Point of use
PRAMP	Property Asset Management Plan
RMA	Resource Management Act
RPS	Environment Waikato Regional Policy Statement
SAMP	Solid Waste Asset Management Plan
SLT	Senior Leadership Team (CEO and 2nd Tier Managers)
SMP	Stormwater Management Plan
SWAMP	Stormwater Asset Management Plan
T24	Track 24
TDC	Taupo District Council
TRAMP	Transportation Asset Management Plan
UVT	Ultraviolet Transmittance (UV Transmittance)
WAMP	Water Asset Management Plan
WDMP	Water Demand Management Plan
WINZ	Water Information New Zealand
WSP	Water Safety Plan (formerly PHRMP)
WTP	Water Treatment Plant
WW	Wastewater
WWAMP	Wastewater Asset Management Plan
WWTP	Wastewater Treatment Plant.

4.0 ASSET DATA

4.1 Asset Summary and Valuation

Taupo District Council (TDC) is responsible for the management of water assets with a replacement value (excluding land value and excluding assets that have reached end of life) of approximately $211 million. The water asset consists of a number of components:

- Treatment Plants (including reservoirs and boosting pump stations)
- Network reticulation (water meters, fire hydrants, valves and pipes)

The following tables give a summary of the asset valuation as at 30 June 2023.

Table 4.1: Water Replacement Value Summary

Area	Reticulation Replacement Value	Treatment Replacement Value	Total Replacement Value
Acacia Bay	$5,259,198	$3,290,767	$8,549,966
Atiamuri	$819,416	$840,044	$1,659,461
Bonshaw Park	$827,374	$649,096	$1,476,470
Centennial Drive	$4,183,423	$3,672,016	$7,855,439
Hatepe	$735,498	$676,839	$1,412,337
Kinloch	$12,232,310	$3,591,342	$15,823,651
Mangakino	$1,949,074	$2,672,290	$4,621,364
Mapara Road	$4,881,677	$372,424	$5,254,101
Motuoapa	$3,206,526	$1,631,307	$4,837,833
Motutere	$81,531	$365,579	$447,109
Omori	$7,011,069	$2,499,580	$9,510,648
River Road	$1,962,795	$488,351	$2,451,146
Taupo	$75,191,704	$31,397,689	$106,589,393
Tirohanga	$6,626,324	$1,557,735	$8,184,059
Turangi	$12,762,092	$3,845,956	$16,608,048
Waihaha	$5,256,222	$926,499	$6,182,721
Whakamaru	$702,952	$1,156,811	$1,859,763
Whakamoenga	$721,749	$693,974	$1,415,724
Whakaroa	$2,869,030	$824,736	$3,693,766
Whareroa	$1,255,266	$859,554	$2,114,820
Total	**$148,535,231**	**$62,012,589**	**$210,547,820**

Table 4.2: Water Asset Valuation Summary

Asset Group	Optimised Replacement Cost	Optimised Depreciated Replacement Cost	Annual Depreciation
Reticulation	$148,535,231	$105,853,283	$2,055,636
Treatment	$62,012,589	$24,071,475	$2,598,744
Total	**$210,547,820**	**$129,924,758**	**$4,654,381**

4.1.1 VALUATION PROCESS

All recorded components have been valued in terms of their replacement and depreciated replacement value. The valuation process has been performed in accordance with Section 111 of the Local Government Act 2002 which requires financial information to be included in Annual Reports to be prepared in accordance with generally accepted accounting practice.

The applicable accounting standard for property, plant and equipment is Public Benefit Entity International Public Sector Accounting Standard 17 Property, Plant and Equipment (PBE IPSAS 17). The revaluation has been carried out in accordance with the current version of this Standard.

The valuation has also been carried out in accordance with the New Zealand Infrastructure Valuation and Depreciation Guidelines, issued by the New Zealand Asset Management Support Group (NAMS) of IPWEA.

4.2 Asset Component

4.2.1 SOURCE, TREATMENT PLANTS, BOOSTER PUMP STATIONS & WATER STORAGE

4.2.1.1 Description

Taupo District Council manages 17 water supply schemes. There are 18 treatment plants as the Rainbow Point plant in Taupo is currently retained for emergency use. Whakaroa which is part of the Kinloch scheme can be reported separately from a financial perspective, however physically it is part of the Kinloch scheme. Since the 2021 LTP the Acacia Bay scheme has been connected to Taupo which has reduced the scheme number by one.

Table 4.3: Source, Treatment Plant

Water Scheme	
1	Atiamuri
2	Bonshaw Park
3	Centennial Dr
4	Hatepe
5	Kinloch / Whakaroa
6	Mangakino
7	Motuoapa
8	Motutere
9	Omori
10	River Road
11	Taupo
12	Tirohanga
13	Turangi
14	Waihaha
15	Whakamaru
16	Whakamoenga
17	Whareroa
	TOTAL

4.2.1.2 Capacity/Performance

The required capacity of each scheme is determined through planning activities including assessment of growth and future demands. Resource consents determine the volume of water that can abstracted and where additional capacity is needed this is applied for. Treatment plant are designed and built to meet the capacity requirements, with upgrades planned as needed by growth forecasts.

The performance of each water treatment plant is assessed based on the Water Services Act, Regulations, Quality Assurance Rules, and resource consent compliance requirements. Performance is reported internally on a monthly basis. External compliance reporting is completed as required with data and reports uploaded to the Taumata Arowai self-service portal for drinking water suppliers, Hinekōrako.

Annual Reports are prepared for WRC against consent conditions for each plant detailing the performance of the plant for that year for instantaneous, daily and annual water volume abstraction results, and other parameters as required. Increasingly consent conditions require the provision of flow data direct to the WRC telemetry system daily. This is completed through a link from Councils reporting system Water Outlook.

4.2.1.3 Condition

The conditions assessment of the Water Treatment assets including boosting pump stations and reservoirs is a live document and is being updated every year by the TDC operations team. The condition rating is stored on an excel spreadsheet (Water Asset Condition and Renewals Plan, TDC Ref: A309067), which is generally derived from the asset register.

Condition assessment data and failure history is used to prepare maintenance and renewal plans which are in turn used to determine the LTP budgets. The asset data team are steadily migrating asset data from the condition assessment spreadsheet into the AMS. Ultimately the AMS will be utilised to store the treatment asset data including attributes, condition assessment data, maintenance plans and records.

The revaluation of these assets is done by external consultants every three years.

4.2.1.4 Treatment Plant Age

The water treatment plants have been constructed at different times as required. In some cases, upgrades have occurred. This information is shown in the table below.

Table 4.4: Treatment Plant Type and Ages

Scheme	Source	Type of Treatment (current)	Construction Year	Upgrade Year	Upgrade Type
Acacia Bay inc. Mapara Road	Lake	Chlorination	1987		Decommissioned 2022
Atiamuri	Bore	Chlorination	1992	2023[1]	[1]Upgrade underway in 2023
Bonshaw Park	Bore	Chlorination	1990	2019[2]	[2]Bore head security upgrades
Centennial Drive (River intake)	River	Chlorination	1988		Chlorine contact tank added in 2017.

Scheme	Source	Type of Treatment (current)	Construction Year	Upgrade Year	Upgrade Type
Hatepe	Lake	Chlorination	1983	2017	Chlorine contact tank.
Kinloch	Lake	Chlorination	1985	2023[3]	[3]Upgrade underway in 2023
Mangakino	Spring	UV treatment and Chlorination	1965	2011-12	Original PS retained and new WTP built to meet NZDWS.
Motuoapa	Lake	Chlorination	1984		
Motutere	Lake	Chlorination		2018	Intake Pipeline Renewal
Omori	Lake	Chlorination	1997	2023[4]	[4]Upgrade underway in 2023
River Road	Spring	Chlorination	1994	2018[5] 2022[6]	[5]New Reservoir 2018 [6]New Treatment Plant 2022
Lake Terrace	Lake	Membrane, Chlorination and Fluoridation	2014	1970[7] 2009-14[8] 2019-20[9]	[7]Pump Upgrades [8]New WTP to meet DWSNZ 25MLD [9]Capacity Upgrade to 30MLD
Tirohanga	Spring	Chlorination	1984	2009	Upgrade to allow supply to new subdivision
Turangi	Spring	UV, Chlorination and Fluoridation	1965-67	2011-12	Pump station and WTP to meet NZDWS.
Waihaha	Spring	Chlorination	1983	2023[10]	[10]Upgrade underway in 2023
Whakamaru	Bore	Chlorination	1983	2014[11] 2022[12]	[11]Service pumps upgrade [12]New Treatment Plant 2022
Whakamoenga Point	Bore	Chlorination	1992	2008	Upgrade pumps
Whareroa	Bore	Chlorination	1989	2010	Upgrade pumps

4.2.1.5 Booster Pump Stations

There are also a number of booster pump stations within the network as shown below.

Table 4.5: List of Water Pump Stations

Scheme	Pump station
Centennial	AC Baths PS
Kinloch	Locheagles PS
Mapara Road	Mapara PS
	Blueridge PS
Omori	High Level PS (Omori)
	Pukawa PS
Taupō	Gillies Avenue PS
	Nukuhau PS
	Acacia Bay Connect PS
	Woodward Street PS
	Ashwood PS
	Broadland Road PS
	Titoki PS
	Airport PS
	Botanical Heights PS
Tirohanga	Spencer Road PS
	Serenity Cove PS

Scheme	Pump station
Waihaha	Motere PS
Whakaroa	Whakaroa Low PS
	Whakaroa High PS

4.2.1.6 Water Storage

Water storage is provided at each scheme to meet daily and fire demands and to provide resilience in emergency events. Asset value for water storage units is reported within the treatment plant figures.

In total there are 94 water storage units including contact tanks across the district with a combined capacity of 43,897 m^3. Water storage units are included in Assetfinda and condition data and further details are included in an excel spreadsheet (TDC Ref: A918569).

4.2.1.7 Asset Data and Hierarchy – Treatment Plants, Reservoirs and Pump Stations

Asset data for Treatment Plants, Reservoirs and Pump Stations is currently stored in an excel file in objective (Water Asset Condition and Renewals Plan TDC Ref No. A309067). TDC is in the process of transferring all the assets recorded in this excel file into Assetfinda. An example of the hierarchy being setup is included below:

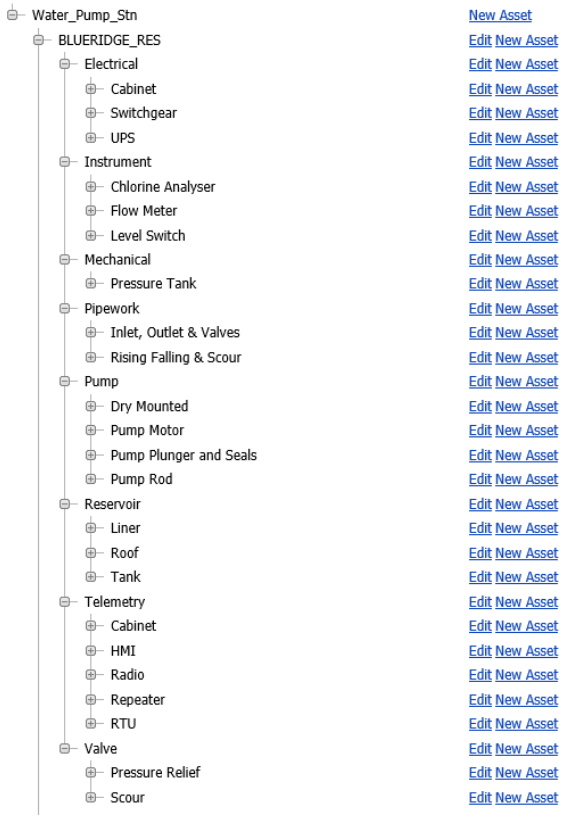


Figure 4.1: Asset Hierarchy Example - Water Pump Stations

4.2.2 RETICULATION

4.2.2.1 Reticulation Description

Reticulation includes pipes (both gravity and pumping), fire hydrants, isolation valves, water meters, strainers, backflow preventors, pressure reducing, relief, scour, air release and boundary valves, and supporting infrastructure such as chambers and manholes.

4.2.2.2 Reticulation Age and Condition

Condition assessment data for reticulation infrastructure is generally collected by analysing age, material of construction, sampling and testing records, customer service records, leak detection surveys, water loss calculations, maintenance activities data and historical failures. Specific condition assessment activities include:

- Sampling and testing of pipeline sections following failures, renewals or other planned works (TDC Ref: qA132611).
- Asbestos cement pipeline deterioration modelling (TDC Ref: A2276691 and A2276693).
- Fire hydrant flushing, condition and performance monitoring programme (annual programme TDC Ref: fA215580)
- Pressure reducing valve periodic inspections (annual programme TDC Ref: fA216425)
- Valve inspection and exercising programme.
- Backflow device testing
- Meter reading operations and follow up maintenance and replacements.
- Water loss calculations (annual programme TDC Ref: qA157051).

All of the above assessments feed into renewals planning activities, which is discussed in more detail in Section 8. Condition data collected is fed back to Assetfinda for updating details of the individual asset.

Water reticulation age and condition across the District is variable. There remains significant quantities of asbestos cement and galvanised pipelines estimated to be beyond their useful life. The current construction backlog value is estimated at approximately $26M. Detail regarding plans to improve pipeline condition are included in Section 8.

4.2.2.3 Reticulation Performance

Reticulation performance is assessed through performance against levels of service including the number of services requests received on the particular asset, how many water quality (taste, odour, colour) related complaints that get registered, leaks /bursts causing low water pressure and or disruption to water supply, water loss performance against targets, and fire flow monitoring.

Performance of the network is variable. Pipeline failures and corresponding service requests for no water or similar are largely influenced by pipeline age and condition as presented above. Other factors such as third party strikes can also affect performance.

In some of the smaller water schemes, for instance Hatepe and Waihaha, organics and suspended impurities can be elevated which can cause issues in the network as well as

water safety concerns. The water network flushing programme, online monitoring of raw water turbidity and selective abstraction systems aims to reduce these problems.

Water loss targets were set as part of the TDC Water Supply Strategy as follows:

- Urban Schemes – Target Current Annual Real Loss = 160 l/connection/day
- Rural Schemes – Target Current Annual Real Loss = 4.2 m3/km watermain/day

Water balances are completed annually. In the most recent balances water loss was found to be close to target in Taupo but significantly above targeted levels in Turangi. Water loss targets were met in Kinloch, Motuoapa, Bonshaw Park, and River Road.

Table 4.7: Water Loss Performance – Annual Real Water Loss

	2021	2022	2023
Taupo	202 l/con/day	173 l/con/day	169 l/con/day
Turangi	707 l/con/day	637 l/con/day	654 l/con/day
Urban Networks (Avg)	143 l/con/day	128 l/con/day	218 l/con/day
Rural networks (Avg)	6.2 m3/km/day		6.3 m3/km/day

Council developed a water loss strategy in 2019 and implementation of this is nearing completion. This has included setup of district meter areas across Taupo, Turangi and Mangakino, installation of zone flowmeters across the District and electronic meters on many of our small schemes. Many of the improvements are associated with improving understanding of where water is being lost, to aid the prioritisation of future renewals spending.

Fire flow testing is carried out to determine performance of fire hydrants against the Fire Service Code of Practice. Results from the 2022/23 program are included below along with the performance graph for Kinloch Medium Zone hydrants tested. Where hydrants fail tests, network investigations are completed to determine if capital or operational expenditure is needed to rectify the failure. An example of this is where hydrants failed in Turangi, network investigation revealed some closed valves and on second test pass results improved.

Table 4.8: 2019/20 Fire Hydrant Testing Programme

Scheme	Tests Completed	Tests Pass	Pass Rate
Mapara	16	12	75%
Parawera	1	1	100%
Rakanui Rd	1	1	100%
Turangi	137	120	88%
River Rd	4	0	0%
Kinloch Medium Zone	29	21	72%
TOTAL	188	155	82%

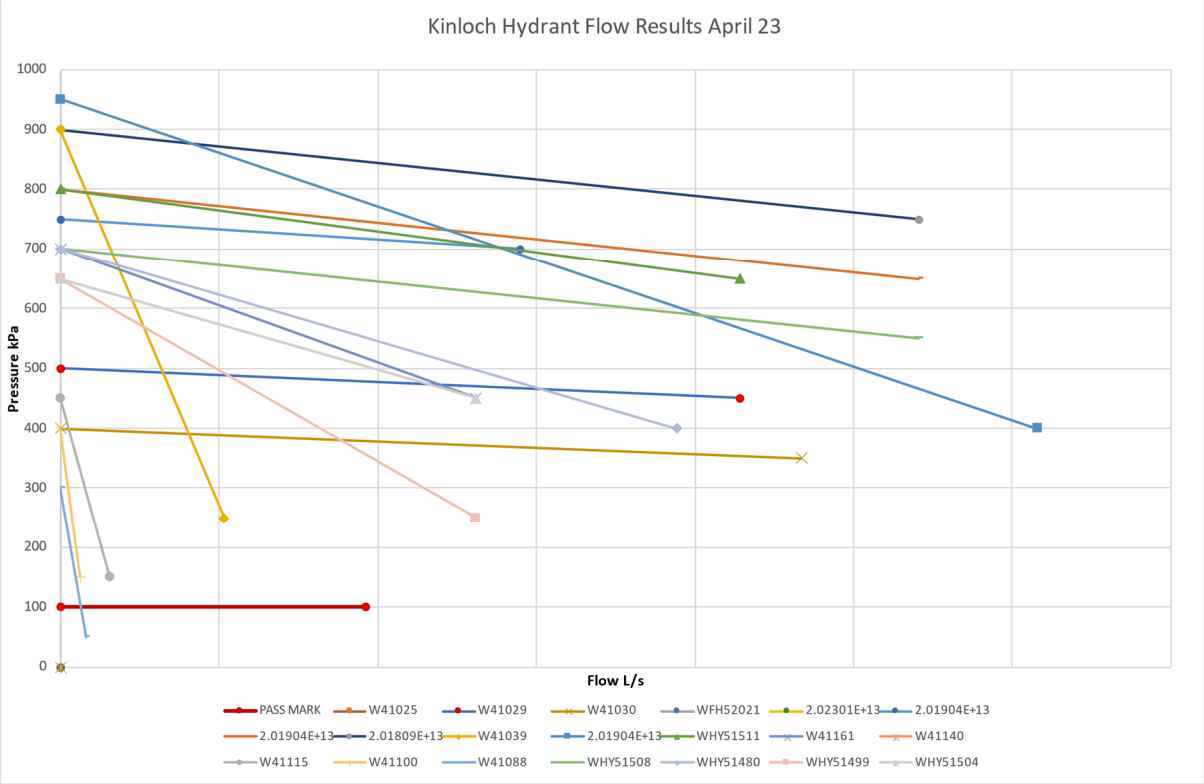


Figure 4.2: Kinloch Medium Zone Fire Flow Result Graphs

4.2.2.4 Asset Data Collected– Reticulation

Asset data for Reticulation assets is currently stored in Assetfinda. An example of the data within Assetfinda for pipe assets is included below.

Table 4.9: Pipe Assets Data Example

Asset_ID	Asset_Type	MATERIAL	DIAMETER	Community	Quantity_Length	Install_Date	Unit_Cost	Base_Life	Condition	Performance	Accuracy	Criticality	Base_Life_Optional	Renewal Date Calculated	Asset_Owner	Source	Status	Method	Edited_By	Edited_Date
20180103111650	Water Main	uPVC	100	Atiamuri	59.13	30/09/2016	122.98	100	Excellent	Excellent	Excellent	N/A	0	30/09/2116	Public		In Service	As Built	lstewart	15/01/2018
WMN08345	Water Main	PVC	150	Atiamuri	9.67	1/07/1982	160.56	60	Good	Excellent	Excellent	Medium	0	1/07/2042	Public	07 As-Built Plan Digitised (High Error)	In Service	Imported	lstewart	27/11/2017
WMN08346	Water Main	GALV	80	Atiamuri	0.39	1/07/1982	101.35	50	Poor	Excellent	Excellent	Medium	0	1/07/2032	Public	06 As-Built Plan Digitised (Low Error)	In Service	Imported	lstewart	27/11/2017
WMN08347	Water Main	CI	100	Atiamuri	65.72	1/07/1952	122.98	75	Excellent	Excellent	Excellent	Medium	75	1/07/2027	Public	07 As-Built Plan Digitised (High Error)	In Service	Imported	lstewart	18/07/2018
WMN08348	Water Main	CI	150	Atiamuri	68.6	1/07/1952	160.56	75	Excellent	Excellent	Excellent	Medium	75	1/07/2027	Public	08 Running Distance	In Service	Imported	lstewart	18/07/2018
WMN08349	Water Main	AC	100	Atiamuri	0.15	1/07/1952	122.98	50	Very Poor	Excellent	Excellent	Medium	0	1/07/2002	Public	08 Running Distance	In Service	Imported	lstewart	27/11/2017
WMN08350	Water Main	CI	150	Atiamuri	0.22	1/07/1952	160.56	75	Excellent	Excellent	Excellent	Medium	75	1/07/2027	Public	08 Running Distance	In Service	Imported	lstewart	18/07/2018
WMN08351	Water Main	CI	100	Atiamuri	121.28	1/07/1952	122.98	75	Excellent	Excellent	Excellent	Medium	75	1/07/2027	Public	07 As-Built Plan Digitised (High Error)	In Service	Imported	lstewart	18/07/2018
WMN08352	Water Main	CI	100	Atiamuri	70.24	1/07/1952	122.98	75	Excellent	Excellent	Excellent	Medium	75	1/07/2027	Public	08 Running Distance	In Service	Imported	lstewart	18/07/2018
WMN08353	Water Main	GALV	150	Atiamuri	121.26	1/07/1952	160.56	50	Very Poor	Excellent	Excellent	Medium	60	1/07/2012	Public	07 As-Built Plan Digitised (High Error)	In Service	Imported	lstewart	16/04/2018
WMN08354	Water Main	uPVC	150	Atiamuri	145.81	1/07/1992	160.56	100	Good	Excellent	Excellent	Medium	0	1/07/2092	Public	07 As-Built Plan Digitised (High Error)	In Service	Imported	lstewart	27/11/2017
WMN08355	Water Main	GALV	100	Atiamuri	92.08	1/07/1952	122.98	50	Very Poor	Excellent	Excellent	Medium	60	1/07/2012	Public	08 Running Distance	In Service	Imported	lstewart	16/04/2018

The following Figure shows pipeline materials in the network and a summary of useful life of the network.

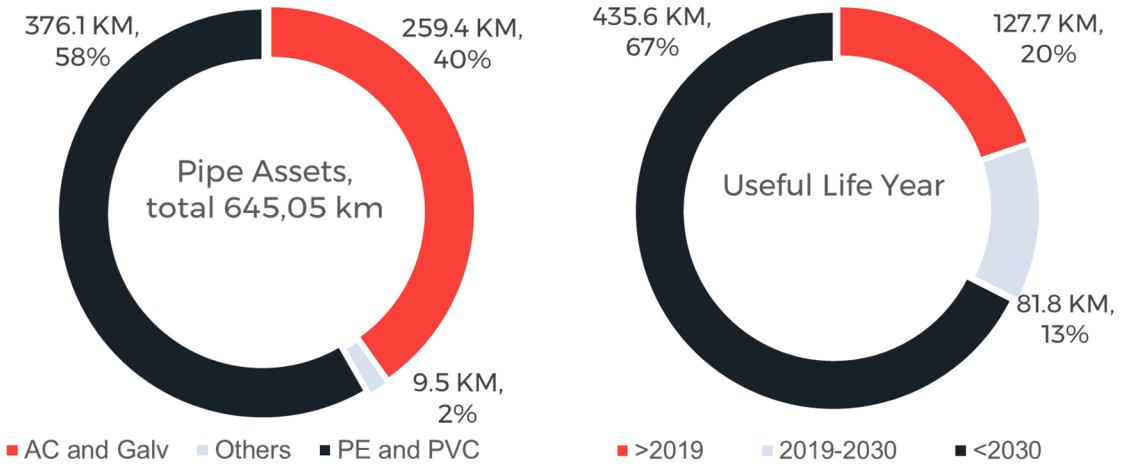


Figure 4.3: TDC Pipe Materials and Estimated End of Useful Life

4.3 Asset Confidence Rating

The asset valuation assigns confidence ratings to the source data and unit cost rates and to other items as appropriate (refer objective A1349065). The overall confidence rating for the water asset is **B-.**

Table 4.10: Key to Asset Confidence Rating

Grade Score	Grade	Description	Accuracy
1-2	A	High Accuracies, data based on reliable documents	±5%
2-3	B	Data based on some supporting documentation	±10%
3-4	C	50% Estimated, data based on local knowledge	±15%
4-5	D	Significant Data Estimated / No Data, data based on best estimate of experienced person	±30%

Table 4.11: Summary of Asset Confidence Ratings

Attribute	Confidence Grade							
	D		C		B		A	
Asset data								
Physical properties (length/size/materials)								
Location								
Age								
Condition								
Performance								
Deterioration rate								
Financial data								
Opex								
Operation costs								

Maintenance costs								
Asset management costs								
Interest rates								
Depreciation								
Renewals								
Unit rates								
Project scope								
Cost estimates								
Capital works								
Demand forecast								
Project timing								
Project scope								
Project costs								
Project prioritisation								

Additional support to data confidence of network assets was provided for within an assessment completed by WSP in 2018 (TDC Ref: A2276691). In this assessment, greater than 95% of Council pipeline data set (assessed by both length and number) were given a confidence rating of Grade 1 (Very High Confidence). Typically, a data set that exceeds 90% of Grade 1 (Very High Confidence) is viewed as excellent.

5.0 LEVELS OF SERVICE

5.1 Introduction

A key objective of this Asset Management Plan is to match the level of service provided by the asset with the expectations of customers. This requires a clear understanding of customers' needs, expectations and preferences.

The levels of service defined in this section will be used:

- to inform customers of the proposed type and level of service to be offered
- to enable customers to assess suitability, affordability and equity of the services offered
- as a focus for the AM tactics proposed to deliver the required level of service
- to measure the effectiveness of this AM plan
- to identify the costs and benefits of the services offered

The target levels of service for water supply and current industry standards are based on:

Community Outcomes: Provide guidelines for the scope of current and future services offered and manner of service delivery and define general levels of service which the community wishes to receive.

Customer Expectations: Information gained from customers on expected quality and price of services.

Statutory Requirements: Legislation, regulations, environmental standards and Council By-laws that impact on the way assets are managed (i.e.: resource consents, building regulations, health and safety legislation). These requirements set the minimum level of service to be provided.

Strategic and Corporate Goals: Provide guidelines for the scope of current and future services offered and manner of service delivery and define specific levels of service which the organisation wishes to achieve.

Consultation Process and Strategic Linkages: The following Figure 5.1 identifies the consultation process and reporting requirements for levels of service. It also incorporates the links to strategic documents and gap analysis and how this links into the Annual Plan and Long-Term Plan.

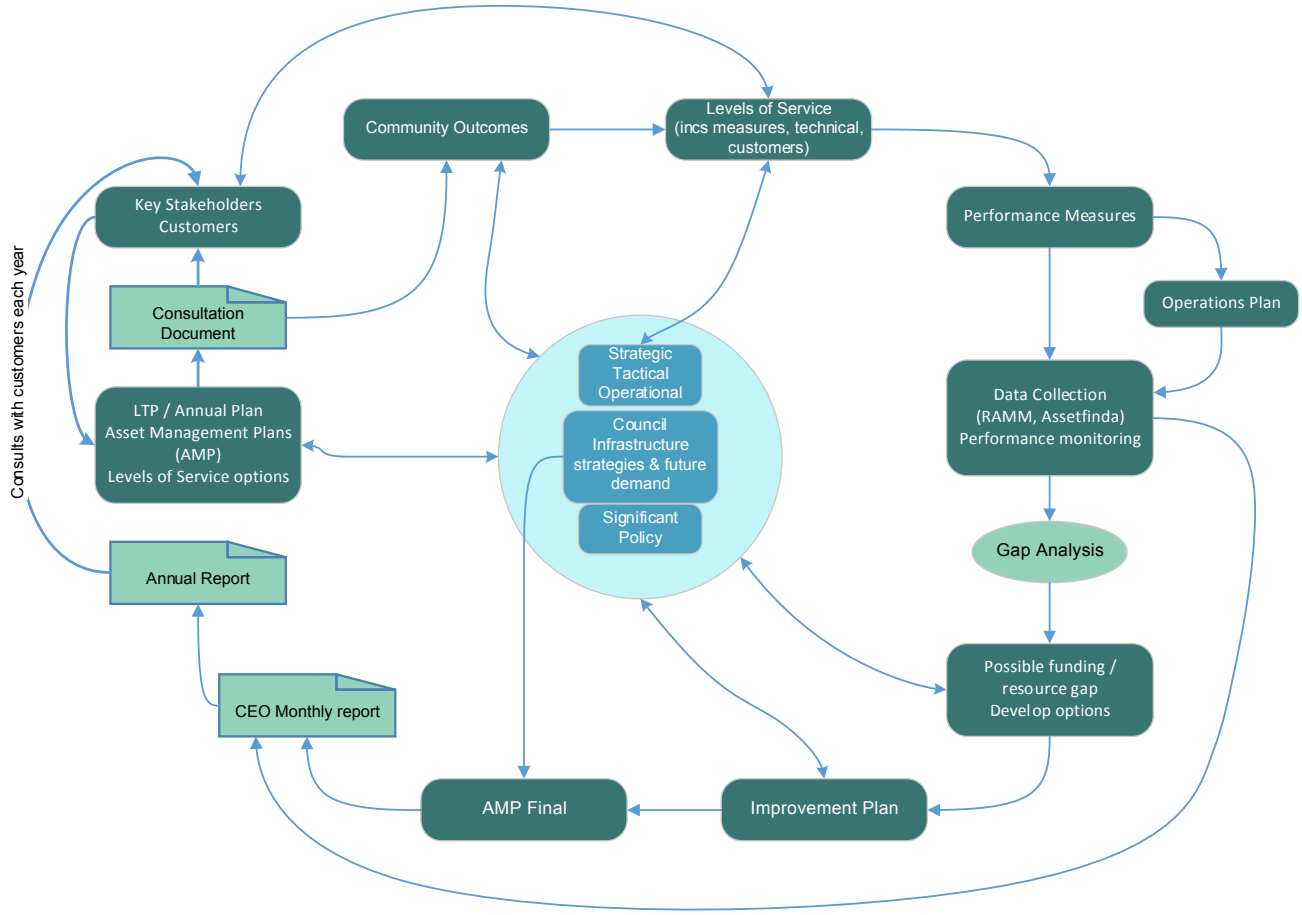


Figure 5.1: Consultation Process and Strategic Linkage Diagram

Within Councils Significance and Engagement Policy 2022, water assets are considered strategic assets given they are critical to deliver services. This applies to the water supply, wastewater and stormwater networks within the district. The policy determines from the beginning of a decision-making process, the extent, form and type of engagement with the community that is required.

5.2 Types of Levels of Service

5.2.1 OPERATIONAL

Desired Levels of Service

The targets currently set are those carried over from the previous version Water AMP with adjustment where capital programmes have move forward or legislation has changed. These have been broadly developed as:

- Compliance with water services regulations and resource consent requirements; these are minimum targets set by legislation and reflect maintaining the current level of service through existing abstraction, treatment and distribution systems. It must be noted that the current levels of service are graduated in relation to safe water compliance as not all sites are currently capable of meeting all aspects of the current regulations.

- Fault response times; set at levels achievable through available resources and current level of service

- Customer satisfaction; these are the minimum targets set by legislation and reflect maintaining the current level of service through existing abstraction, treatment and distribution systems

- Demand management

Current operational levels of service for water are scheduled in Table 2. The levels of service are "how we maintain our existing assets" for our customers.

Operational levels of service fall into two categories:
Technical (asset/product related) measures, which relate to the outputs the customer receives in terms of:

- Quality
- Capacity
- Quantity
- Health /Environmental impacts
- Availability
- Cost/ affordability
- Legislative requirements
- Maintainability
- Safety
- Reliability and performance
- Criticality

Service Quality (service process related) measures, which relate to how the customer receives the service in terms of:

- Tangibles (information sheets etc.)
- Responsiveness
- Courtesy
- Empathy (understanding, individual attention)
- Assurance (knowledge, courtesy, trust, confidence)

5.2.2 TACTICAL

The levels of service stated within Table 5.1 are "why we build new assets". These are thresholds which warrant the creation of a new asset in order to maintain an optimum level of service for the asset.

5.2.3 IMPLEMENTATION

The implementation levels of service stated within Table 5.2 are "the standard we build a water asset to".

5.3 Current Levels of Service

Objective: To safeguard the community and to provide treated /palatable water to ensure public health is maintained for all users connected to council's supply.
Note: An asterisk* identifies the performance measure in LTP **(Non-financial performance measures)**

Table 5.1: Tactical Levels of Service

Sr. No.	Community outcome	Level of Service	How we measure it (customer)	How we measure it (technical)	Current LoS Performance	How We Monitor Performance	Target LoS Medium Term (1-3 years)	Target LoS Long Term (4-10 Years)
Safety of Drinking Water Performance measure **T1**	Economy	<u>Safe drinking water</u> We provide a safe and continuous supply of water that will over time meet New Zealand's drinking water standards for communities	No public health incidents related to drinking water quality	The extent to which Councils drinking water supply complies with the Drinking Water Quality assurance Rules 2022 This measure applies to all Council water supplies where required under the Water Services Act.	The new Drinking Water Quality Assurance Rules came into effect in 2022 and Council is transitioning to full compliance reporting against these rules. The following schemes will be closest to full compliance: - Taupo - Turangi - Mangakino - River Road - Whakamaru The following schemes require upgrade to enable compliance: - Atiamuri - Bonshaw Park - Centennial - Hatepe - Kinloch - Motuoapa - Motutere - Omori - Tirohanga - Waihaha - Whakamoenga Point - Whareroa	Compliance report issued to Taumata Arowai via online portal Hinekorako. Note: Currently all our water supply schemes are equipped with continuous monitoring instruments for measurement of flow, pH, Chlorine and turbidity. Any failure of equipment / process triggers an operational response until the system is back to normal.	The following water supplies have adequate data to demonstrate compliance at: • Mangakino, • River Road, • Taupo, • Turangi, and • Whakamaru. Capital projects will enable compliance within 3 years at: • Atiamuri, • Kinloch, • Hatepe, • Omori, • Motuoapa, • Tirohanga, • Waihaha, and • Whareroa. Compliance will no longer be demonstrated for the Whakamoenga Point and Bonshaw Park treatment plants as these schemes will be connected to Taupo.	All council water supplies comply with the Drinking Water Quality assurance Rules 2022.
System and adequacy **T2**	Economy	Sufficient capacity to meet current demands and future growth	If a connection is possible within existing network and or new growth areas	Capacity of pipework relative to capacity required. That all new development is able to be connected immediately, if previously identified under the growth model, LTP and or District Plan.	LTP includes projects to enable future subdivisions as predicted by the revised growth model to connect to network.	Through the ability to allow subdivisions within specified development areas to occur	Capacity of pipework relative to capacity required. That all new development is able to be connected immediately, if previously identified under the growth model, LTP and or District Plan.	Same as short term.

Table 5.2: Operational Levels of Service

Sr. No.	Community outcome	Level of Service	How we measure it (customer)	How we measure it (technical)	Current LoS Performance	How We Monitor Performance	Target LoS Medium Term (1-3 years)	Target LoS Long Term (4-10 Years)
Maintenance of Reticulation Network Performance measure **O1**	Environment & Financial Prudence	Water loss Level of real water loss from the Council's networks reticulation system. State and operation of the water reticulation network infrastructure. THIS IS A DIA MANDATORY MEASURE.	Uninterrupted water supply	Methodology in line with Water NZ "Water Loss guidelines. Targets set as part of water loss strategy work as follows: Urban Schemes – Target Current Annual Real Loss = 160 l/connection/day Rural Schemes – Target Current Annual Real Loss = 4.2 m3/km watermain.	**2023 Results** • Taupo Annual Real Loss = 169 l/connection/day • Turangi Annual Real Loss = 654 l/connection/day • Average of other urban networks Current Annual Real Loss = 218 l/connection/day • Average of rural networks Current Annual Real Loss = 6.3 m3/km watermain/day Targets were set as part of the water supply strategy.	Annual water loss calculations. Water balance measurement methodology in line with Water NZ "Water Loss guidelines	Urban Schemes – Target Current Annual Real Loss = 300 l/connection/day Rural Schemes – Target Current Annual Real Loss = 6.0 m3/km watermain.	Urban Schemes – Target Current Annual Real Loss = 160 l/connection/day Rural Schemes – Target Current Annual Real Loss = 4.2 m3/km watermain/day
Fault Response Times Performance measure **O2**	Economy	**Urgent call outs**[i1] Fault response time Attendance for urgent call-outs: from the time that Council receives notification to the time that the service personnel reach the site is ≤1hr. Fault resolution time Resolution of urgent call-outs: from the time that the local authority receives notification to the time that the service personnel confirms resolution of the fault or interruption is within 4 hrs.	Percentage of failure responded within the specified time	Response time from Council receiving notification of the fault to the time that service personnel reach the site of the water supply fault.	Response and resolution times in 2022/23 were not recorded accurately.	Analysis of service requests and contactors KPIs. This measure has not been able to be recorded because of issues relating to the recording of after-hours call outs. We are putting systems in place to ensure that this issue is rectified for the future.	Response time for service personnel reach the site of the fault is ≤1hr (90%) Time to resolve the problem is ≤ 4 hrs (85% of times).	Response time for service personnel reach the site of the fault is ≤1hr (>91%) Time to resolve the problem is ≤ 4 hrs (90% of times).
Performance measure		**Urgent call out** Fault response time (median) Attendance for urgent call-outs: from the time that Council receives notification to the time that the service personnel reach the site. Fault resolution time (median) Resolution of urgent call-outs: from the time that the local authority receives notification to the time that the service	Median response time for attendance and resolution	Response time from Council receiving notification of the fault to the time that service personnel reach the site of the water supply fault.	Response and resolution times in 2022/23 were not recorded accurately.	Analysis of service requests and contactors KPIs. This measure has not been able to be recorded because of issues relating to the recording of after-hours call outs. We are putting systems in place to ensure that this issue is rectified for the future.	Less than 1 hours Less than 4 hours	Less than 1 hours Less than 4 hours

[1] An urgent call-out is one that leads to a complete loss of supply of drinking water.

Sr. No.	Community outcome	Level of Service	How we measure it (customer)	How we measure it (technical)	Current LoS Performance	How We Monitor Performance	Target LoS Medium Term (1-3 years)	Target LoS Long Term (4-10 Years)
		personnel confirms resolution of the fault or interruption. THIS IS A DIA MANDATORY MEASURE.						
Fault response Times Performance measure Performance measure **O3**	Economy	**Non Urgent call outs**[ii]**2** Fault resolution time Resolution of non-urgent call-outs: from the time that the local authority receives notification to the time that the service personnel confirms resolution of the fault or interruption is within 7 days.	Percentage of failure responded within the specified time	Response time from Council receiving notification of the fault to the time that service personnel reach the site of the sewerage overflow resulting from a blockage.	Response and resolution times in 2022/23 were not recorded accurately.	Analysis of service requests and contactors KPIs. This measure has not been able to be recorded because of issues relating to the recording of after-hours call outs. We are putting systems in place to ensure that this issue is rectified for the future.	Time to resolve the problem is ≤ 7 days (85% of times).	Time to resolve the problem is ≤ 7 days (90% of times).
		Non Urgent call out Fault response time (median) Attendance for non-urgent call-outs: from the time that Council receives notification to the time that the service personnel reach the site. Fault resolution time (median) Resolution of non-urgent call-outs: from the time that the local authority receives notification to the time that the service personnel confirms resolution of the fault or interruption. THIS IS A DIA MANDATORY MEASURE.	Median response time for attendance and resolution	Where Council attends to water supply fault in the sewage system,	Response and resolution times in 2022/23 were not recorded accurately.	Analysis of service requests and contactors KPIs. This measure has not been able to be recorded because of issues relating to the recording of after-hours call outs. We are putting systems in place to ensure that this issue is rectified for the future.	Less than 4 hours. Less than 6 days.	Less than 4 hours. Less than 6 days.
Customer Satisfaction Performance measure **O4**	Economy	Customer satisfaction (a) Drinking water clarity (b) Drinking water taste (c) Drinking water odour (d) Drinking water pressure or flow (e) Continuity of supply (f) Council response to these issues THIS IS A DIA MANDATORY MEASURE.	Complaints by customer on (a) Drinking water clarity (b) Drinking water taste (c) Drinking water odour (d) Drinking water pressure or flow (e) Continuity of supply (f) Council response to these issues	Total complaints reported as a whole of district. Calculate as per 1000 connections	Number of complaints in 2022/23 – 11.8 complaints per 1000 connections	Total number of complaints / 1000 connections. Number of faults from the service request system. Number of connections from the rates database.	Target number of complaints per 1000 connections ≤ 14	Target number of complaints per 1000 connections ≤ 8

[2] An urgent call-out is one that leads to a complete loss of supply of drinking water.

Sr. No.	Community outcome	Level of Service	How we measure it (customer)	How we measure it (technical)	Current LoS Performance	How We Monitor Performance	Target LoS Medium Term (1-3 years)	Target LoS Long Term (4-10 Years)
Demand Management Performance measure **O5**	All	Demand Management Sustainable use of potable water. We use our water efficiently.	Drinking water is always available	Average summer consumption per day per household equivalent unit within district. Take total water supplied for urban water supply schemes and divide this by the total household equivalent units (connected) for these areas. We include the following schemes: Atiamuri, Bonshaw Park, Hatepe, Kinloch, Mangakino, Motuoapa, Omori, River Road, Taupo, Turangi, Whakamaru, Whakamoenga, Whareroa.	2022/23 – Achieved (0.9 m^3/day/HEU)	We take monthly water consumption data and divide by the HEU for each water supply area.	Summer peak household water consumption less than or equal to 1.5 m^3/day/HEU.	Summer peak household water consumption less than or equal to 1.25 m^3/day/HEU.
Fire water flows O6	Economy	We provide adequate water for firefighting in urban schemes.	Fire hydrant will have adequate water flow and pressure.	Minimum of FW2 fire water classifications are met in urban hydrants or exception agreed with NZ Fire service.	2022/23 – Achieved (9 per cent of hydrants tested)	By testing at least 5 % fire hydrants during peak seasons for coincident demands. If inadequate water flow / pressure, we either upgrade the network or if it is cost prohibitive then advise fire services the limitations.	Our water pressure in urban areas meets FW2 firefighting code of practice standards	Our water pressure in urban areas meets FW2 firefighting code of practice standards

5.4 Consultation

The most recent level of service consultation was undertaken in 2016 as part of the preparation for the 2018-28 LTP. The most recent Levels of Service Survey conducted by TDC was in November 2016 and the survey asked for satisfaction. Ratepayers from the district were highly satisfied with the Council's provision of water services. Overall, 79 % were satisfied, while only 5 % were dissatisfied.

In preparation for the 2024 LTP, no specific levels of service consultation has occurred, however Council carried out pre-consultation for the 2024 LTP in late 2023 from which the community mentioned levels of service where they felt it was important. Specific feedback included:

- Support to the tactical level of service T1: Safety of Drinking Water
    - Water needs to be safe and compliant
- Support to the tactical level of service T2: System and adequacy
    - Council needs to make sure that development is catered for with the appropriate provision of drinking water. This includes catering for the peak population.

5.5 Change to Level of Service

There are no proposed changes to levels of service.

There are still a few areas that are not meeting the current levels of service. These include:

- DWSNZ compliance
- Response times
- Water complaints
- Water loss

Capital expenditure to improve the level of service includes;

- Construction of new treatment plants, upgrade of existing treatment plants and connection of water supply schemes to enable full compliance with the DWSNZ
- Improvement to control system and SCADA for better monitoring and reporting
- Reticulation renewals and upgrades to reduce water loss and reduce complaints

Potential impacts on level of service could be: water reform, local government amalgamation, long term funding constraints, regional delivery of water services, expiry of resource consents, funding changes, water takes limits, environmental effects, loss of access to land and treaty settlements.

5.6 Monitoring and Reporting Process

Levels of service are monitored by the Asset Manager. Annual performance is prepared by the Asset Manager for reporting in the Annual Plan document, and every 3 years the AMP document.

6.0 FUTURE DEMAND

6.1 Factors Affecting Demand

There are several factors that influence demand for the water asset within the Taupō District. These are described below and include:

- Growth in population and the number of houses
- Climate impacts such as increasing dry weather and/or rainfall
- Community expectations
- Regulation changes and pressure

Other factors which influence the demand on the water asset however not described in detail are usage efficiency, tourism/events, and leisure trends.

Council has developed a network model for the Taupo, Acacia Bay, Mapara, Kinloch and Whakaroa schemes. Growth projections are modelled to identify where upgrade works might be required to meet demand. Council has not undertaken detailed modelling of the other smaller network due to the cost and the simplicity of these networks, and the lower levels of growth that is occurring.

The main growth areas in Taupo are residential areas in Wharewaka and Nukuhau as well as increasing infill in the town centre. Kinloch is continuing to see strong growth within the Kinloch Structure Plan boundary areas and growth in Turangi and Mangakino has picked up within existing zoned areas.

Examples of recent climate impacts on demand include:

- A flood in the River Road area during the 2018/19 summer scoured a stream that provided water to several private supplies. Following this event council received numerous requests for connection to the Council supply.
- The 2021/22 summer included a significant dry spell that resulted in drought conditions for much of the upper North Island. Water demand during this period was higher than normal throughout the Taupo District and water restrictions were required.
- In February 2023 Cyclone Gabrielle struck New Zealand and caused significant damage. In Taupo district many trees were uprooted which consequently damaged services included watermains causing large water loss. Council supported some Wairakei businesses during this period that were normally supplied water from a private scheme that was damaged. This increased demand on the Taupo scheme.

Managing community expectations regarding water demand can be challenging. Part of the challenge in the Taupo District relates to the perception of water availability due to relatively abundant natural water resources including rainfall averaging 1,100 mm/yr, the country's largest lake, significant rivers and easily tapped groundwaters and springs.

From a regulation perspective, there is growing regional and central government focus on efficient use of water resources. The responsibility falls on local authorities to demonstrate prudent management.

Changes to the regulation and enforcement of standards relating to drinking-water supply are also increasingly impacting demand. In rural areas connection requests are regularly received by Council as pressure on private suppliers increases. Most recently this has occurred in Wairakei and Kinloch.

6.2 Demand Management

Demand management is:

"the modification of customer demands for services in order to maximise use of existing assets or to reduce or defer the need for new assets."

TDC has a current Water Demand Management Plan which is written for the purpose of managing the water supplies to the community to ensure that:

- Water sources are used in a sustainable manner;
- Infrastructure is planned, constructed and managed;
- Growth, consumption and water quality trends are monitored;
- Address the demand challenges through an action plan, which considers the specific environmental, cultural, economic, and social framework of our district.

A summary of demand management initiatives from the plan include:

- Water metering – universal metering currently planned over the next 6 years
- Pricing strategies – will be reviewed in conjunction with the universal metering project
- Incentivising technology e.g. low flow fittings – to be considered as part of district plan review
- Restrictions – currently applied in advance of peak summer periods and elsewhere if demand necessitates
- Water loss management – projects currently underway and more planned in 2021 LTP
- Education initiatives – to be requested via operational budgets

6.3 Plans Related to Growth

In addition to general council planning documents such as the District Plan there are other planning documents that relate to demand in relation to the water asset. These include:

- DC Policy 2024 and Growth Model
- Growth Management Strategy – Taupo District 2050
- Taupo Town Centre Structure Plan
- Taupo Commercial & Industrial Structure Plan
- Kinloch Structure Plan
- Mapara Valley Structure Plan
- Southern Settlements Structure Plan

6.4 Growth

6.4.1 GROWTH MANAGEMENT STRATEGY

In June 2006 the Council adopted Taupō District 2050 (TD2050), the Growth Management Strategy for the District. The growth management strategy identifies where urban growth is anticipated so that land use and infrastructure planning can be aligned. TD2050 has been

incorporated into the District Plan by way of plan changes, particularly Plan Change 21 which identifies the future urban growth areas.

This strategic approach to integrating land use and infrastructure is intended to be supported by subsequent structure planning of the urban growth areas to identify the detailed settlement pattern and infrastructure servicing. Council has prepared structure plans for:

- Kinloch
- Mapara Valley
- South-western Bays Settlements (including Turangi); and
- Commercial and industrial areas within Taupō Township.

6.4.2 GROWTH MODEL REVIEW (2023)

A *Taupō District Growth Model* has been in place since 1 July 2004 and was initially developed with the projected growth identified in TD2050. The *Taupō District Growth Model* and *Growth Model Review* have been updated and included in the current *Development Contributions Policy*, to reflect changes in the economy and the timing of key infrastructure. A growth model was developed based on the anticipated population increase and associated residential lot increases in TD2050. The growth model is generally reviewed and updated every three years prior to the review of the asset management plans and development of the long-term plan.

A significant update to the growth model was made during 2023. The update has resulted in a large increase in growth rate on most schemes where zoned land area is available.

Based on the TDC Environmental scan 2023, Taupō District is home to 41,040 people who usually live here. This is projected to grow to 61,400 residents by 2050. Taupō has a birth rate above the national average and pre-Covid, Taupō had high levels of migration. Current projections estimate annual long-term population growth of 1.3-1.5% per year.

YEAR	2025	2030	2040	2050	2060
Taupō Population	42,500	45,800	53,000	61,400	70,200

It is dangerous from a financial aspect to overestimate the level of future growth. Where growth is overestimated the requirement for capital expenditure is overstated, essentially elevating costs to the ratepayer with limited ability to collect development contributions.

Taupo water supply growth planning has been completed while considering future connection of outlying communities and peak water demand variance. The treatment plant was upgrade in 2020 to enable production of up to 30MLD of treated water. A further upgrade to 35MLD is currently planned to time with peak demand of 35MLD. This will be impacted by the planned connection of the small nearby communities of Bonshaw Park and Whakamoenga Point and the larger Centennial Drive scheme. A more significant impact however is a potential move to universal residential water metering which is expected to reduce demand considerably.

The Figure below displays current demand forecasts for Taupo with impacts of metering and the timing for reaching plant capacity. This shows that universal metering is needed in approximately 10 years if water usage doesn't change. Note that capacity can also be created by disconnected the Centennial scheme in the future.

Future Demand

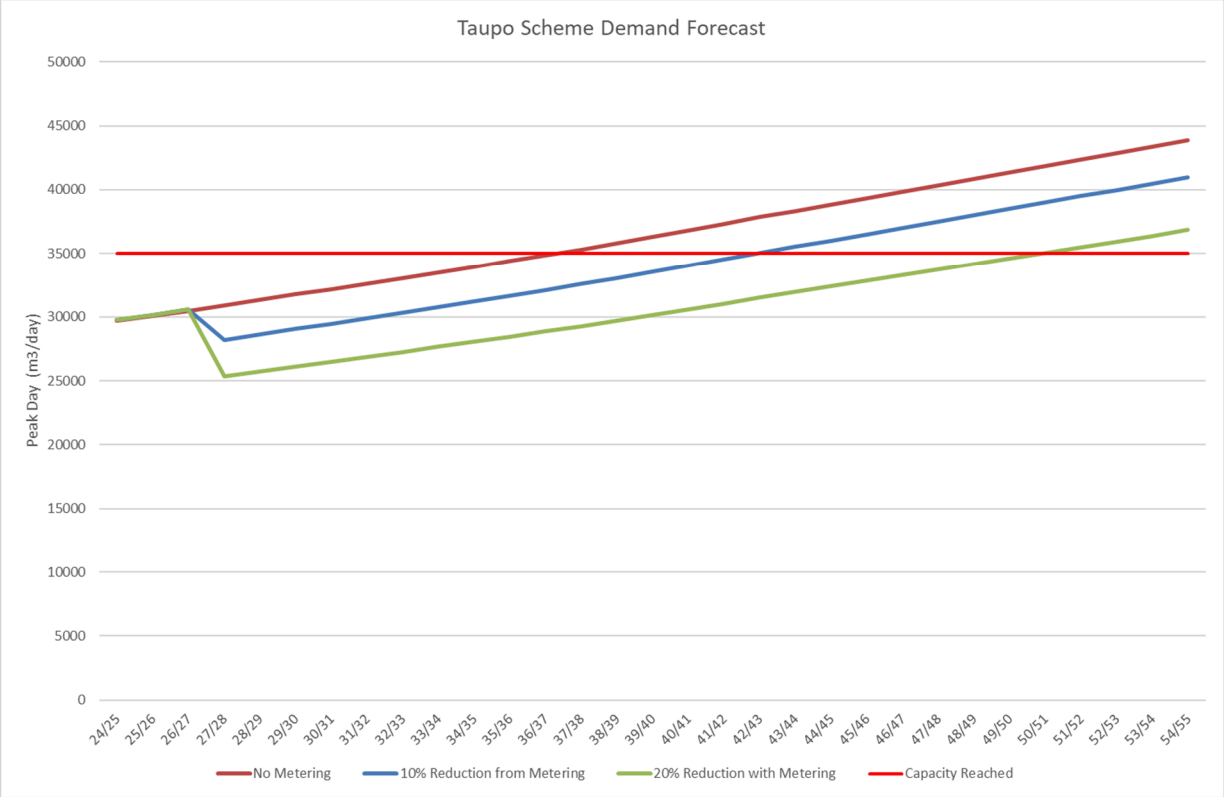


Figure 6.1: Taupo Water Supply Demand Forecasts Compared to Upgrade Options

Growth in Kinloch is limited by the structure plan which defines ultimate development. The speed of the development is very much up to market conditions. The Figure below presents the estimated peak day flow using growth forecasts from the new model, with and without universal metering.

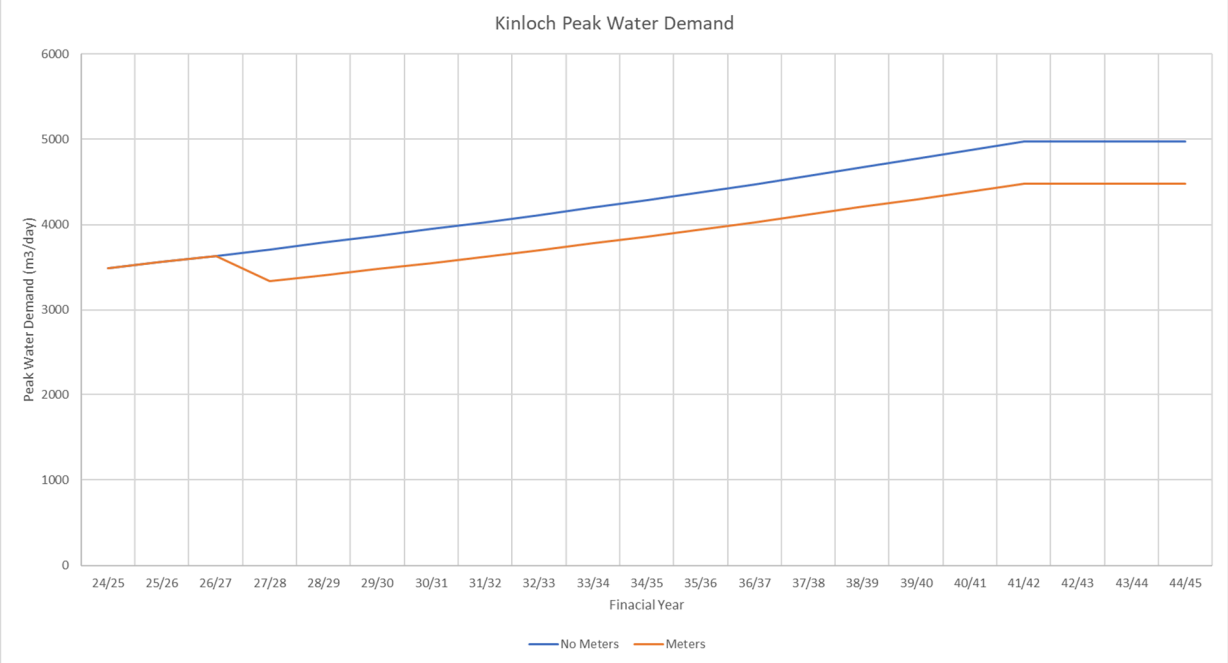


Figure 6.2: Kinloch Estimated Peak Water Demand

Future Demand

Growth in Turangi has increased significantly in the new growth model. The Figure below shows that with no improvement in water loss or metering the consent limit is expected to be exceeded in approximately 15 years. Improvement in water loss to targeted levels is sufficient to reduce risk of consent non-compliance. Similarly a 20% reduction in water use via implementation of water meters will reduce peak demand to within consent limits.

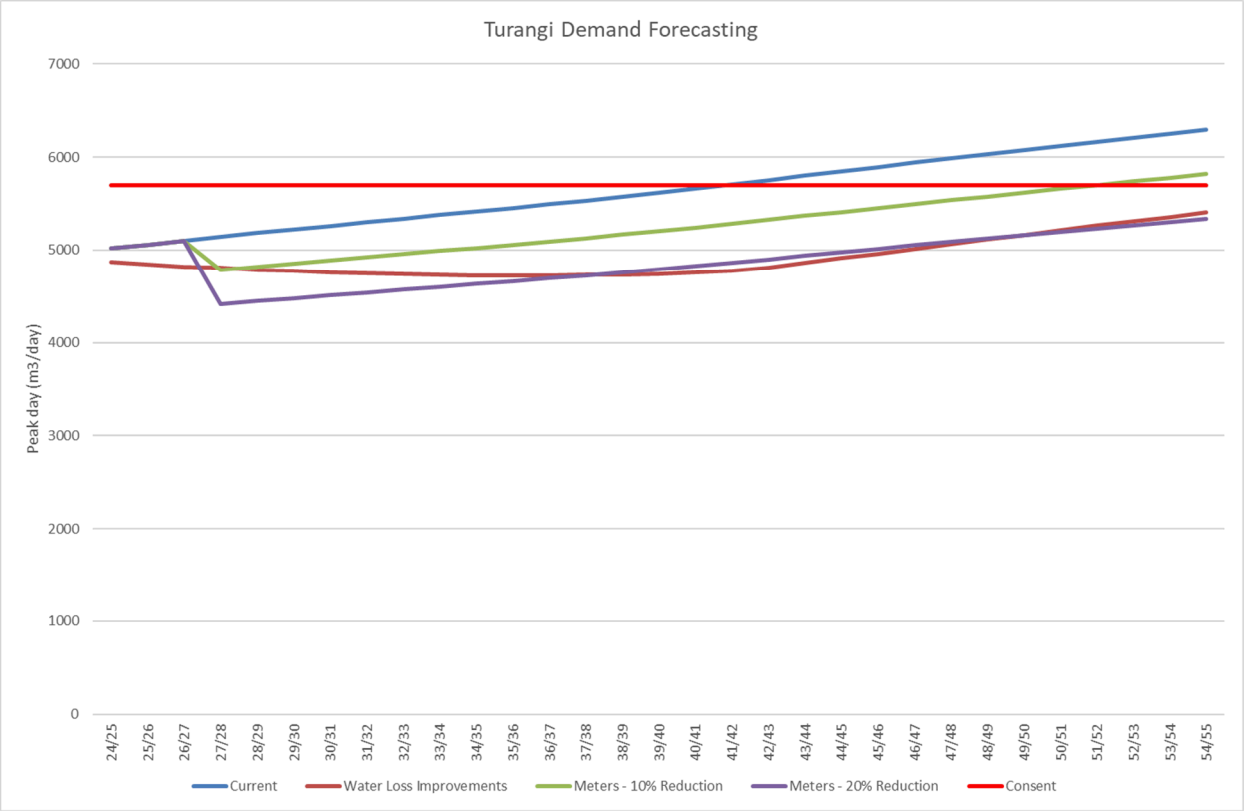


Figure 6.3: Turangi Estimated Peak Water Demand

6.4.3 DEVELOPMENT CONTRIBUTIONS (DC) POLICY

Council's method for collecting funding for growth projects is outlined in detail in its DC Policy. This is determined in conjunction Under the DC Policy the cost of growth-related infrastructure is the responsibility of the developer. If the development does not occur as projected but the project still proceeds, the cost of the growth-related capital expenditure is transferred onto the rate payer, therefore ultimately increasing rates.

Growth in the number of lots and dwellings in the district has impacts on infrastructure demand. Growth Council's decision-making processes and planning documents such as the 10-Year Plan, the Asset Management Plans, and others.

Where growth is overestimated the requirement for capital expenditure is overstated, essentially elevating costs to the ratepayer with limited ability to collect development contributions.

6.4.4 NEW LOTS TO BE CREATED

Consideration has been given to census data, the optimistic discussions with developers, actual consent numbers over the past three years, demographic considerations[1] and officers' estimates when estimating the potential lot numbers outlined in the DC Policy and the Growth Model.

The table below outlines those estimates for the next ten years. The areas that are not predicted to have any growth are not shown.

2024 Development Contributions Policy - Projected New Water Connections

Year (1 July to 30 June)	24/25	25/26	26/27	27/28	28/29	29/30	30/31	31/32	32/33	33/34	34/35
New lots per year for each DC area (in HUE)											
Mangakino	8	8	9	7	6	6	6	6	6	5	6
Kinloch	28	28	27	31	30	31	32	33	33	34	35
Taupō South	138	151	164	181	182	182	181	183	184	185	190
Taupō North	24	26	29	32	32	32	32	32	32	32	33
Taupō Town	17	19	21	23	23	23	23	23	23	23	24
Tūrangi	10	14	17	21	16	16	16	16	16	15	15
Omori/Kuratau/Pukawa	3	4	5	5	5	5	5	5	5	5	5
Whareroa	0	1	1	1	2	2	2	2	2	2	2

Table 6.1: Estimated Lot Creation 2024 - 2034

The estimated growth of the district; and water, wastewater, and transportation catchments; models are found in the DC Policy and Taupō Growth Model. New lot projections are estimated on a development basis and then aggregated into catchments[2]. The data was then reviewed and amended in an officer discussion process which moderated the estimates with the aim to avoid overreaction to the unpredictable short term upturns and downturns in growth.

6.4.5 OCCUPANCY PER DWELLING

Council uses a Household Equivalent Unit (HEU) to convert between population figures and the number of dwellings. Current Census data shows the HEU is approximately 2.6 people per household.

In Taupō District, this figure is complicated by holiday homes which form approximately 34 %[3] of the district's dwellings based on Census data. This figure is difficult to fully determine due to the difference between out-of-town ratepayers and what is likely to be deemed a holiday home.

However, because of this high number of possibly empty homes for a significant part of the year Council needs to consider peak usage and populations when determining demand. This peak demand is particularly relevant when considering demand on infrastructure, such as water and wastewater outlined in detail in the *DC Policy* and *Taupō Growth Model*.

The following Figure displays water use per household (HEU) over the last 5 years. It shows a steadily increasing trend of water use. It should be noted that peak use is dramatically impacted by weather conditions, for instance when comparing the very high use during the 2021/22 summer with the very wet summer that followed in 2022/23.

[1] Jackson, N., "*Taupō District, Demographic Trends and Projections, National Institute of Demographic and Economic Analysis*", June 2014.
[2] Water, Wastewater and Transportation, Taupō Growth Model.
[3] Statistics NZ data

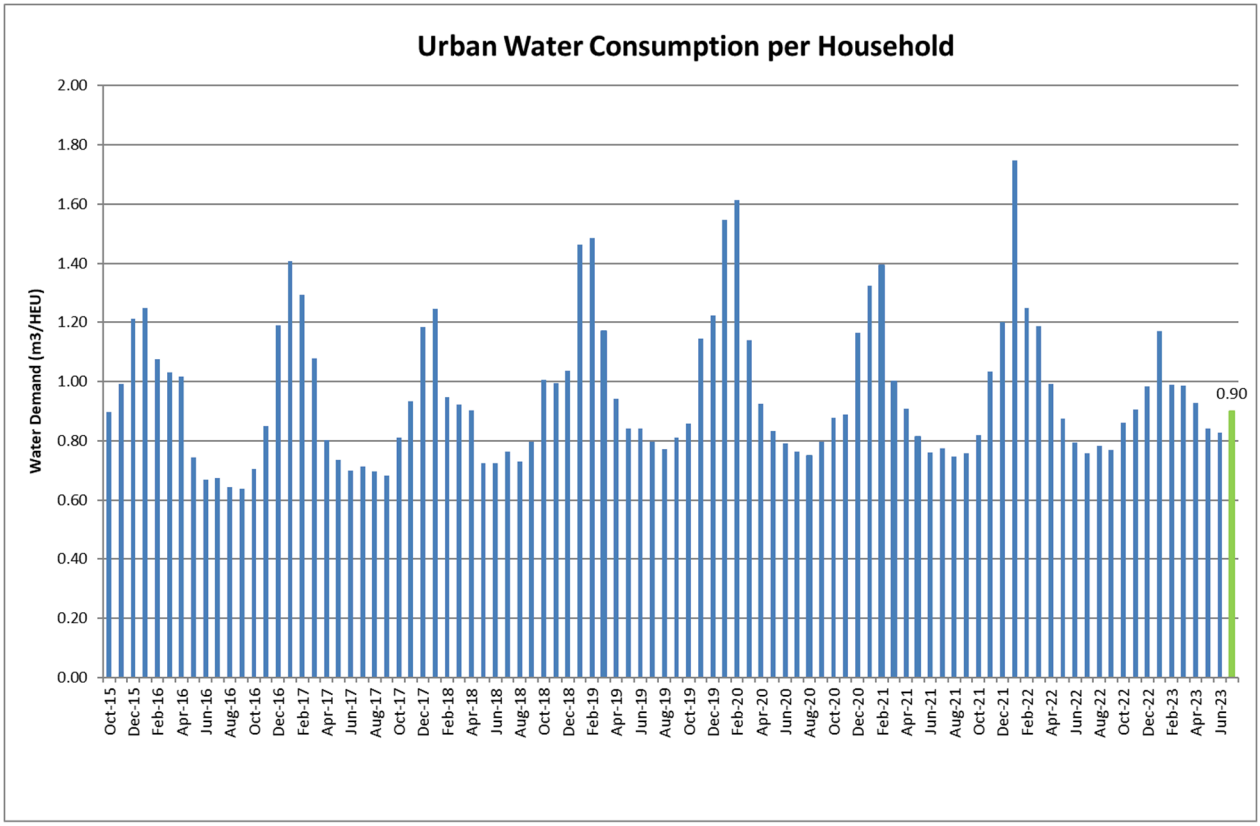


Figure 6.3: Urban Water Consumption Trend

6.5 Meeting increased/changing demand

Increased/changing demand can be met by using a number of methods including;

- Other non-asset-based methods e.g. education for the business community regarding water conservation.
- Capital Expenditure – building new assets e.g. upgrading treatment plants, pump stations, reservoir and pipes, and universal metering to cater for growth.
- Operational/maintenance – for instance tweaking of existing plant settings or swapping out of pump impellors to enable delivery of higher flows

It is important to point out that there may be a change to the cost to operate or maintain due to growth or to changes in demand. There may also be increased operations and maintenance costs due to new assets created. Costs include; increased maintenance costs of planned maintenance, telemetry, instruments for continuous monitoring, increased power costs, new AMS systems, and new water pipes built to cater for growth.

6.5.1 OTHER NON-ASSET BASED SOLUTIONS DEMAND MANAGEMENT TOOLS TO MANAGE CHANGES IN DEMAND

A unique feature of demand management in Taupō District is the managing of the fluctuating demand. Taupō has a large percentage of unoccupied dwellings which means that the base demand as compared to dwelling numbers is low. However, this demand increases significantly during peak holiday periods, tourist seasons and when there are large events in town.

TDC currently uses the following techniques to manage demand for water:

- Bylaws and legislation (including the District Plan).
- Water supply restrictions using Water Demand Management Plan

Other areas which may be used in future are:

- Education through increased customer consultation.
- User charges.

6.5.2 CAPITAL EXPENDITURE DUE TO CHANGES IN DEMAND

The development of additional water connections in the district in the coming ten years will require new infrastructure as well as necessitating the upgrading of the existing assets. The table below outlines the infrastructure required, the cost of this infrastructure and the timing of the provision of components with a Council cost share.

TABLE 6.2: Capital Projects Required to Service Taupō District

Project	Project Cost	Construction timing
District - Fire Flow Improvements	<$1M	Y1 to Y4
District - Universal Smart Water Metering	>$10M	Y1 to Y6
Kinloch - Low Zone Reservoir Construction	$5M-$10M	Y2 to Y3
Kinloch - Treatment Compliance Upgrade	$1M	Y1
Omori - Treatment Compliance Upgrade	$1M-$5M	Y1
Taupo - Brentwood Reservoir Construction	$1M-$5M	Y9 to Y10
Taupo - Mapara Area Capacity Increase	$1M-$5M	Y1 to Y3
Taupo - Napier Road Reservoir Construction	$1M-$5M	Y2 to Y4
Taupo - Nukuhau Structure Plan Water Upgrades	$1M-$5M	Y6 to Y7
Taupo - Poihipi Reservoir Construction	$5M-$10M	Y3 to Y5
Taupo - Tauhara Ridge Reservoir and Airport Connection	$1M-$5M	Y1
Taupo - Wairakei Area Capacity Upgrade	$1M-$5M	Y7 to Y8
Taupo - Taupo WTP capacity upgrade to 35 MLD	$1M-$5M	Y2
Taupo – Wairakei Reservoir Upgrade	$1M-$5M	Y7 to Y8
Taupo – Cyanotoxin Upgrade	$1M-$5M	Y1 & Y7 to Y8
Omori – Reservoir Upgrade	$1M-$5M	Y5 to Y6
Turangi – Reservoir Upgrade	$1M-$5M	Y16 to Y17

6.5.3 OPERATIONAL EXPENDITURE DUE TO CHANGES IN DEMAND OR LOS

Operational budgets are increased in order to operate and maintain new assets. Funding of this expenditure is discussed in the financial section of this asset management plan (section 9) and strategies for operation and maintenance of assets in Section 4. Operational budgets have been adjusted inline with the growth projects listed above.

6.6 Community Expectations

Customers are primarily concerned with expansion of existing network services such as:

- Ability to connect to the current network
- Adequate flow and pressure

- Water safety
- Cost of service

Customer opinion is to be gauged more thoroughly as part of increased consultation, as detailed in the improvement plan.

6.7 Tourism

The effect of tourism is to increase the population and perceived growth over short periods. The 2018 census indicated that the Taupō District had a population of 41,040. However, the number of people staying in the Taupō district during the peak tourism season of the Christmas/New Year school holiday period has been estimated to be up to 2 times that number. Hence, we design assets for peak demand based on historical data and we base this on lots rather than permanent population.

7.0 RISK MANAGEMENT

7.1 Introduction

Risk management is an important element in the development and management of assets. For asset management planning to be robust it must be integrated with other corporate risk management processes and that this encompasses strategies for Council's most critical assets, provide for the effects of asset failure and be integrated with disaster recovery plans and business continuity plans.

7.1.1 BACKGROUND

Council has a Risk Management Charter reviewed and adopted by the Audit & Risk Committee reviewed in 2021. Council determined its overall policy would be to continually develop a Risk Management System that reflects best practice.

The aim of risk management for Council is to ensure that the Council has effective processes to support better decision making in the planning and delivery of products and services to the community through its integration into governance and decision making of the Council and good understanding of risks and their likely impacts. It is Council's intention policy to implement and maintain a Risk Management system that reflects best practice and ensure that sound risk management practices are incorporated into Council's planning and decision-making processes.

Overarching strategies for managing risk within Council are:

- Council's Chief Executive will establish and implement a relevant Risk Management system that ensures a systematic method is used to identify, analyse, evaluate, treat, monitor and communicate key risks associated with Council responsibilities in order to manage risk in according to the Council's risk appetite
- Ensuring that the concept of risk management becomes fundamental to the organisational culture through the philosophy of risk minimisation by doing everything possible to identify risks and reduce the probability and/or impact of a risk.
    - Ensuring the risk management system is consistent with recognised industry standards in particular ISO 3100:2018.

7.1.1.1 Current Risk Management Status

Council has an Audit & Risk Committee which oversees the governance of a Risk Management Programme within the Taupō District Council. Risk Management is continuously being integrated into Councils culture, philosophy, practices, activities and plans rather than being viewed or practised as a separate programme.

The accountability for the management of risk is not removed from the specific activity managers and the Senior Leadership or those responsible for the management of assets and this is viewed as a collaborative process between governance and management.

The high-level assessment of critical assets is done and now needs to be coordinated with the other assets to determine true criticality; this work is an improvement task and will be completed over the next couple of years.

Business Continuity Plans (BCP) have been developed to maintain continuity of operations and service delivery as part of the implementation of Councils Risk Management Charter. Additionally, Council had adopted a Crisis Management Plan (strategic BCP) in 2021, which also addresses aspects of asset management during emergencies.

It is envisaged that BCPs will assist Council in the following areas:

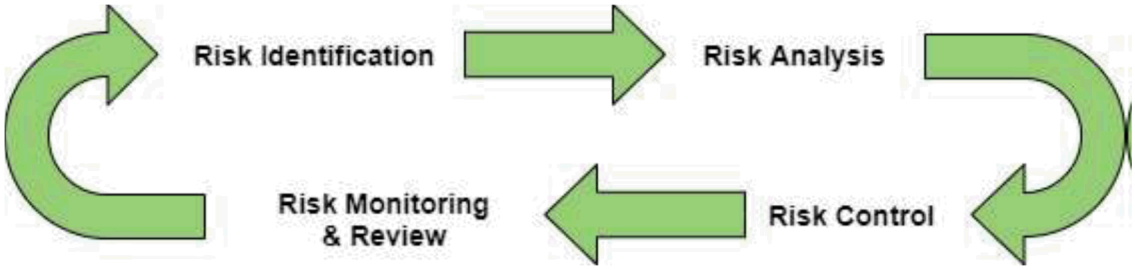
- To reduce the cost of disruptions.
- To be more resilient
- To mitigate business risks and financial exposures
- To meet compliance
- To enhance health and safety
- To benefit from insurance premium discounts, reduced excesses and doors opening to new insurance markets.

TDC is also a member of the Waikato Utility Lifelines group and the wider Waikato Civil Defence and Emergency Management Group.

The Three waters maintenance contracts include an after-hours emergency response for network issues and customer complaints. After hours staff (the Tauranga City Council call centre) receives calls and forward emergency calls directly to the contractor who are required to respond in a certain time. The treatment plant operations team also has on call staff to attend to all treatment plant related emergencies.

7.2 Risk Management Process

The Taupo District Council will use a 4 stage risk management cycle as illustrated in the diagram below:



The 4 stages of risk management are part of a continuous dynamic cycle. For existing risks this cycle will continue until the risk is resolved or eliminated. For actual and potential new and emerging risks the identification/detection stage needs to be carried out continuously.

7.3 Funding for Risk

Council looks to provide funding for disaster recovery through a separate reserve. It appropriates funding each year to a Disaster Recovery Fund reserve to enable access to ready cash in the event of a natural disaster. This is intended to assist reinstatement and to finance any short term needs in the time between any disaster and the recommencement of services. Council has chosen not to insure its below ground assets given the position of its reserves.

Secondly the TEL Fund was established in September 1995 when TDC sold its investments in Taupō Electricity Ltd and Taupō Generation Ltd. The use of that sale capital and subsequent investment income generated each year are included in Council's Treasury Management Policy. One requirement of that policy is that the portfolio and funds are managed in a manner that reflects their potential utilisation as a disaster recovery fund in the event of a natural disaster within the Taupō district.

Thirdly Council maintains headroom within its Debt covenants with the Local Government Funding Agency (LGFA) that would allow it to borrow significant amounts in the event that Council needed to fund a disaster recovery programme.

With these three funding mechanisms in place Council considers it is prudently and effectively managing the risk of being able to fund both short and long term needs with respect to potential natural disaster and subsequent recovery operations in the district.

7.4 Insurance

Council only insures above ground infrastructure assets as specifically identified by the finance team. This includes treatment plants, pumps stations and reservoirs. Underground assets are not insured as Council self-insure for these on the basis that in the event of damage caused by a natural event, essential infrastructure recovery programme funding will be utilised, see Section 7.3 above.

7.5 Dangerous and Insanitary Buildings Policy

Section 131 of the Building Act 2004 requires territorial authorities to adopt a policy on dangerous buildings and of insanitary buildings. The definition of insanitary buildings is included in the Building Act. A building is considered dangerous if,-

- in the ordinary course of events (excluding the occurrence of an earthquake), the building is likely to cause injury or death (whether by collapse or otherwise) to any persons in it or to persons on other property; or damage to other property; or
- in the event of fire, injury or death to any person in the building or to persons on other property is likely because of fire hazard or the occupancy of the building.

The Council Policy applies equally to water facilities and buildings as it does to other buildings around the District.

7.6 Lifelines Risk Assessment

TDC is a member of Waikato utility Lifelines Group. This process aims to identify components within the TDC water network that may be vulnerable to seismic, flood or volcanic events and the impact of failure of these assets.

7.7 Risk Register

The specific asset risk register (see following) identifies risks, the consequence of the risk, the existing controls in place, treatment options and the level of risk to the asset as assessed and updated by Council Officers. A possible improvement to the register is to provide each treatment options with an associated cost and added to the risk register; however, these are yet to be costed by TDC.

7.8 Risk Classification Matrices

7.8.1 LIKELIHOOD

Likelihood scale for consideration based on **ANZS 4360** is as follows.

Table 7-1: Risk Likelihood

Level	Descriptor	Damage / Failure Indicative Frequency
A	Almost Certain	Once per year or more frequently
B	Likely	Once every three years
C	Possible	Once every ten years
D	Unlikely	Once every thirty years
E	Rare	Once every 100 years
N	Almost Impossible	Once in 10,000 years

7.8.2 CONSEQUENCE

A consequence scale as a result of a risk event occurring based on **ANZS 3460** is shown for consideration as follows.

Table 7-2: Risk Consequence

Level	Descriptor	Description
5	Catastrophic	Extreme Impact of damage or failure
4	Major	High impact of damage or failure
3	Moderate	Medium impact of damage or failure
2	Minor	Low impact of damage or failure
1	Insignificant	Very little impact of damage or failure
N	Negligible / Nil	Assessment is Nil

7.8.3 RISK RATING MATRIX

With both likelihood and consequence scales in place a qualitative risk analysis matrix/level of risk can be determined.

Likelihood	Consequences					
	N	**1**	**2**	**3**	**4**	**5**
A	N	L	M	H	E	E
B	N	L	M	M	H	E
C	N	L	L	M	M	H
D	N	L	L	L	M	H
E	N	L	L	L	L	M
N	N	N	N	N	N	N

Table 7-3: Risk Matrix

The rating legend for the matrix, in this example, can be summarized as follows

E = Extreme risk
H = High risk
M = Moderate risk
L = Low risk
N = Negligible risk approaching nil / no risk

7.8.4 RISK MITIGATION MEASURES

High to Extreme risk would normally involve more detailed studies, action plans and management responsibility specifically assigned.

Moderate risk would be managed by monitoring or response procedures and management responsibility specified.

7.8.4.1 Summary of Identified High Risks

This is a summary of the high risks; the complete list is included as Table 7-5.

Table 7-4: Identified High Risks

Asset Risk	The Risk	Mitigation Measures
Earthquake	Damage to treatment system and water supply network	Generators, operating procedures and a list of known local contractors.

Asset Risk	The Risk	Mitigation Measures
Fire	Damage to the intake pump stations, WTP and reticulation because of structural/electrical system damage of the WTP or computer system damage.	Generators, operating procedures and a list of known local contractors.
Flooding/ high stormy winds on lake shore	Wastewater /Stormwater finding its way through to WTP and or damaged water pipes due to water supply pipes movement.	Health & Safety standards, for WTP / pump stations that are built on low-lying land near the lake shore / riverbed, particularly if a volcanic /seismically unstable area lies just offshore.
Tomo's	Damage to the reticulation system due to pipe fracture, disconnection of joints and/or pump failure	List of local contractors' details for easy access to a work force
Contractual Obligations not fulfilled external parties	Failure in the reticulation system due to pipe burst for failure to address new connections, capacity and maintenance issues.	Contract monitoring, performance measures.
Contractual Obligations not fulfilled external parties	Failure to comply with DWSNZ, HDWAA and resource consents	Contract monitoring, performance measures. Continuous monitoring. Sampling of reticulation samples.
Excessive costs to maintain, renew or create assets	Failure to comply with DWSNZ	Improved planning and investigation. Continuous monitoring of water leaving the WTP.
Public safety non-compliance / occupational health and safety non-compliance	Public safety and workers' safety are put at risk due to, Exposure to open manholes, Leaking pipes, Inadequate water treatment, Contaminant discharges to the environment (immediate environs and the Lake), Inadequate training on operation of machines and other devices or Inadequate occupational health and safety trainings	Public Health Risk Mgt Plans, appropriate signage on hazard areas, upgrade of the WTP and NETWORK, spill to environment procedure in place for both river and lake, adequate training provided, adequate PPE for staff)
Water Treatment	Excessive or low chlorine residuals	The Telemetry is upgraded to continuously monitor FAC and the alarm is communicated to duty operator. There are adequate spare Chlorine gas bottle and skilled staff to manage the situations.
Water Distribution	Watermain breaks and leaks, sediment being stirred up with pressure fluctuations.	Highly skilled repair technicians and network engineers, following standard repair procedures. Network dead-end flushing schedules. Water network model review update and calibration for optimisations.

7.9 Critical Assets

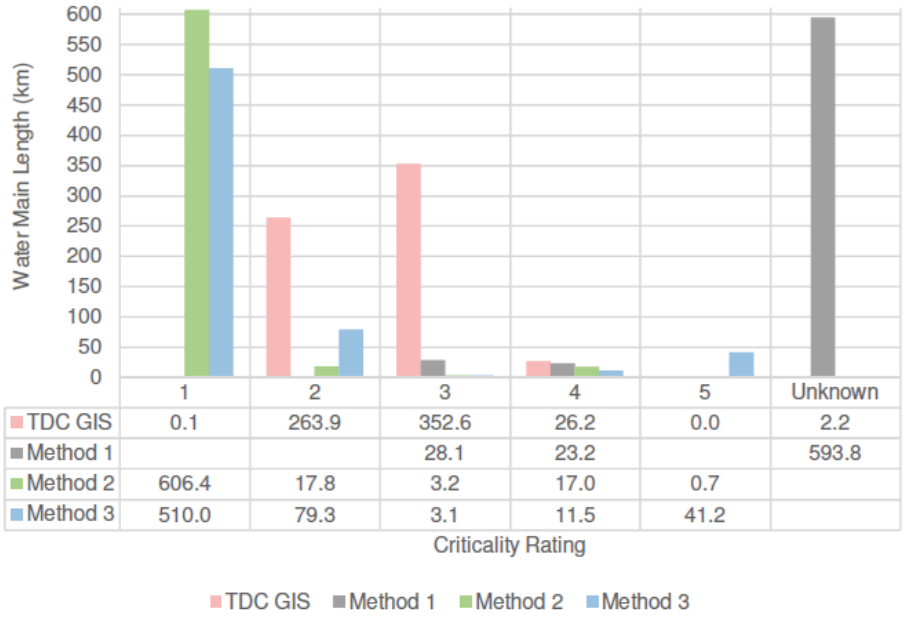
Asset criticality work was completed for all water supply assets in 2016. This work provided all major assets including treatment plants, pump stations, reservoirs and reticulation infrastructure a criticality rating. An example screen shot of the criticality work completed for reservoirs is included below in Figure 7.1. While valuable, this work required some improvement in the reticulation area where pipelines were given higher criticality based on pipe size only.

In 2018, the water reticulation renewals strategy project, improved the criticality analysis for reticulation assets. In this project three methodology's were considered, namely the Project Max report (July 2016), Metadata method (residential population rating), and a customised method developed in conjunction with TDC staff that uses as a combination of pipe diameters and facility importance ratings to determine the pipe criticality, see Figure 7-2. The customised method was taken forward as the preferred methodology and has been used to provide criticalities for all TDCs reticulation assets to enable improved renewals planning to occur.

Prioritisation of watermain renewals utilised the criticalities and condition grade of pipes to determine an order. This was then adjusted based on local knowledge, engineering judgment, other factors (e.g. road sealing), and to ensure appropriate bundling of work for a renewals contract.

<table>
<tr><th>Asset Group</th><th>Assessment of Criticality</th><th>Criticality</th></tr>
<tr><td rowspan="2">Reservoirs</td><td>Reservoirs are a fundamental risk reduction asset within a water supply system by providing a source of treated water while other assets are restored.
Small systems that be readily supplied by tanker and which frequently have multiple tanks could potentially be ranked as Low criticality. However, given that they can typically be readily inspected and significant failures foreseen it is better to allocate a Moderate Criticality to align with the regular inspections that should occur.
Any single reservoir system should be regarded as High Criticality unless it is possible to bypass and operate effectively directly from the source. Turangi has a single reservoir but can be bypassed and the system operated directly off the pumps for a period of time.
Reservoirs have a minimum rating of Moderate. This reflects their importance in the system and the disruption inevitably associated with any major repair or refurbishment. Such a grading also aligns with the expectation that they would be regularly inspected to ensure their operational condition and security. It also aligns with an expectation that they would be subject to more rigorous structural and water tightness assessment on regular basis. Appendix 9.8.4 provides more information on this.
While the Criticality of the Taupo reservoirs sits at Moderate, or higher, there is some ranking within this that may be of use when assigning priority. This is detailed in Appendix 9.2 and summarised below</td><td>Moderate
Non-Taupo Schemes
Many of the smaller schemes (< 200 connections) could be serviced by tanker if a reservoir failure occurred but with significant community disruption.
High (Major)
Turangi, Kinloch and Acacia</td></tr>
<tr><td><table>
<tr><th>Taupo Reservoir</th><th>Relative Ranking</th><th>Criticality Ranking</th></tr>
<tr><td>Tamatea</td><td>Highest</td><td>High (Extreme)</td></tr>
<tr><td>Titoki</td><td>Highest</td><td>High (Major)</td></tr>
<tr><td>Tauhara</td><td>Moderate</td><td>High(Major)</td></tr>
<tr><td>Botanic Gardens</td><td>Moderate</td><td>Moderate</td></tr>
<tr><td>Hinehura</td><td>Lowest</td><td>Moderate</td></tr>
<tr><td>Airport</td><td>Moderate</td><td>Moderate</td></tr>
</table></td><td>Taupo reservoirs – see table</td></tr>
</table>

Figure 7-1: Reservoir Criticality Analysis



	1	2	3	4	5	Unknown
TDC GIS	0.1	263.9	352.6	26.2	0.0	2.2
Method 1			28.1	23.2		593.8
Method 2	606.4	17.8	3.2	17.0	0.7	
Method 3	510.0	79.3	3.1	11.5	41.2	

Figure 7-2: Criticality Analysis and Length Distribution (Method 3 Adopted)

In 2023, Council commissioned a further 3 waters criticality renewal planning project with consultant WSP to update asset criticality across the District.

Table 7-5: Water Risk Register

Asset Management Plan

Risk Register

Division:	Infrastructure	Compiled by:	Tom Swindells, Asset Manager	Date:	October 2020
Asset:	Water	Reviewed by:	Denis Lewis, Infrastructure Manager	Date:	October 2020

NATURAL RISKS

Asset Risks	The risk: What can happen and how it can happen	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
Earthquake	Damage to reticulation system due to: - Pipe fracture - Disconnections in joints - Pump failure - Earth slip - Land subsidence causing changes of grade in pipe network	Major	Unlikely	E (list of local Contractors' details available when needed)	4	D	M	
	Damage to treatment system due to: - Electrical system failure - Telemetry failure - Earth slip failure - Mechanical failure - Structural failure (e.g. Building, Control Room, contact tanks, screen filters, process treatment unit, etc.) - Pipe fracture	Catastrophic	Unlikely	E (built-in/ portable generators, staff trained for servicing, list of local Contractors' details available when needed)	5	D	**H**	
	Lake /Groundwater contamination due to: - Earth slips in source intake / treatment plants with huge storage of chemicals	Major	Unlikely	NC	4	D	M	
	Inaccessibility to network due to footpath/road system failure	Minor	Unlikely	E (emergency road repair)	2	D	L	
Volcanic Eruption/ Ash fall	Damage to treatment system due to: - Clogging of open pipes/ pumps with ash in the WTPs - Increased solid biomass on the pumps and tanks due to ash fall - Corrosion of equipment due to acid content of the ash	Moderate	Unlikely	E (water blasting, vacuum trucks, adequate capacity of the grit chamber in the WTP,	3	D	L	
	Inaccessibility of the WTP and inability to operate the plant	Minor	Unlikely	E (water blasting of access way)	2	D	L	
Lahar	Damage to the treatment system due to: - Increased solid biomass on the tanks - Potential corrosion of pipes and machines	Moderate	Rare	E (water blasting, vacuum trucks)	3	E	L	

Asset Risks	The risk: What can happen and how it can happen	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
	Inaccessibility of the WTP and inability to operate the plant.	Minor	Rare	E (water blasting of entrance)	2	E	L	
Flooding	Inaccessibility of the WTP and inability to operate the plant	Minor	Unlikely	E (use of big trucks)	2	D	L	
	Damage to the treatment system due to: - Silting of tanks - Tank overflow	Moderate	Unlikely	E (vacuum truck, WTP has 1-day storage capacity for dry-weather flow, pump out to the NETWORK which has max of 2-day irrigation capacity)	3	D	L	
	Wastewater /Stormwater finding its way through to damaged water pipes due to: - Retic pipes movement	Major	Unlikely	NC	4	D	**H**	
Tsunami	Damage to reticulation network due to: - Scouring and damage to footpath/road system - Destruction of pump stations and other structures	Major	Rare	E (pond the area and suck with vacuum truck)	4	E	L	
	Inaccessibility of the WTP and inability to operate the plant	Minor	Rare	E (water blasting of access way)	2	E	L	
Fire	Damage to the reticulation network due to: - Structural/electrical system damage of pump station	Catastrophic	Possible	E (list of local Contractors' details available when needed)	5	C	**H**	
	Damage to the treatment system due to: - Structural/electrical system damage of the WTP - Computer system damage	Catastrophic	Possible	E (built-in generators, staff trained for servicing, list of local Contractors' details available when needed)	5	C	**H**	
Lightning	Damage to the reticulation network due to: - Structural/electrical system damage of pump station	Major	Rare	E (list of local Contractors' details available when needed)	4	E	L	
	Damage to the treatment system due to: - Structural/electrical system damage of the WTP - Computer system damage	Major	Rare	E (built-in generators, staff trained for servicing, list of local Contractors' details available when needed)	4	E	L	
High winds	Damage to the reticulation network due to: - Structural/electrical system damage of pump station	Major	Unlikely	E (list of local Contractors' details available when needed)	4	D	M	
	Damage to the intake pump station / treatment system due to: - Stormy winds flooding the pump station and Structural/electrical system damage of the WTP - Computer system damage	Major	Unlikely	E (built-in generators, staff trained for servicing, list of local Contractors' details available when needed)	4	D	M	

Asset Risks	The risk: What can happen and how it can happen	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
Landslide/Slip	Damage to reticulation system due to: - Pipe fracture - Disconnections in joints - Pump failure - Earth slip - Land subsidence causing changes of grade in pipe network	Major	Possible	E (list of local Contractors' details available when needed)	4	C	M	
	Damage to treatment system due to: - Electrical system failure - Earth slip failure - Mechanical failure - Structural failure (e.g. Building, Control Room, contact tanks, screen filters, WTP process equipments, etc.) - Pipe fracture	Major	Unlikely	E (built-in generators, staff trained for servicing, list of local Contractors' details available when needed)	4	D	M	
	Groundwater contamination due to: - Earth slips in NETWORK	Major	Possible	NC	4	C	M	
	Inaccessibility to network due to footpath/road system failure	Minor	Possible	E (emergency road repair)	2	C	L	
Tomos	Damage to reticulation system due to: - Pipe fracture - Disconnections in joints - Pump failure - Land subsidence causing changes of grade in pipe network and loss of support for pipe system	Major	Likely	E (list of local Contractors' details available when needed)	4	B	**H**	
	Damage to treatment system due to: - Structural failure (e.g. Building, Control Room, contact tanks, screen filters, WTP process equipment, etc.) - Pipe fracture	Major	Possible	E (built-in generators, staff trained for servicing, list of local Contractors' details available when needed)	4	C	M	
	Groundwater contamination due to: - Land subsidence in NETWORK	Major	Possible	NC	4	C	M	
	Inaccessibility to network due to footpath/road system failure	Minor	Possible	E (emergency road repair)	2	C	L	
Geothermal activity	Damage to the reticulation system due to: - Potential corrosion of pipes	Major	Possible	E (water blasting, ceramic pipes are used in high-risk areas)	4	C	M	
	Damage to the treatment system due to: - Potential corrosion of pipes and machines	Moderate	Possible	E (immediate water blasting on-site for surfaces and engage Contractors for water blasting of pipes every 3 months)	3	C	M	
	Inaccessibility of the WTP and inability to operate the plant	Minor	Unlikely	E	2	D	L	

EXTERNAL RISKS

Asset Risks	The risk: What can happen and how it can happen	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
War	Damage to reticulation system due to: - Pipe fracture - Disconnections in joints - Pump failure	Major	Almost impossible	NC	4	N	N	
	Damage to treatment system due to: - Electrical system failure - Mechanical failure - Structural failure (e.g. Building, Control Room, contact tanks, screen filter, WTP process equipments, etc.) - Pipe fracture - Inability to operate the WTP	Major	Almost impossible	NC	4	N	N	
	Inaccessibility to the network	Minor	Almost impossible	NC	2	N	N	
Terrorism	Damage to reticulation system due to: - Destruction by terrorists	Major	Rare	E (list of local Contractors' details available when needed)	4	E	L	
	Damage to treatment system due to: - Destruction by terrorists - Inaccessibility of the WTP and inability to operate the plant	Major	Rare	E (list of local Contractors' details available when needed, staff trained for servicing)	4	E	L	
	Inaccessibility to the network	Minor	Rare	NC	2	E	L	
Protests/Riots	Damage to reticulation system due to: - Destruction by protesters	Major	Unlikely	E (list of local Contractors' details available when needed)	4	D	M	
	Damage to treatment system due to: - Destruction by protesters - Inaccessibility of the WTP and inability to operate the plant	Major	Unlikely	E (list of local Contractors' details available when needed, staff trained for servicing)	4	D	M	
	Inaccessibility to the network	Minor	Unlikely	NC	2	D	L	
Vehicle Accident	Damage to reticulation system due to: - Ramming into the pipes, manholes and pump stations	Moderate	Possible	E	3	C	M	
	Inaccessibility of the network along the footpath/road after an accident	Minor	Possible	E (immediate clearing)	2	C	L	
	Inability to address operational issues in the network and WTP if accident involves staff	Moderate	Possible	E (enough staff to cover operations)	3	C	M	
	Damage to treatment system due to: - Ramming of buildings and other structures - Inability to operate the WTP	Moderate	Possible	E (list of local Contractors' details available when needed, staff trained for servicing)	3	C	M	

Asset Risks	The risk: What can happen and how it can happen	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
Contractual obligations not fulfilled by external parties	Failure in the reticulation system due to: - Pipe bursts/ failure to address capacity and maintenance issues	Major	Likely	E (scoring system monitored closely, termination of contract for non-compliance and tendering new one)	4	B	**H**	
	Failure to undertake network maintenance and maintain the required network performance standard	Moderate	Likely	E (scoring system monitored closely, termination of contract for non-compliance and tendering new one)	3	B	M	
	Failure to comply with HDWAA / DWSNZ and Resource Consents	Major	Likely	E (scoring system monitored closely, termination of contract for non-compliance and tendering new one)	4	B	**H**	
	Failure to implement required works due to lack of feasibility and design works	Minor	Likely	E (scoring system monitored closely, termination of contract for non-compliance and tendering new one)	2	B	M	
Excessive costs to maintain, renew or create assets	Failure to maintain the required network performance standard	Moderate	Likely	E (Will allow for unplanned costs)	3	B	M	
	Failure to comply with DWSNZ / HDWAA, Resource Consents	Major	Likely	E (Will allow for unplanned costs)	4	B	**H**	
	Failure to address service demand	Moderate	Likely	E (Will allow for unplanned costs)	3	B	M	
Lack of contractors to carry out works	Failure in the reticulation system due to: - Pipe bursts for failure to address capacity and maintenance issues	Major	Possible	NE	4	C	M	
	Failure to undertake network maintenance and maintain the required network performance standard	Moderate	Possible	NE	3	C	M	
	Failure to comply with Resource Consents	Major	Possible	NE	4	C	M	
	Failure to implement required works	Moderate	Possible	NE	3	C	M	

OPERATIONAL RISKS

Asset Risks	The risk: What can happen and how it can happen	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
Public health risk from Water Source	Contamination of source water i.e. lake, river, underground streams, springs and bores. ▪ By animal and human waste							
	▪ Algae bloom and associated bio-toxins	Moderate Major	Almost certain Likely	NFE NFE	3 4	A B	**H** **H**	5 5
	▪ Geothermal contaminants							
	▪ By oil, petroleum by-products	Moderate	Almost certain	NC	3	A	**H**	8
	▪ Water quality to poor to treat	Minor	Unlikely	NC	2	D	L	9
	▪ Volcanic activity	Major	Likely	N	4	B	H	5
	▪ Heavy rainfall event	Catastrophic	Rare	NC	5	E	M	6
	▪ Heavy wind	Moderate	Possible	NFE	3	C	M	6
	▪ Industrial waste	Moderate	Almost certain	NFE	3	A	H	7
	▪ Hazardous substances	Major	Possible	NC	4	C	M	8
	▪ Agrichemicals	Major	Possible	NC	4	C	M	9
		Major	Unlikely	NC	4	D	M	9
Source water unable to match demand	Unable to abstract enough water	Moderate	Rare	NC	3	E	L	11
Water Treatment	Not having enough Free available Chlorine (FAC) to eliminate bacteria.	Major	Likely	E (The Telemetry is upgraded to continuously monitor FAC and the alarm is communicated to duty operator. There are adequate spare Chlorine gas bottle and skilled staff to manage the situations.)	4	B	**H**	-
	Over chlorinating – too much FAC	Moderate	Almost certain	E	3	A	**H**	-
	Total Organic Carbon increases forming chlorination by-products	Moderate	Possible	E	3	C	M	-
Fluoridation	Overdosing of fluoride ▪ Due to wrong preparation of dosing solution with powder / liquid. ▪ Incorrect monitoring instrument ▪ Calibration issues	Moderate	Likely	E (The Fluoride monitoring standard solutions are maintained and reliable monitoring instrument is	3	B	M	-

Asset Risks	The risk: What can happen and how it can happen	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
				sourced with warranties and service agreements)				
Pump Operations	Changes in pressure or water hammer	Major	Almost certain	NFE	4	A	E	3
Plant failure	Power failure	Major	Almost certain	E	4	A	E	-
	Natural disaster	Catastrophic	Possible	NC	5	C	**H**	6
Post Treatment Storage Risks	Not enough water to meet demand	Major	Likely	E	4	B	**H**	-
	• Contaminating material getting into reservoir	Major	Possible	E	4	C	M	-
	• Development or re-suspension of sediment	Moderate	Almost certain	E	3	A	**H**	-
	• Material failure of reservoir	Catastrophic	Possible	E	5	C	**H**	-
	• Natural disaster	Catastrophic	Possible	NC	5	C	**H**	-
	• Vandalism or sabotage	Major	Possible	E	4	C	M	
Telemetry Monitoring	Incorrect water quality data used for water supply management	Major	Possible	E	4	C	M	-
Water Distribution Risks	Contaminated material gets into main							
	▪ Mains breaks and leaks	Moderate	Almost certain	NFE	3	A	**H**	4
	▪ Sediment being stirred up with pressure fluctuations	Moderate	Almost certain	NFE	3	A	**H**	6
	▪ Inadequate backflow prevention	Major	Almost certain	NFE	4	A	E	2
	▪ Poor hygiene practices during maintenance	Major	Almost certain	NFE	4	A	E	1
	▪ Poor construction materials and practices	Moderate	Possible	E	3	C	M	-
	Low flow or No flow							
	▪ Unable to meet demand	Major	Possible	E	4	C	M	-
	▪ Power failure	Major	Almost certain	E	4	A	E	-
	▪ Pipe failure	Major	Almost certain	E	4	A	E	-
	▪ Pump failure	Moderate	Likely	E	3	B	M	-
	▪ Natural disasters or incidental damage	Catastrophic	Possible	NFE	5	C	**H**	6
Staff training	Unskilled / untrained staff ▪ Poor water quality and distribution management. ▪ Water is contaminated	Moderate	Likely	NFE	3	B	M	1
Legislative non-compliance	Failure to achieve Levels of Service due to: - Non-compliance to Resource Consents - Unlawful discharges (without Consent) to the environment	Major	Possible	E (capital/renewal/maintenance works programmed)	4	C	M	

Asset Risks	The risk: What can happen and how it can happen	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
	Court subpoena for unlawful acts; specifically, violation to RMA	Major	Possible	E (to be addressed accordingly)	4	C	M	
In adequate asset condition assessment and valuation	Failures in the WTP/reticulation system due to: - Pump /motor / valve failure - Pipe bursts / fracture	Major	Possible	E (The qualified maintenance staff conducting condition assessment regularly and development of an in-house Asset Management System for proper planning)	4	C	M	
	Failure in the treatment system due to: - Electrical system failure - Mechanical failure - Structural failure (e.g. Building, Control Room, contact tanks, screen filters, WTP process equipment, etc.) - Pipe fracture	Major	Possible	E (Acquisition of proprietary AMS to replace in-house Asset Management System for proper planning)	4	C	M	
	Failure in the disposal system due to: - Saturation of the field as a result of insufficient capacity	Major	Possible	E (Acquisition of proprietary AMS to replace in-house Asset Management System for proper planning)	4	C	M	
	Failure to come up with robust capital works, renewal and operational programmes	Moderate	Possible	E (Acquisition of proprietary AMS to replace in-house Asset Management System for proper planning)	3	C	M	
	Expenditures are not optimised	Minor	Possible	E (Acquisition of proprietary AMS to replace in-house Asset Management System for proper planning)	2	C	L	
Incorrect financial projections to create, renew or maintain assets	Delayed project completion	Moderate	Possible	E (Plan Improvement)	3	C	M	
	Over- or under spent budget creating impact on rates and development contributions	Moderate	Possible	E (Plan Improvement)	3	C	M	
Not meeting community expectations	Loss of ratepayers' faith and trust to Council due to: - Failure to maintain network performance standard - Failure to deliver the target levels of service	Major	Possible	E (Plan Improvement)	4	C	M	
Public safety non-compliance/ Occupational Health and safety non-compliance	Public safety and workers' safety are put at risk due to: - Exposure to open manholes - Leaking pipes - Inadequate water treatment - Contaminant discharges to the environment (immediate environs and the Lake)	Major	Likely	E (Water Safety Plans, appropriate signage on hazard areas, upgrade of the WTP and network, spill to environment procedure in place for both river and lake, adequate training	4	B	**H**	

Asset Risks	The risk: What can happen and how it can happen	The consequences of an event happening		Adequacy of existing controls	Consequence rating	Likelihood rating	Level of risk	Risk priority
		Consequences	Likelihood					
	- Inadequate training on operation of machines and other devices - Inadequate occupational health and safety trainings.			provided, adequate PPE gears for staff)				
Loss of asset data/information on assets	Failure to maintain network performance standard due to: - Potential delay in work programmes - Unreliable asset management planning	Moderate	Unlikely	E (Robust database and Asset Mgt. System)	3	D	L	
	Increased expenditure to recollect the data. Failure of in-house AMS	Minor	Unlikely	E (Robust database and Asset Mgt. System)	2	D	L	
High staff turnover and absence of staff to undertake water asset management	Failure to maintain network performance standard due to: - Loss of historical and current knowledge base - Planned programmes tend not to be sustainable - Learning periods consume significant work time as new staff comes in - Institutional/Organisational development is not sustained.	Moderate	Likely	E (Organisation restructured to ensure Network Engineers have the capability to address issues across disciplines)	3	B	M	
Lack of management support to the required work programmes	Failure to maintain network performance standard due to: - Disapproval of required work programmes - Insufficient justification to support the program proposals	Moderate	Likely	E (Proper investigations and scoping to justify the planned works)	3	B	M	

8.0 LIFECYCLE MANAGEMENT PLAN

Prior to 1950, the district was largely undeveloped and sparsely populated. Since that time, population has increased rapidly to approximately 41,040 (NZ Census 2018, Resident Population 2021). Urban growth has focused on Taupo Township and various lakeshore settlements, whilst rural land development has been dramatic with the conversion of scrub wastelands to productive farmlands and vast exotic forest plantations and future conversion to lifestyle properties.

Taupo District Council provides water services to many urban & rural areas within the district including Taupo, Turangi, Tokaanu, Acacia Bay, Mapara Road, Bonshaw Park, Centennial Drive including Rakanui Road, Hatepe, Kinloch, Motuoapa, River Road, Tirohanga, Waihaha, Whakamoenga, Whakaroa, Waitahanui, Omori, Kuratau, Pukawa, Whareroa, Whakamaru, Atiamuri, Mangakino and Motutere motor camp.

This section contains life cycle management plans for the following water asset components:

- Treatment plants, reservoirs and pump stations
- Reticulation (pipes, valves, fire hydrants, water meters etc)

Many of these assets are seen as critical assets where failure could have a dramatic impact. This has been discussed in further detail in the Risk Management section.

Background data for the asset type including asset description, capacity, performance, condition and valuations is included in the Asset Data section.

This section contains the general *management strategies,* to achieve the levels of service defined in Level of Service section. These strategies are divided into four main work categories (routine maintenance, renewal, capital and disposal) as illustrated in the following figure.
A management strategy for each of the schemes is included in the appendices.

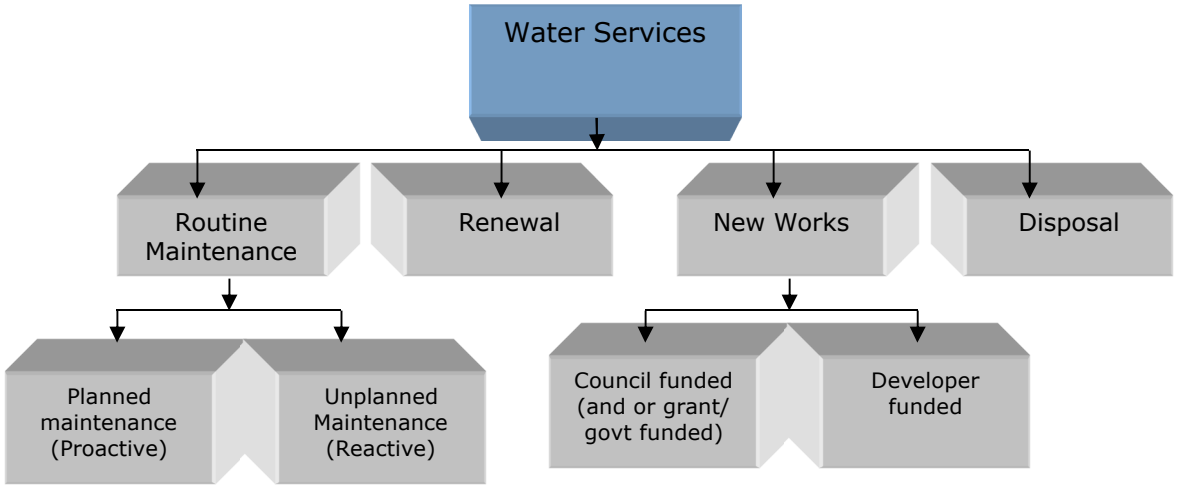


Figure 8-1: Asset Works Categories

The work categories are defined as follows:

Routine Maintenance

Routine maintenance falls into two broad categories as follows:

- Planned (Proactive) Maintenance: Proactive inspection and maintenance works planned to prevent asset failure.

- Unplanned (Reactive) Maintenance: Reactive action to correct asset malfunctions and failures on an as required basis (i.e. emergency repairs).

A key element of asset management planning is determining the most cost-effective blend of planned and unplanned maintenance as illustrated in the following figure.

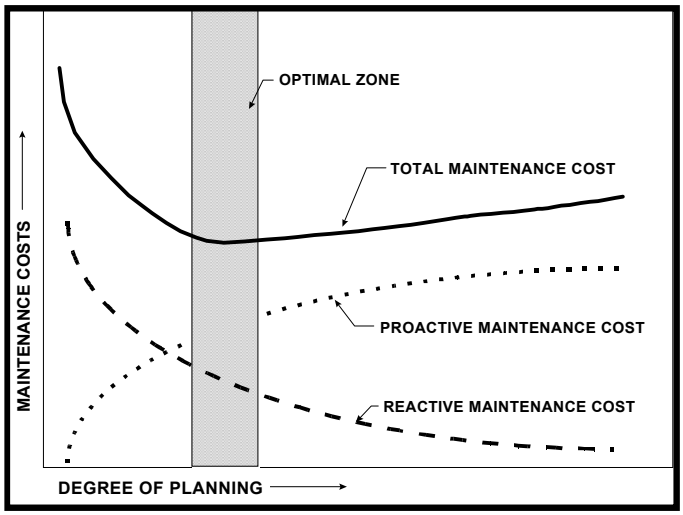


Figure 8-2: Balancing Proactive and Reactive Maintenance

Renewals
This includes replacement and rehabilitation of existing assets to their original condition and capacity.

New Works
Creation Works: New works which extend or upsize assets, which are required to cater for new development and growth. Creation works fall into two separate categories as follows:

- Council funded - Works funded and constructed by TDC (or through other government funding schemes e.g. MoH Funding, CIP Funding, Water Reform Funding).
- Developer funded - Works funded by developers as part of sub divisional development or by way of contributions that are then vested in Council.

Asset Disposal
Retirement or sale of surplus assets.

A forecast of the 10-year expenditure for each asset group in each of the categories outlined above has been provided in the Financial Summary section.

8.1 Overarching issues/ strategies for water supply

Council updated and adopted a new Water Supply Strategy in 2019, available at the following link https://www.taupodc.govt.nz/council/plans-and-strategies/district-strategies/water-

supply-strategy. The purpose of the Water Supply Strategy is for Council to set a direction on how we intend to manage drinking water supplies for the coming 20 years. This strategy aims to clearly set out how the Water Supply Strategy will help to achieve the Council vision, the outcomes that we want to achieve for our drinking water supplies, and goals and responses which describe how we will achieve the outcomes.

The 5 key outcomes from the strategy are presented below, in relation to how they have been utilised in the asset management planning process to resolve to the overarching issues in the management of our water supply service.

1. We ensure the protection of public health

Public health protection is considered the first and foremost requirement of Council as a drinking-water supplier. The major issue Council faces is the significant non-compliance of Councils supplies with the DWSNZ. The issue is largely a lack of treatment capability to remove protozoa and arsenic which is present in Lake Taupo and some groundwater in the District. The challenge for 100% compliance may be considered greater in Taupo due to the number of operating treatment plants, 18 of, and the small communities they service. This has likely impacted investment decisions historically.

The major goals and responses in this area of the strategy focus on a commitment to compliance with the Water Services Act and to accelerate where possible LTP projects related to public health. For these reasons, the asset management planning process has scheduled LTP projects that are expected to enable compliance for all water supplies within a 4-year period with the exception of the Motutere campground supply which will have a protozoa barrier installed immediately but full arsenic removal not planned until year 7 and 8. A 4-year period was chosen with consideration to deliverability of the projects required. In addition to these projects, cyano-toxin treatment at Taupo is scheduled for years 6 and 7.

During preparation of this Asset Management Plan the water regulator has requested further acceleration of some treatment project to ensure all sites have protozoa barriers. Council has responded and has brought forward some funding in the final plan.

2. We recognise Te Mana o Te Wai

Council has committed within the strategy to recognising the te reo Maori concept of Te Mana o te Wai, or to ensuring the integrated and holistic health and well-being of a water body. Council has a strong relationship with local Iwi and recognise and respect the importance of, and connection between, iwi and freshwater (wai Maori).

Council is committed to continuing the strong relationships formed and recognises and respects Tangata Whenua's rights and interests in Water. The premise of the Water Supply Strategy and Asset Management Planning process in relation to Iwi is to act as a mechanism to open up dialog on the matters facing Council and to develop methods by which Iwi and Council can work together to ensure Te Mana o te Wai is achieved.

3. We use water responsibly and sustainably

The growing regional and central government focus on efficient use of water resources is of high importance for Taupo District due in part due to our location at the start of the Waikato River catchment which serves so many water users downstream. Historically and currently water use in the District is high (Water NZ Benchmarking Surveys), and this is compounded by high levels of water loss from the system. Low lake levels and/or drought conditions can result in enforced water restrictions and reduction in consented take levels.

With a strategy goal to reduce overall water use in the District, asset management planning in this area has focussed on improving our asset data and performance knowledge to support improved decision making, and improving our networks to reduce leakage and failures. Current and future projects include that will support this goal include:

- District Universal Smart Water Metering Programme, Year 1 to 6.
- Water Reticulation Renewals, Year 1 to 10
- Water Loss Calculations, annual from operational budgets
- Water Demand Management Plan update, 3 yearly from operational budgets

All of the above projects will also help support levels of service items including; water loss, pipework capacity, customer satisfaction and demand management.

4. We support the Communities Growth aspirations

As presented in Section 6, the Taupo District is seeing considerably growth which can put pressure on delivery of services. The challenge of estimating peak demand in tourist hot spots can be difficult. The water strategy includes goals to better understand our population demographics and trends, which is directly related to asset management planning, as well as ensuring we provide sufficient water for growth aspirations which has driven many of the projects included for within the 2024 LTP (set out in Section 6).

Asset management plans for the upcoming LTP also include ongoing update and calibration of water supply models in Taupo, Acacia Bay and Kinloch where growth is the greatest. Future model builds have been allowed for on the remaining large schemes and rural schemes where growth and management of demand is the most challenging.

5. We ensure that our water supply system is financially sustainable

The strategy stresses the importance of robust forward planning process to ensure we continue to deliver value for money to our community. Following the district wide water rating change in the 2021 LTP, planning in the 2024 LTP will be focussed on standardising water usage billing in preparation for the District Universal Smart Water Metering Programme, Year 1 to 6.

8.1.1 CLIMATE CHANGE

Recent scientific data shows that the globe is warming and this is starting to impact on the climate. What this means long-term is hard to specifically pinpoint, but indications are that rainfall events will worsen, droughts will occur more often and seas will rise. While sea level rise isn't a major concern for the Taupō District we need to be acutely aware of what the other impacts might be. These impacts are likely to include:

- Increased frequency of droughts will increase the demand for our drinking water supplies, while at the same time there will be less water available to take.
- Warmer, drier days, with less wind are likely to result in increased number of algal bloom events. This may require the installation of additional treatment methods.
- Increased frequency and severity of intense rainfall and storm events. Ex-tropical cyclones will likely be stronger and cause more damage as a result of heavy rain and strong winds. Increased risk of power and communications outages from wind damage.
- Increasing rain events may require the installation of additional treatment, where our supplies are taken from drinking water.
- Changes to the make-up of our freshwater ecosystems as a result in temperature change. This could threaten native species and make conditions more attractive to pest species.

By ensuring our asset management planning delivers on each of our water strategy outcomes, the climate change impacts above will be considered. For example the risk of increasing drought events will be considered within outcome 3, we use water responsibly and sustainably.

8.2 Service delivery & rationale

The water supply services are carried out by a number of providers both internal and external.

Table 8-1: Service Delivery Rationale

Service	Provider	Rationale (Why?)
Asset Management	Council	We retain in-house knowledge
WTP Operation and Maintenance	Council	We retain in-house knowledge Confidence in critical treatment safety aspects of water supply
Concept Design	Council with support from External Consultants	We retain in-house and local knowledge Concept work often requires public consultation
Detail Design	External Consultants	To capitalise on external expertise resource/ experience and due to specialised nature of service.
Network Operation and Maintenance	External Contractors	To capitalise on external specialist resource/ experience at a competitive market rate.
Management of Maintenance Contracts	Council Business unit	Control of cost
Construction Contracts	External Contractors	To capitalise on external specialist resource/ experience at a competitive market rate
Management of Construction Contracts	Project Management Office or External Consultants	Control of cost External consultants utilised to balance resource peaks

The following table shows a summary of all TDC maintenance and renewals contracts

Table 8-2: Maintenance, Operations and Renewal Contracts

Contract Name	Contract No.	Approx. Value ($)	Term (yrs)	Comments	Maintenance/Renewal / Creation
Three Waters Network Maintenance Contract	CN499	Downer	~$5M/yr	Start date: 2023 Term: 4	Combination of reactive and proactive maintenance activities, renewal and new works. Includes water wastewater and stormwater.
Laboratory Testing Services	TDC/1920/300	Eurofins	Approximately $550,000 p.a.	Start date: 8 Jun 2020 Term: 5 +2 +2	Operational Water and Wastewater

Contract types

TDC has a Procurement Policy and procurement guide that sets out how TDC procures the products and services it needs. Refer the Procurement Policy for details.

Asset Type

8.2.1 TREATMENT PLANTS, PUMP STATIONS AND RESERVOIRS

Overall Asset Objectives:	To provide safe and clean water that meets the requirements of the Water Services Act, at the quantity required. To pump Water from WTP's and within the network to reservoirs and users at adequate flow and pressure. To provide sufficient treated water storage for contact time, demand management, and emergency requirements.

Key treatment pump station and reservoir issues are:

- Variations in source water quality e.g. due to rainfall, wind action, or algae growth
- Treatment plant capability and capacity
- Communications systems failures impacting the ability to demonstrate compliance
- The costs of providing treatment
- Managing asset failures e.g. instruments, equipment, structures
- Demand variation and impacts on contact time and emergency storage levels
- Ageing asset base e.g. reservoirs
- Asset redundancy
- Specific information on each scheme is included in Appendix A to U.

8.2.1.1 Treatment Plant, Pump Stations and Reservoirs Operations and Maintenance

Maintenance is carried out on treatment plants, pump station and reservoirs to ensure that the levels of service outlined in the Level of Service section of this document are met. A summary of the changes to operations & maintenance budgets over the course of the LTP is included within the full financial summary in Section 9.

The treatment plants are operated by TDC operators, whereas pump stations and reservoir operation is split between TDC and Downer. Specialist maintenance such as equipment calibration, reservoir cleaning, instrumentation maintenance and calibration, electrical and telemetry works are carried out by specialist contractors.

Council operates an electronic service request system to record and manage responses issues raised by the public. Assetfinda provides this function for the three waters services. Service requests can be sent directly to Council staff (e.g. to the operations or maintenance team), or externally to the three waters maintenance contractor. The three waters maintenance contractor will respond to any electrical maintenance work at treatment plants, pump stations and reservoirs, and may also be called to support the internal treatment team with reticulation type issues on their treatment sites, such as a leaking pipe. Service requests have response times and ramp through the Council hierarchy if not completed on time.

Each treatment plant has operational manuals and management plans. These can be found in the council's objective filing system as folders with files as below:

Table 8-3: Operational Manual and Management Plans

Sr. No.	***Description of file folder***	***Objective Reference no.***
1	*Standard Operating Procedures*	*fA32241*

2	Standard Maintenance Procedures	fA69218
3	Health & Safety Policies & Procedures	fA32238
4	Emergency Management Procedures	fA32237

8.2.1.2 Treatment Plant, Pump Stations and Reservoirs Renewal

Renewal expenditure is work that restores an existing asset to its original capacity or required condition. By renewing plant equipment as required the quality level of service is met. Where assets become surplus to requirements or no longer meet the required level of service, they are renewed and the existing asset either used in other schemes, sold as surplus where possible, or disposed of, which occurs normally at the end of useful life.

Over the last three years more information has been obtained which in term enables a more detailed renewals programme to be developed. Undertaking renewals at the identified time due to loss of condition will ultimately reduce the reactive maintenance and renewal spending enabling better budget planning with reduced unbudgeted expenditure.

The renewal programme is prepared through condition rating of the assets by operational staff. This information is currently stored in an excel file in objective (TDC Ref No. A309067) and is updated as required with no more than three years between condition rating and review. TDC is in the process of transferring all the assets recorded in this excel file into Assetfinda, which will in future store all asset details, condition assessment records and will be used to support renewal planning. At the stage of writing this AMP, the process is not yet complete.

Large renewals work, over $50,000 is listed individually for the first three years of the LTP. The remaining work for each plant is grouped together for the respective financial year. Business cases for these works are included in the appendices. If an unexpected renewal is required, the lesser prioritised renewal (or renewals) is deferred till the next year. Renewals that are grouped together include analysers, VSDs, dosing equipment, pump replacements, valve or bearing replacements, seals, small motors etc. Treatment Plant Creation

The section covers strategies for the creation of new assets (including those created through subdivision and other development) or works which upgrade or improve an existing asset beyond its existing capacity/performance in response to changes in capacity requirements, legislation or influent quality.

A significant reservoir renewal and strengthening programme is included in the plan. The programme focuses on renewal of existing timbertank reservoirs that have low seismic resilience first followed by concrete reservoirs some of which will be rnewed and others which are planned for strengthening works to bring them up to current seismic standards.

8.2.1.3 Treatment Plant Asset Disposal

In general where assets become surplus to requirements or no longer meet the required level of service, they are renewed and the existing asset is removed for use on other schemes, sold as surplus where possible, or disposed of, which occurs normally at the end of useful life.

A treatment plant decommissioning programme is planned as part of the 2024 LTP due to both historic and future connection of water facilities. The program will consider the following assets:

- Mapara pump station and reservoir site (redundant)
- Rainbow Point intake and WTP site (currently retained for emergency use)

- Bonshaw Park WTP and bore sites (redundant after connection to Taupo scheme)
- Whakamoenga Point intake and WTP site (redundant after connection to Taupo scheme)
- Airport pump station and reservoir site (redundant after connection to medium zone)
- Acacia Bay intake and WTP site (redundant after connection to Taupo scheme)

8.2.2 *RETICULATION SYSTEM*

Overall Asset Objective:	To safely supply throughout the pipeline network to the users at adequate flow and pressure, under all demand conditions, including providing water for firefighting capabilities.

The purpose of the WTP is to remove contaminants in the water or reduce the concentration of contaminants so the water becomes fit for its desired end-use. The reticulation system delivers this water to the end user.

Key issues relating to the reticulation system are:

- Pipeline failures due to:
  - condition and age
  - pressure surges or water hammer
  - ground instability
  - third party damage
  - tree roots
- Impact of pipeline failures
  - Property damage, flooding
  - Contamination risks
  - Negative pressures and backflow risks
  - Loss of service
- Capacity during peak flow periods
- Water loss from the system
- Backflow into system
- Stagnant areas during low demand periods
- Blockages of screens, strainers or filters
- Failure of key equipment within pump stations, treatment plants, or reservoirs and corresponding impact to the network
- Ageing asset base and major renewals backlog
- Scheme specific information is included as Appendix A to U

8.2.2.1 Reticulation Operations & Maintenance

Reticulation network maintenance is carried out by a specialist maintenance contractor. Planned work is issued by Council Network Engineers. Maintenance plans are included at the following link (TDC Ref: A2743711). Maintenance expenditure includes;

- Reactive (i.e. response to breakages, leaks, no water, taste, odour, smell complaints etc)
- Proactive (i.e. valves, hydrants, pressure reducing valves inspections / service work)
- Performance based (i.e. hydrant flow tests, backflow tests, PRV tests)

8.2.2.2 Reticulation Renewals

As presented in Section 4, water reticulation age and condition across the District is variable. There remains significant quantities of asbestos cement and galvanised pipelines estimated to

be beyond their useful life. Every year more pipelines reach end of life, and with no or insufficient renewal spending the construction backlog will increase. As the construction backlog increases, so do pipeline failure numbers, disruption to customers, and risks of contamination within the network.

Operational budgets have been utilised to develop renewals strategies for the LTP. This work was completed between 2018 and 2023 with a further update underway currently. The work has enabled the successful delivery of 2021 LTP renewal budgets of $4.5M per year. The strategy work also enabled justification of future renewals budgets for the LTP.

The aim of the renewal programme is to reverse the current upward trend in pipeline failure numbers, and to catch up to the backlog of renewals within a 10-year period. The figure below depicts the proposed reticulation renewals budget for the 2024 LTP against the construction backlog for each year from 2023 to 2037. It should be noted that the current construction backlog is forecast at in excess of $25M.

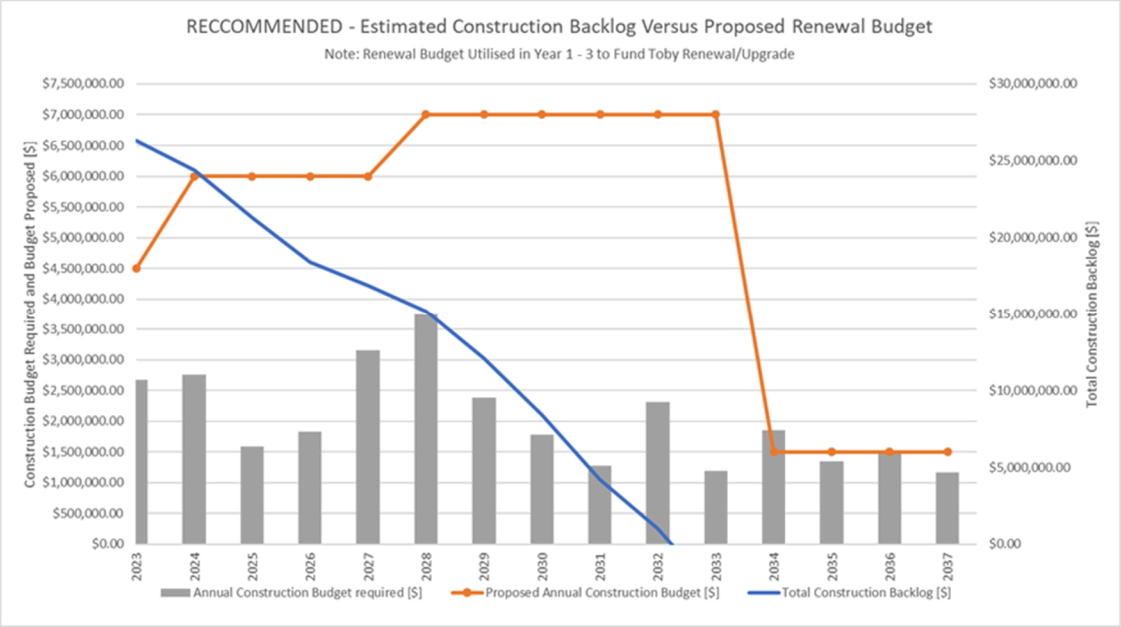


Figure 8-3: Construction Backlog and Impact of Renewals Spending

The following figure compares pipeline failure numbers and length of aged main (pipeline forecast as beyond its useful life) for two scenarios;

- no pipeline renewals spend, and
- the proposed LTP renewals programme.

With no renewals spend, failure numbers increase from approximately 200 per year to 800 per year by 2030. The proposed renewals spend scenario results in steadily reducing pipeline failure numbers and corresponding reduction in aged pipeline length.

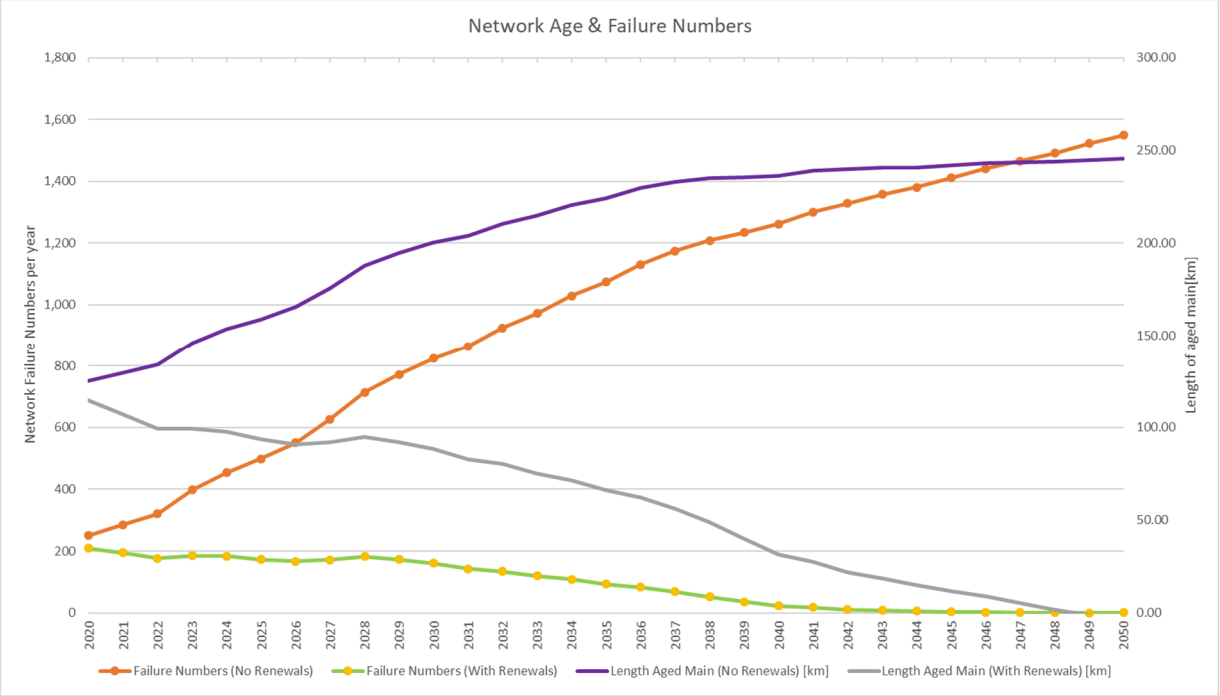


Figure 8-4: Impact of Renewals Spending on Network Age and Failure Numbers

8.2.2.3 Future Asset Creation

Future reticulation asset creation is constructed by Council or land developers. Land developers create assets as new subdivisions are constructed, with assets then becoming vested in Council.

Council has included some growth-related reticulation projects that will create new assets in the LTP. Growth-related information is included in Section 6.

Council is planning to extend the Taupo network to service the communities of Bonshaw Park and Whakamoenga Point. Extension of the Taupo network to these communities will enable compliant water to be provided to these communities. This will also create a significant amount of new reticulation infrastructure.

8.2.2.4 Reticulation Asset Disposal

Pipeline assets are generally disposed of due to renewal or upgrade projects. Standard practice is to cap old pipelines and leave them in the ground. These assets remain on the AMS and GIS mapping system to aid future queries. Valves, hydrants and other infrastructure is generally removed and disposed of. If these assets have high remaining life, then will be reused.

8.2.3 RESOURCE CONSENTS

TDC have acquired numerous resource consents for the water abstraction and treatment. Copies of these consents are filed in document management system (Objective). The table below summarises the consented water abstraction volumes for each scheme, along with the date that the consent expires.

8.2.3.1 Resource Consenting Cost

The annual resource consent and monitoring costs are included in the operations budget. Any costs associated with applying for new consent (or replacements consents) are given in Section 9, Financial Summary, financial tables.

Consent Type	Consent No	File No	Objective ID	Description	Location	Expiry Date	Issue Date	Comments on Application Progress
Water	104296	60 55 22A	A466031	Take up to 6300 m^3/day from a tributary of the Tokaanu Stream for public water supply.	Turangi	28/02/2017	12/03/2002	Application made - S37 Extension for Consultation
Water	970485	60 55 30A	A518554	Discharge filter backwash into the ground	Motuoapa	2/11/2031	2/11/2021	Current
Water	970484	60 55 30A	A466039	Take up to 45000 m^3/day from Lake Taupo for public water supply purposes	Combined	7/12/2021	14/08/1997	Current - Covers Taupo, Motuoapa, Kinloch, Hatepe, Whakamoenga, Acacia Bay, Rainbow Point & Motutere take points
Water	102792	60 01 75A	A464959	Take water from unnamed tributary of Waikato River for Mangakino town supply	Mangakino - Maraetai	30/11/2049	30/11/2019	Current
Water	105576	60 55 05A	A518607	Take up to 37,000 m^3/day of water from the Uanui Stream for Tirohanga Rural Water Supply Scheme,	Tirohonga - Atiamuri - Pokuru Rd	1/09/2021	2/10/2001	Application made - awaiting WRC feedback
Water	105580	60 55 05A	A518601	Discharge, up to 35 000 m^3/day of water to the Uanui Stream and discharge backwash associated with the cleaning of the filters	Tirohonga - Atiamuri - Pokuru Rd	1/09/2021	2/10/2001	Application made - awaiting WRC feedback
Water	109046	60 06 77A	A466025	Take up to 600 m^3/day at a max rate of 10 litres/second from Kaiwhitiwhiti Spring for water supply purposes	Tiverton Downs Rd (River Rd)	24/11/2042	24/11/2022	Current
Water	124398	60 54 63A	A983449	Filter backwash discharge into the Waihora Stream	State Highway 32 Waihora	30/04/2027	30/08/2012	Current
Water	121300	60 54 64A	A1063505	Take up to 682 m3/day of groundwater for community water supply	Whareroa	31/01/2033	31/01/2013	Current
Water	126712	60 01 86A	A1140849	Take up to 225 m3/day of groundwater for minicipal supply	Atiamuri - Moana Ave	31/07/2033	23/07/2013	Current
Water	126710	60 01 88A	A1140835	Take up to 200 m3/day of groundwater for minicipal supply	Whakamaru - Mountview Close	31/07/2033	23/07/2013	Current
Water	132689.01.01	60 54 63A		Take and use water from the Waihora Stream	Waihaha-Waihora Stream	6/11/2036	30/05/2014	Current
Water	120056	60 30 41A	A644410	Take groundwater for rural water supply purposes	Bonshaw Park	29/03/2045	29/03/2010	Current
Water	137026.01.01	60 55 08A	A1936351	To take water from the Waikato River	Centennial Drive Taupō	21/04/2047	20/04/2017	Current
Water	125017	60 55 49A	A1015888	Discharge filter backwash from town water supply	Lake Terrace - Taupō	31/10/2047	31/10/2013	Current
Water	121770	60 54 71A	A1707848	Take water from Lake Taupo at Omori	Omori - Kuratau Lakeshore Reserve	7/07/2051	8/07/2016	Current

Table 8-11: Summary of Water Resource Consents

9.0 FINANCIAL SUMMARY

9.1 Process of Determining Financial Forecast

The provisional 30-year financial forecast for water was determined by identifying new works, and the continuation/evaluation of current maintenance and renewal strategies within each of the components, i.e. reticulation and treatment plants. Changes to the operations (OPEX) and capital projects (CAPEX) expenditure for items within each of the asset types were generally due to maintaining current level of services, legislation (DWSNZ) and increased contract rates.

Council uses the following strategy for financial forecasting:

- assign realistic timing to projects given the resources available under Councils current funding sources and in relation to impacts in other Asset Management Plans.
- optimise timing of projects.
- generate consistent budgeting philosophies across all Council divisions.
- align expenditure with growth predictions.

Consultation on the final 10-year financial forecast will be carried out via the 2024-2034 LTP process.

9.1.1 IMPLICATIONS OF CHANGES BETWEEN DRAFT AND FINAL BUDGETS

[This section is a place holder and will be updated following LTP consultation periods]

9.2 Funding of Expenditure

9.2.1 FUNDING STRATEGY

The focus of this AMP is to identify the optimum (lowest lifecycle) cost for water supply and to identify the cost for each asset group necessary to produce the desired level of service. How this cash flow will be funded is outlined in Council's long-term financial strategy.

Current funding sources available for water supply include:

- Rates – income generated by the collection of general, separate, and differential rates.
- One off capital contribution – contributions made by individual developers for projects that are of particular benefit to them that are being constructed by TDC
- Development Contributions – contributions made by developers under the Local Government Act 2002.
- Private (developer) funded works – projects completely built and funded by developers where ownership is handed over to TDC on completion (vested assets).
- Connection Fees
- Interest on general funds.
- Fees and charges (ref Annual Plan for current Fees & Charges).

9.2.2 ALLOCATION OF FUNDS

The process of allocating funds is generally based on:

- Maintenance and operations are funded from General Rates.
- Renewal works are funded by Depreciation. Depreciation is calculated using either the straight line or the diminishing value method to allocate their cost or revalued amounts, net of their residual values, over their useful lives.

- New Works are funded by either or a combination of Development Contributions, Loans, Individual Contributions (e.g. underground power) and Depreciation (if it has not all been used for Renewal Works).

The funding strategy can be found within the Long-Term Plan (LTP).

9.3 Forecast Expenditure

9.3.1 OPEX: OPERATING AND MAINTENANCE EXPENDITURE

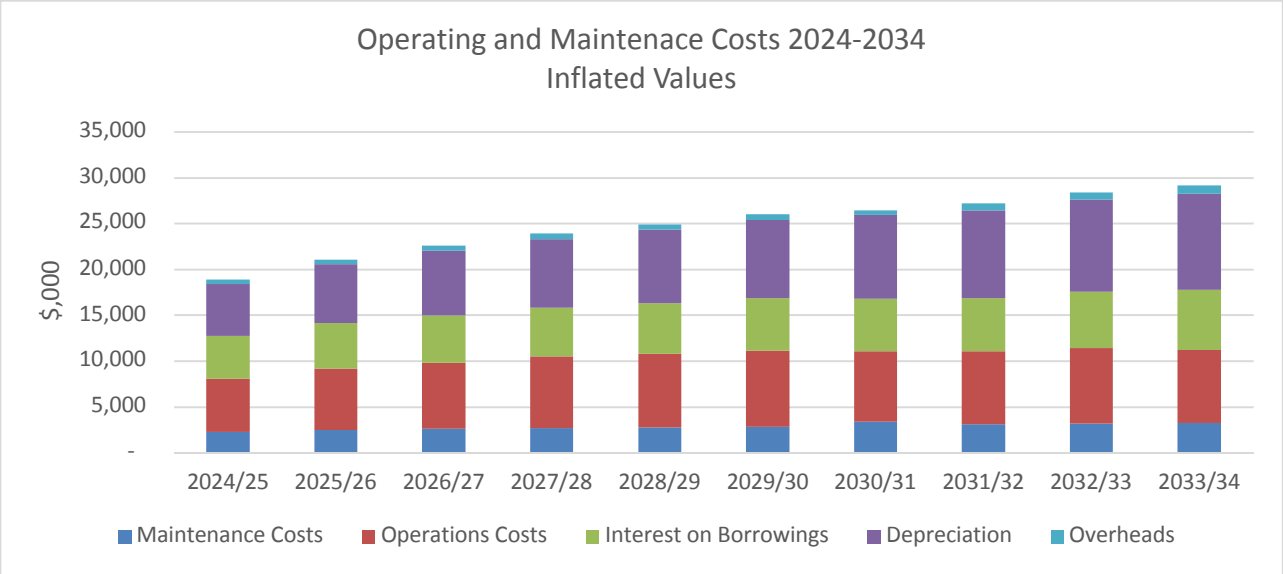


Figure 9-1: Operating and Maintenance Expenditure

Operation and maintenance costs average approximately $10.5 M/year (inflated cost). This is an increase on previous years due to inflation, additional treatment costs associated with operating and maintaining new plants, and additional network expenses due to growth in our networks.

9.3.2 RENEWAL EXPENDITURE

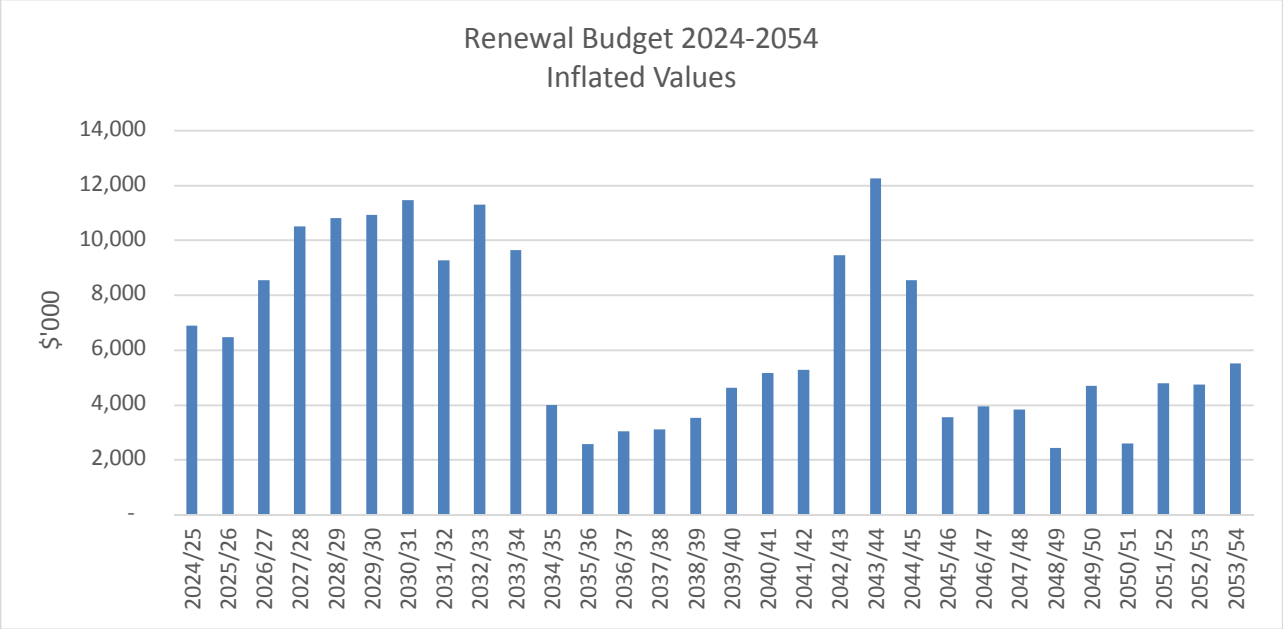


Figure 9-2: Renewals Expenditure

There is significant renewals spending predicted for the next 10 years as AC and galvanized pipework is replaced, and treatment assets are renewed.

Renewals include any items where an existing asset is replaced for example pumps, meters, valves, or filter rehabilitation etc. Renewal costs fluctuate year to year as assets with different expected lives reach the end of their useful lives or condition assessment or performance measurement determines that an asset need renewing or replacing.

Generally, the timing of renewal for an asset is based on assessment as the asset is nearing the end of its useful life. Loss in service potential is calculated by straight-line depreciation with the exception of land which is not depreciated. The depreciation rates are applied at a component level and are dependent on the remaining useful life of each component.

9.3.3 CAPEX: NEW WORKS EXPENDITURE

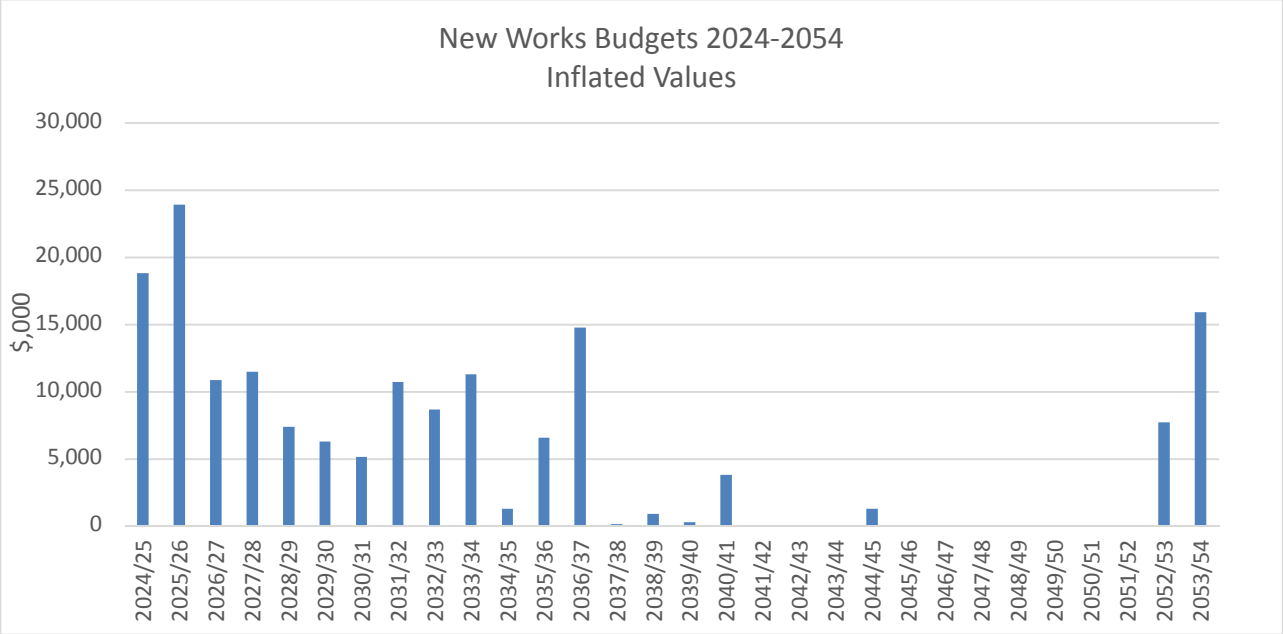


Figure 9-3: New Works Expenditure

New works over the first 3 years are predominantly related to meeting drinking water standards compliance and supporting growth and level of service achievement through network upgrades and reservoir installations.

For full project details refer to the business cases in the appendices.

9.3.4 EXPENDITURE LINKAGES TO LEVEL OF SERVICE

The expenditure links to the levels of service are detailed on the individual business cases.

9.4 Total Expenditure and Funding

Overall, the total budget fluctuates depending on the capital projects which are more significant in the first 2 years. Total water expenditure averages $52 million per year for years 1 to 10.

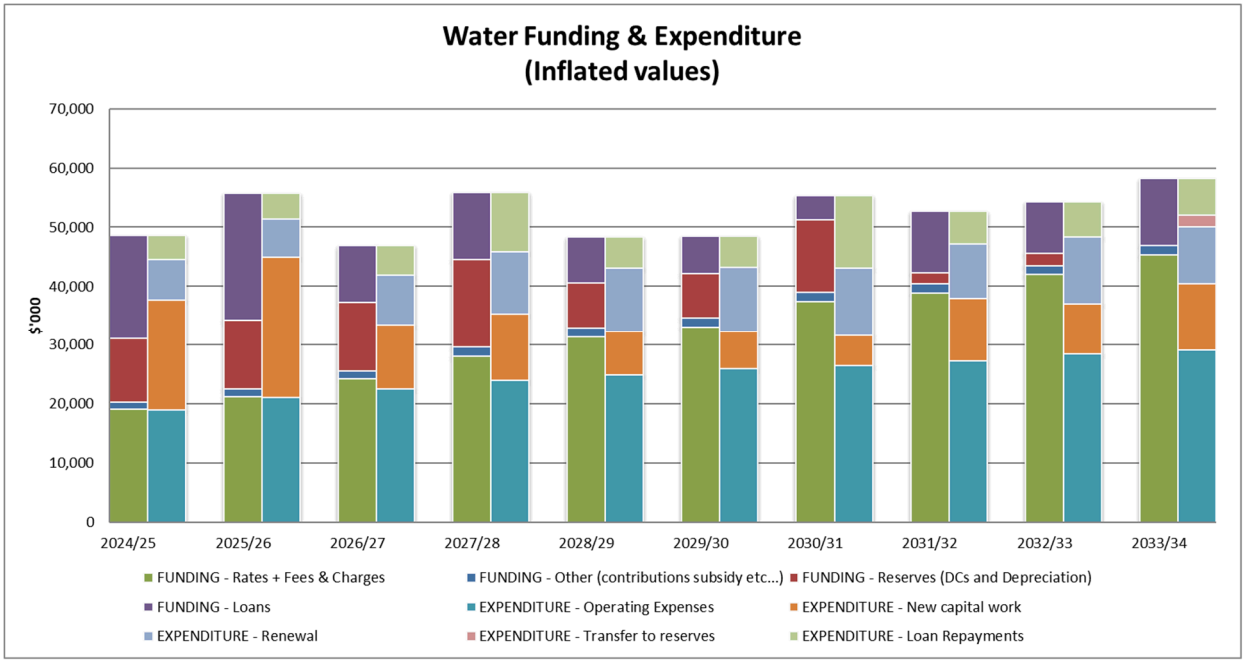


Figure 9-5: Water Funding and Expenditure

Valuation of Water Assets

Water assets provide a continuing service to the community and are not generally regarded as tradable. The cost to replace an asset with the Modern Equivalent Asset (MEA) is used as a basis to determine replacement value. This AMP is being updated with the latest Asset valuations of June 2023.

Refer to Section 4 (Asset Data), for a summary of the valuation of Water assets. A full valuation report is available on request.

9.5 Financial Assumptions

The following financial assumptions have been made. Further information can be found in the LTP document.

- Asset valuation are as at June 2023 have been used as the basis for asset values.
- The revenue received from Rates meets the expectation.
- Development Contributions Income is assumed to eventuate as predicted.
- Investment Returns eventuate as predicted.
- Interest Rate on borrowings remains as predicted within the financial model.
- Expenditure of capital projects occurs, and estimated debt levels are as predicted.
- No allowance has been made for inflation adjustment within this AMP. The source of funds for the future replacement of significant assets is stated in the revenue and Financing Policy.
- The useful lives of significant assets are as per the accounting policies documented in the LTP. Depreciation is charged at 50% for the first year and 100% in subsequent years.

9.6 Financial Confidence Levels

The confidence in the asset data used as a basis for the financial forecasts has been assessed using the following grading system from the International Infrastructure Management Manual – Australia/New Zealand Edition, 2011.

Table 9-1: Confidence Grading Table

Confidence Grade	General Meaning
A	Highly reliable. Data based on sound records, procedure, investigation and analysis, documented properly and recognised as the best method of assessment
B	Reliable. Data based on sound records, procedures, investigation and analysis, documented properly but has minor shortcomings, for example the data are old, some documentation is missing, and reliance is placed on unconfirmed reports or some extrapolation.
C	Uncertain Data based on sound records, procedure, investigation and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which grade A or B data are available
D	Very Uncertain. Data based on unconfirmed verbal reports and/or cursory inspection and analysis.

The confidence level is B+ overall. The financial cost within the first 3 years is seen as reliable with reliability decreasing with time. Also, reliability depends on the phase of project with reliability increasing as project moves from scoping to construction.

Scoping	Increasing Reliability ↓
Investigation	
Design	
Construction	

Water										
Financial Summary										
For the 2025-34 Asset Management Plan										
	2024/25	**2025/26**	**2026/27**	**2027/28**	**2028/29**	**2029/30**	**2030/31**	**2031/32**	**2032/33**	**2033/34**
Revenue										
General Rates	(1)	(1)	-	-	-	-	-	-	-	-
Targeted Rates	(18,681)	(20,880)	(23,799)	(27,719)	(31,009)	(32,723)	(37,042)	(38,470)	(41,552)	(44,921)
Operating subsidies & Other	(1,180)	(1,295)	(1,350)	(1,497)	(1,494)	(1,505)	(1,506)	(1,528)	(1,539)	(1,557)
Fees and charges	(350)	(359)	(368)	(378)	(387)	(396)	(406)	(414)	(423)	(432)
Total Revenue	**(20,212)**	**(22,535)**	**(25,517)**	**(29,594)**	**(32,890)**	**(34,624)**	**(38,954)**	**(40,412)**	**(43,514)**	**(46,910)**
Operating Expenses										
Maintenance Costs	2,254	2,486	2,580	2,644	2,719	2,777	3,381	3,076	3,141	3,207
Operations Costs	5,810	6,666	7,243	7,880	8,077	8,347	7,664	7,989	8,261	8,015
Interest on Borrowings	4,688	5,006	5,130	5,249	5,513	5,742	5,730	5,793	6,164	6,501
Depreciation	5,662	6,401	7,097	7,530	7,982	8,482	9,176	9,555	10,042	10,523
Overheads	491	505	511	596	617	643	470	795	778	900
Total Operating Expenditure	**18,905**	**21,064**	**22,561**	**23,899**	**24,908**	**25,991**	**26,421**	**27,208**	**28,386**	**29,146**
Net Deficit (Surplus) of Operations	**(1,307)**	**(1,471)**	**(2,956)**	**(5,695)**	**(7,982)**	**(8,633)**	**(12,533)**	**(13,204)**	**(15,128)**	**(17,764)**
Funded by:										
Transfers to/from Reserves	1,307	1,471	2,956	5,695	7,982	8,633	12,533	13,204	15,128	17,764
Check balance	-	-	-	-	-	-	-	-	-	-
Capital Expenditure										
Renewals	6,880	6,458	8,535	10,498	10,804	10,918	11,464	9,259	11,285	9,637
New Capital Expenditure	**2024/25**	**2025/26**	**2026/27**	**2027/28**	**2028/29**	**2029/30**	**2030/31**	**2031/32**	**2032/33**	**2033/34**
Backflow protection on tanker fill points2024 projects	50	-	-	-	-	-	-	-	-	-
Burst Valves, Level Switches - Reservoir Resilience, Renewals and Strengthening	150	133	532	-	-	-	-	-	-	-
Centennial - Treatment Compliance Upgrade	500	6,253	-	-	-	-	-	-	-	-
District - Backflow Protection on Tanker Fill Points	300	-	-	-	-	-	-	-	-	-
District - Chlorine Dosing and pH Correction Improvements	-	-	790	1,890	-	-	-	-	-	-
District - Fire Flow Improvements	100	410	-	-	-	-	-	-	-	-
District - Fire Flow Improvements Whakamaru	-	-	53	432	-	-	-	-	-	-
District - Fluoridation Programme	-	-	-	-	387	1,982	-	-	-	-
District - Reservoir Resilience, Renewals and Strengthening	-	-	-	-	-	-	-	7,518	8,462	9,010
District - Universal Smart Water Metering	500	1,025	526	3,240	3,321	3,398	-	-	-	-
Hatepe - Treatment Compliance Upgrade	1,000	5,125	-	-	-	-	-	-	-	-
Kinloch - Low Zone Reservoir Construction	-	2,563	1,737	-	-	-	-	-	-	-
Kinloch - Treatment Compliance Upgrade	4,900	-	-	-	-	-	-	-	-	-
Motuoapa - Treatment Compliance Upgrade	4,255	2,973	-	-	-	-	-	-	-	-
Motutere - Treatment Compliance Upgrade	-	-	-	-	-	-	290	2,072	-	-
Omori - Treatment Compliance Upgrade	1,600	-	-	-	-	-	-	-	-	-
Omori - WTP Rising Main	150	1,691	-	-	-	-	-	-	-	-
River Rd - Chlorine Contact Tank	-	-	316	-	-	-	-	-	-	-
Taupō - Brentwood Reservoir Construction	-	-	-	-	-	-	-	-	181	2,283
Taupō - Low Pressure Improvements	-	-	-	-	-	340	2,549	-	-	-
Taupō - Mapara Area Capacity Increase	1,000	1,435	1,316	-	-	-	-	-	-	-
Taupō - Napier Road Reservoir Construction	-	308	4,527	972	-	-	-	-	-	-
Taupō - Poihipi Reservoir Construction	-	-	1,053	4,860	3,598	-	-	-	-	-
Taupō - Tauhara Ridge Reservoir and Airport Connection	1,500	513	-	-	-	-	-	-	-	-
Taupō - Taupō WTP Capacity Upgrade	-	410	-	-	-	-	-	-	-	-
Taupō - Taupō WTP Cyanotoxin Upgrade	100	-	-	-	-	566	2,201	-	-	-
Taupō - Taupō WTP Resilience Upgrade	160	861	-	-	-	-	-	-	-	-
Taupō - Wairakei Area Capacity Upgrade	-	-	-	-	-	-	116	1,125	-	-
Taupo Water Ops Team - 2 x additional vehicle LTP Yr 1	120	-	-	-	-	-	-	-	-	-
Taupo Water Ops Team -1 x additional vehicle Starting LTP Yr 2	-	62	-	-	-	-	-	-	-	-
Taupo Water Ops Team -1 x additional vehicle Starting LTP Yr 4	-	-	-	65	-	-	-	-	-	-
Taupo Water Ops Team -1 x additional vehicle Starting LTP Yr 5	-	-	-	-	66	-	-	-	-	-
Tirohanga - Treatment Compliance Upgrade	1,500	144	-	-	-	-	-	-	-	-
Waihaha - Continuity of Supply Upgrade	350	-	-	-	-	-	-	-	-	-
Whareroa - Treatment Compliance Upgrade	560	-	-	-	-	-	-	-	-	-
Whareroa UV Upgrade2024 projects	-	-	-	-	-	-	-	-	-	-
District - Water Services to South Eastern Lakeside Communities	-	-	-	-	-	-	-	-	-	-
Whareroa - Treatment Capacity Upgrade	-	-	-	-	-	-	-	-	-	-
Centennial WTP Construction	-	-	-	-	-	-	-	-	-	-
Waihaha Storage Improvements	-	-	-	-	-	-	-	-	-	-
Turangi Additional Reservoir Construction	-	-	-	-	-	-	-	-	-	-
Total New Capital Expenditure	**18,795**	**23,906**	**10,850**	**11,459**	**7,372**	**6,286**	**5,156**	**10,715**	**8,643**	**11,293**
Total Capital Expenditure	**25,675**	**30,364**	**19,385**	**21,957**	**18,176**	**17,204**	**16,620**	**19,974**	**19,928**	**20,930**
Funded by:										
Loans raised	(17,503)	(21,442)	(9,568)	(11,334)	(7,701)	(6,452)	(4,081)	(10,456)	(8,644)	(11,294)
Loan Repayments	4,006	4,321	4,950	10,052	5,233	5,349	12,268	5,514	5,905	6,101
Subsidies & Other	-	-	-	-	-	-	-	-	-	-
Transfer from reserve(s)	(12,178)	(13,240)	(14,765)	(20,674)	(15,709)	(16,101)	(24,808)	(15,032)	(17,190)	(15,738)
	(25,675)	**(30,361)**	**(19,383)**	**(21,956)**	**(18,177)**	**(17,204)**	**(16,621)**	**(19,974)**	**(19,929)**	**(20,931)**
Funding -										
Rates + Fees & Charges	19,032	21,240	24,167	28,097	31,396	33,119	37,448	38,884	41,975	45,353
Other (contributions subsidy etc...)	1,180	1,295	1,350	1,497	1,494	1,505	1,506	1,528	1,539	1,557
Reserves (DCs and Depreciation)	10,871	11,769	11,809	14,979	7,727	7,468	12,275	1,828	2,062	-
Loans	17,503	21,442	9,568	11,334	7,701	6,452	4,081	10,456	8,644	11,294
	48,586	**55,746**	**46,894**	**55,907**	**48,318**	**48,544**	**55,310**	**52,696**	**54,220**	**58,204**
Expenditure -										
Operating Expenses	18,905	21,064	22,561	23,899	24,908	25,991	26,421	27,208	28,386	29,146
New capital work	18,795	23,906	10,850	11,459	7,372	6,286	5,156	10,715	8,643	11,293
Renewal	6,880	6,458	8,535	10,498	10,804	10,918	11,464	9,259	11,285	9,637
Loan Repayments	4,006	4,321	4,950	10,052	5,233	5,349	12,268	5,514	5,905	6,101
Transfer to reserves	-	-	-	-	-	-	-	-	-	2,026
	48,586	**55,749**	**46,896**	**55,908**	**48,317**	**48,544**	**55,309**	**52,696**	**54,219**	**58,203**

Table 9-2: Financial Table for the 30 Years 2021-2051

10.0 ASSET MANAGEMENT PRACTICES

10.1 Current Asset Management Practices

This section outlines the decision-making tools Taupo District Council (TDC) currently uses to determine long term maintenance, renewal and creation expenditure for water assets.

Council has had a consultant undertake a review of the three waters asset management plans; this review has enabled asset managers to identify particular areas in the AMP that need to be refined. The refinement process has been placed into the improvement section of the AMP. Also, an asset management team has been established to provide group support to the development of AMPs going forward.

Asset Management Plans are compiled by individual asset managers responsible for their assets. Asset Managers are also part of the Asset Management Team who work together to ensure quality outcomes. The team has key relationships with the policy division to make sure that customer expectations are understood as well as key outcomes are achieved. The Finance team also assist in the preparation of finance section. Project information as well as overall budgeting is then passed to senior management to enable further analysis as well as support. Asset management plans are then presented to Council where further prioritisation occurs.

AM practices fall under three broad headings:

Processes: The necessary processes, analysis and evaluation techniques needed for life cycle asset management.

Information Systems: The information support systems used to store and manipulate the data. The Council now seeks a solution and planning to replace the existing AMS system that can meet needs of today and future proof asset management in the future.

Data: Data available for manipulation by information systems to produce the required outputs.

10.2 Asset Management Processes

10.2.1 ATTRIBUTE DATA COLLECTION AND VALIDATION

Data collection is completed by:

- Treatment Plant operations and maintenance staff
- Water maintenance contractors and Network Engineer(s) providing updated asset information as maintenance works are completed.
- Contractors supplying data where an asset is renewed or installed
- As built data from new subdivision works

Validation is completed in a number of ways:

- Auditing internal staff and contractor's work sheets,
- Review of asset data provided in as builts by Contract Managers
- All data input into Assetfinda, and all changes made within Assetfinda can be fully tracked and traced for full quality assurance

10.2.2 NEW DEVELOPMENT APPROVALS/AS-BUILT RECORDS

The Development Engineer approves completed works and ensures that the following people are issued a copy of all final documents, e.g. plans, pipe and fire hydrant testing results.

- GIS – via the GIS help desk email address
- Utility Asset Officer (who will discuss any issues with the Asset Manager if required).

10.2.3 LEVEL OF SERVICE CONSULTATION

The level of service consultation provides feedback from residents and ratepayers of the Taupo District. The responses from this consultation provide input into how the asset is managed. More information can be found in section 5.

10.2.4 INFORMATION FROM CONTRACTORS

Processes for collection of data (maintenance, condition, new assets, renewals, performance etc.) clearly defined and efficiently administered through asset maintenance contracts.

10.2.5 STANDARD OPERATING PROCEDURES

Standard Operating Procedures are being developed to assist in the operation and maintenance of assets. This process is ongoing with new procedures being developed as the need arises and updates being made as required.

10.2.6 ASSET MANAGEMENT ACCOUNTING AND ECONOMICS

Council uses a renewal accounting system. The asset maintenance, renewal and capital expenditure policy is included in Appendix S.

Infrastructure assets are those public facilities which provide for the delivery of services and sustained standard of living. They primarily comprise the Council's fixed utility systems including roads, streets and footpaths, the water and sewerage reticulation systems, the stormwater system, bridges and culverts.

Infrastructure assets are deemed to have the following attributes:

- they are large networks constructed over several generations;
- they have very long useful economic lives;
- they have a high initial cost;
- they provide a benefit and/or a social service rather than a commercial service, i.e. the assets are used by or for the community as a whole, servicing all the City's residents and visitors The assets are not usually capable of subdivision for ready disposal, because of legal or other restrictions, and consequently are not readily disposable within the commercial marketplace;
- assets are not normally depleted as their service capability is fully maintained in perpetuity, i.e. they are expected to have an indefinite life if adequately maintained although portions of the network will be replaced from time to time.

Assets are systematically evaluated as required, approximately every three years.

Depreciated replacement cost is calculated having regard to an allowance for the expired portion of the expected useful economic life for each category of infrastructure asset.

TDC uses the principles of accrual accounting to measure costs of services provided and recognise revenues.

Renewal accounting treats all upgrading, reconstruction, renewal and renovation work which does not increase the capacity or service potential of assets as operating expenditure.

Operating expenditure can be divided into two broad categories; normal ongoing day to day routine maintenance works, and those other more infrequent larger projects that upgrade or renew the asset to its previous service potential.

Creation expenditure involves increases in an asset's service potential or the creation of new assets.

All expenditure on infrastructure assets will therefore fall into one of three categories:

10.2.6.1Routine Maintenance Expenditure

Routine maintenance projects can be expected to display some or all of the following characteristics:

- regular and ongoing annual expenditure necessary to keep the assets at their required service potential,
- day to day and/or general upkeep works designed to keep the assets operating at required levels of service,
- works which provide for the normal care and attention of the asset including repairs and minor replacements,
- minor response type remedial works i.e., isolated failures requiring immediate repair to make the asset operational again.

10.2.6.2Renewal Expenditure

Work displaying one or more of the following attributes, can be classified as renewal expenditure.

- works which do not increase the capacity or service potential of the asset, i.e. works which upgrade and enhance the assets restoring them to their original size, condition, capacity etc,
- the replacement component of augmentation works which increase the capacity of the asset, i.e. that portion of the work which restores the assets to their original size, condition, capacity etc.,
- the replacement component of a new work which replaces the redundant element of an existing asset,
- reconstruction or rehabilitation components of works involving improvements, realignment and re-grading,
- renewal and/or renovation of existing assets, i.e., restoring the assets to a new or fresh condition.

10.2.6.3 New Works Expenditure

New works expenditure projects displaying one or more of the following characteristics:

- Construction works which create a new asset that did not previously exist in any shape or form,
- Expenditure which purchases or creates a new asset (not a replacement) or in any way improves an asset beyond its original design capacity,

- Upgrade works which increase the capacity of the asset,
- Construction works designed to produce an improvement in the standard and operation of the asset beyond its current capacity.

To the extent that a project results in replacement of an asset caused by physical deterioration, and also provides capacity for increased demand, proportions should be allocated to both creation and renewals on the basis of marginal cost.

It is recommended that the split between creation and renewal expenditure is based on marginal cost. This recognises the full cost of renewing the existing asset to its original service potential is an expense as this expenditure cost does not contribute to improving the asset beyond its original design capacity.

10.2.7 THE LONG-TERM PLAN PROCESS

The Long-Term Plan (LTP) process considers the community outcomes, statutory requirements, the headline indicators and external pressures to determine what Council can or should be doing to help the community work towards its desired future.

The LTP also contains an action plan that sets out how Council will undertake its strategic goals and details the specific activities, functions and initiatives undertaken in the short term (3 years) and long term (10 years).

The LTP draws on information from other documents including the Asset Management Plans and models it in financial terms over a ten-year horizon.

The LTP is updated every three years with the next LTP being currently developed for the 2024 to 2034 period.

10.2.8 THE ANNUAL PLAN PROCESS

The Annual Plan is an action plan that sets out how Council will undertake its strategic goals and details the specific activities, functions and initiatives undertaken. It is produced in the years when a LTP is not. It will also outline deviations from the LTP.

10.2.9 STANDARDS AND GUIDELINES

In all water works there are standards and guidelines that are available to ensure that Council is following 'best practice'. This includes national standards on pipe laying, water treatment, subdivision and development and the TDC Code of Practice for Land Development.

Whereas Acts and Regulations determine minimum levels of service, standards and guidelines provide the means of compliance with specific levels of service.

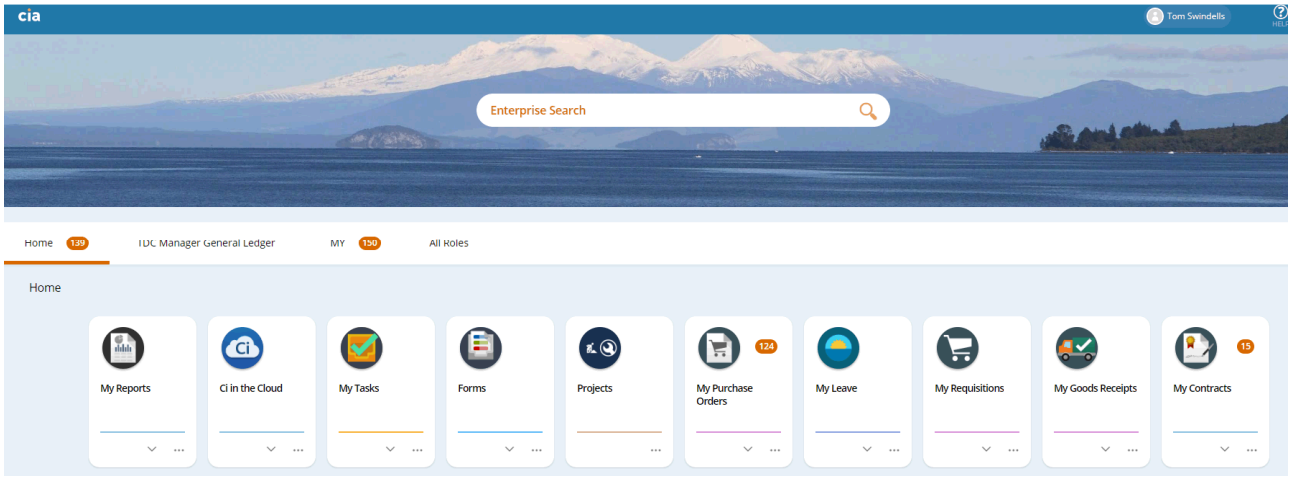
10.3 Asset Management Information Systems

10.3.1 ASSET MANAGEMENT SYSTEM

Council used Asset Finda Asset Management System that contains the data for Three waters (Water, Wastewater and Stormwater) Assets. Asset data for networks is generally complete with data on treatment plants & pump stations being transferred into the system over time from various other sources.

10.3.2 CIANYWHERE

CIAnywhere (Central Intelligence Anywhere) is an 'out-of-the-box' product made by TechnologyOne, which is being rolled out across Council as part of Project Quantum. It will be configured to meet our requirements including a wide range of modules like finance, human resources, payroll, regulatory consents, projects, and procurement. It allows us to grow with the product, meeting our needs now and into the future. As a cloud hosted solution, it allows for easier management and upgrades that occur twice a year (just like Microsoft) and is also compliant to NZ legislation. CiA start page below.



10.3.3 GIS

The GIS stores all the spatial data relating to the assets. The data is taken from the AMS.

10.3.4 SERVICE REQUEST SYSTEM

This is the system used by Council to record customer complaints, comments or compliments. The information is entered into the system when a customer calls and the call will be categorised depending the issue. Predetermined Council Staff are tasked with completing these requests in a predetermined timeframe.

The service request system is currently difficult to produce reports from. It is planned for update as part of Project Quantum when TDC will be installing a new solution from TechnologyOne. Currently trending of complaints is undertaken using Assetfinda where service requests relating to assets are also logged. Complaints are trended every month for the CEO report and annual data reported in the Annual Plan. Example below:

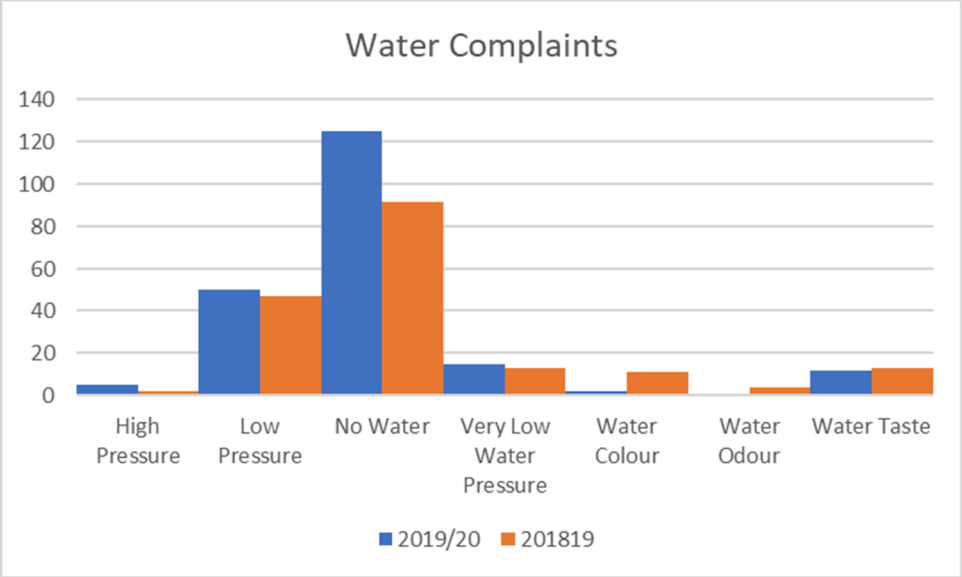


Figure 10-1: Annual Water Complaints Reporting from Assetfinda

10.3.5 ASSET VALIDATION BY CONTRACTORS

Data is collected on a daily basis by maintenance and capital works contractors. This information is then updated in the AMS.

10.3.6 SPM (DEVELOPMENT CONTRIBUTION CALCULATIONS)

Capital works project costing are inputted into SPM along with their respective breakdowns of cost e.g. proportion of the project that is growth, backlog or renewal. The level of Development Contribution (DC's) is then calculated for forward financial planning and income projections.

10.3.7 COUNCIL LABORATORY DATABASE

All results from Council's laboratory provider are stored into one central laboratory database. This database is updated by Laboratory staff and includes data from in-house testing as well as testing carried out by external laboratories. Relevant data can be extracted as required.

10.3.8 OBJECTIVE

Objective is Council's electronic document management system. All information relating to Council business is saved in this system for easy retrieval when required. This includes incoming and outgoing correspondence especially emails and letters. Objective is planned for replacement as part of Project Quantum.

10.3.9 HISTORIAN

Historian is a data management programme that allows viewing of operational data such as daily flows or plant measurements.

10.4 Data

10.4.1 ACCOUNTING COST DATA

Cost data for the asset groups are identified in the accounting records.

The work category type (maintenance, renewals, and new works) is identified. Marginal costs are only separately identified for significant works. Minor asset expenditure (traffic controls, service lanes) may not be separately identified.

Visual inspection to verify quantities for payment for routine maintenance and renewal tasks is done by the professional services business unit.

10.4.2 GROWTH MODEL

The growth model is updated on an annual basis to reflect changes in development patterns. This model predicts the spread and level of growth within the Taupo District Council Area. This model assists Asset Managers in planning forward works for their respective assets.

10.4.3 ASSET VALUATION

The asset valuation provides a three-yearly update of the value of the Water Asset. The asset valuation for the water assets is undertaken every 3 years. New assets or disposal of assets are taken into account at this time. The valuation process is performed in accordance with generally accepted accounting standards and with NZ local authority asset management practice (NAMS). The process also takes into account reviewing the useful lives of each asset type.

10.4.4 CONDITION ASSESSMENT

Condition assessments are carried out by both contractors and council staff. This process is both formal and informal. Currently all condition assessment information for the water treatment plants is stored in objective as an excel file. Reticulation conditional information is contained within contractor reports that are also saved in objective.

10.4.5 OPERATIONAL DATA

Operational data is available on objective, on site and through Historian.

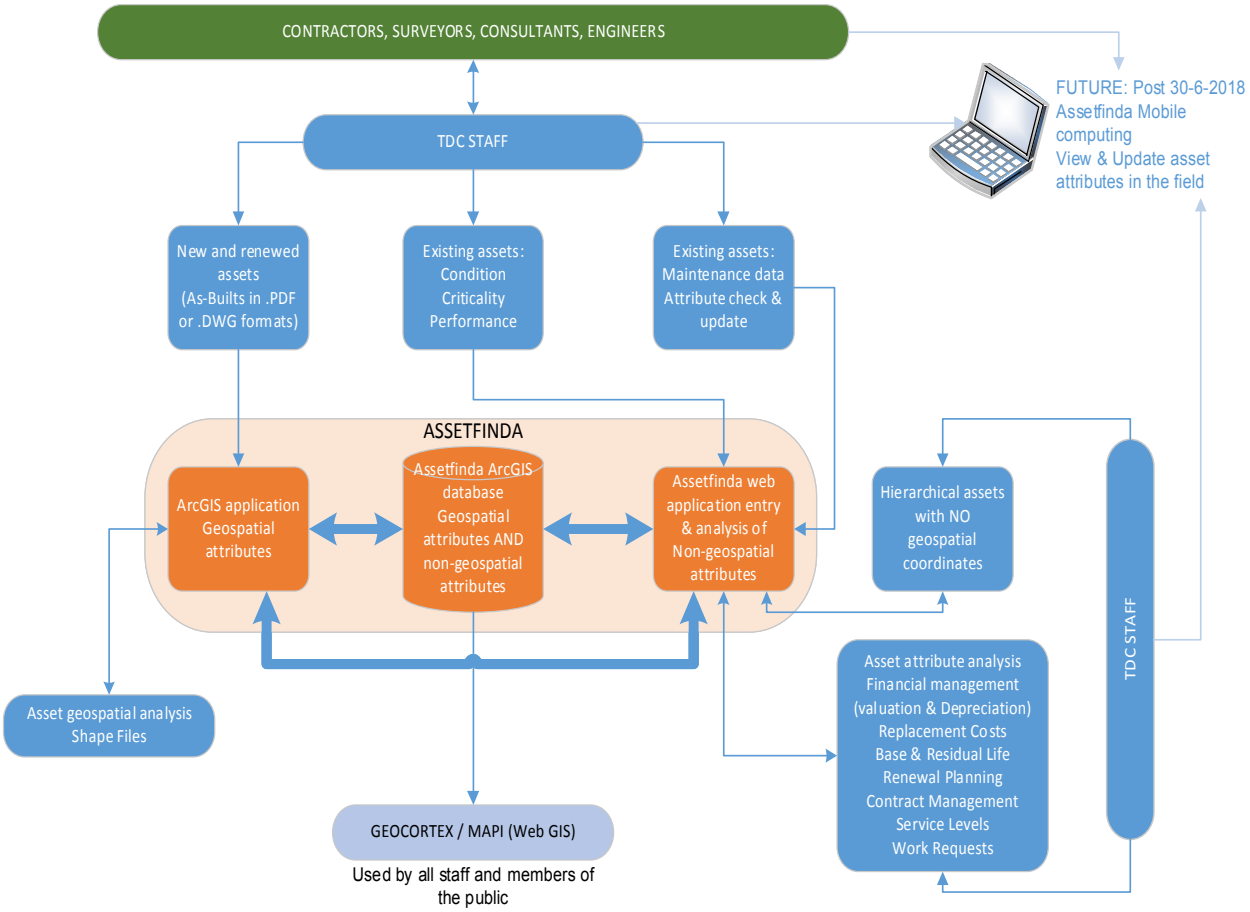


Figure 10-2: Asset Management System / GIS Data Recording Flow

10.4.6 DATA QUALITY ASSURANCE

The following are quality assurance regimes:

- Data Collection:
  - The contractor is responsible for GPS data collection following council standards (council doesn't accept any data with more than 0.3 m error in GPS coordinates).
  - TDC staff is continuously collecting data for historical assets which are updated after verification.
  - Project management team provides as built and field data and advice AMS team to update the information in asset register and or GIS.

- Data entry: Currently council is doing manual entry of the data using ArcGIS import capabilities CAD files and PDF files.

- Data maintenance: This is partially done by council staff whenever the contractor finds any variance in existing data and physical asset in the ground. As regards to the WWTP and pump stations operating staff and contractors' staff are continuously validating and updating the conditions of the asset and informing the AMS team. In future it is envisaged that some efficiency will be developed with upgrade of AssetFinda and field staff will be able to update asset attributes directly and it will be validated using quality assurance protocol developed at that time.

11.0 IMPROVEMENT PLAN AND MONITORING

11.1 Improvement Plan

Improving the management of Taupo District Council's water assets is a continual and on-going process. During the course of updating this plan, AM improvement tasks have been noted for follow-up over the next three years in conjunction with reviewing and improving this plan. This programme reflects the overall aim of improving asset management practices, which is to deliver the right level of service at the lowest long-term cost to TDC's customers.

The highest improvement tasks all focus on meeting that goal by:

- Ensuring the right level of funding is being allocated to maintain the asset service potential.
- Implementing predictive modelling techniques that will allow consideration of alternative long term cost scenarios.
- Consulting with customers to ensure that their views are considered when selecting the best scenario.
- On-going NAMs training is provided for staff involved in the production of the asset management plans to facilitate best management of the assets.
  Asset Managers participate in the Council's asset management planning team which facilitates improvements in planning for all categories of assets.

11.1.1 BACKGROUND

The Asset Management Plan (AMP) is updated every three years in advance of the LTP cycle to reflect changes in national policy and local thinking. Audit NZ audited the 2021 AMP and in addition the AMP was independently peer reviewed by Waugh consultants. Implementation of improvements identified as part of these reviews were delayed due to the ongoing water reform programme.

Due to uncertainty around the water reform programme the improvement plan has not been updated but will be completed for the next iteration of this AMP.

11.2 Improvement Programme

Due to uncertainty around the water reform programme the following improvement programme has not been updated for the 2024 AMP. The programme will be updated for the next iteration of this AMP.

Section	Area for improvement	Identified by:	Action/task description	Priority	Target date	Cost/resources		Status
						Cost $	Resource	
3 WATERS COMMON WEAKNESSES								
	Multiple Sections	Waugh Report 2018	A significant amount of information, data and actions are inferred within the AMPs, but the AMP documents does not provide demonstration of this information, data and actions. Including graphs showing asset age/installation year, materials, sizes, breaks/material, CCTV results/records, service request trends, satisfaction survey trends, will aid in telling the story. Identifying and discussing the 'Key Issues' for each asset group/service at the front of each AMP will aid reader understanding		2024	Internal time only	Asset manager	Ongoing. Included renewal graphs, material, condition graphs (network) Included water loss targets and 2020 results, included trend data for water use Included fire hydrant testing data
4.0 Asset Data								
	Data Confidence	Waugh Report 2018	Section 4.3 provides good description of data confidence i.e. asset data and financial data, but this can be improved upon by distinguishing between above/below ground or reticulation/treatment assets as generally there is a significant difference between data confidence of these asset sets		2024	Internal time only	Asset Manager	Paragraph included with detail of network asset confidence. No new calculation completed. Ongoing
	Asset Register	Improvement	Inventories and condition assessment to be completed for all water treatment plants, reservoir and pump stations (including toby, Fire hydrant, valves & meters). This was first noted in the peer review of the Asset Valuation completed in 2009.	1	2024	Internal time only	Information Manager / Asset Manager	Network complete. Treatment will be completed as assets move into Assetfinda. Ongoing
	Asset Register	Improvement	Continue to maintain, develop and improve the asset register. Continue to monitor new developments in AMS for any improvements in its asset valuation programme.		Ongoing	Internal time only	Information Manager / Asset Manager	Ongoing
5.0 Level of Service								
	Level of Service		Gauge customer opinion more thoroughly as part of increased consultation.	2	2021	Internal time only	Policy Team	To consider consultation to feed into 2024 LTP Ongoing
	Levels of Service	Audit NZ Review	Expanding the capital expenditure linkage detail within the AMPs to include linking capital expenditure to demand, maintenance or renewal, in addition to Levels of Service.		2024	Internal time only	Asset Manager	
6.0 Future Demand								
	Future Demand	TDC Identified Improvement	Update growth projections to resolve uncertainties in current data and forecasts	Added Nov 2020	2024	$50k Est	Policy Team	
7.0 Risk Management								
	Risk Management	Waugh report 2018	The risk section can be enhanced through discussion of resilience and referencing 100Resilient Cities website etc		2024	Internal time only	Risk Manager / Asset Manager	Nov 2020 Discussing with Risk Manager
8.0 Lifecycle Management								
	Asset Maintenance	Audit NZ Review	Asset maintenance activities within AMPs are at a very high level and would benefit from greater granularity.		2024	Internal time only	Asset Manager	

Section	Area for improvement	Identified by:	Action/task description	Priority	Target date	Cost/resources		Status
						Cost $	Resource	
	Lifecycle Management	Audit NZ Review	The asset lifecycles and asset management processes within AMPs are at a very high level and would benefit from greater granularity.		2024	Internal time only	Asset Manager	
9.0 Financial Summary								
	General	Improvement	Consider devaluing assets based on condition rather than birthday life. Implement the necessary procedures for the revaluation. Include disposal strategies where appropriate.	2	Ongoing	Internal Time Only	Condition assessment and updating asset register is ongoing, after which we can review valuation processes.	Ongoing
10.0 Asset Management Practices								
	Condition Assessment	Audit NZ Review	Condition assessments are performed, however the condition grading model as per the NAMS IIMM manual is not detailed in the AMPs.		2024	Internal time only	Asset Manager	
11.0 Improvement Plan & Monitoring								
	Improvement Programme	Waugh Report 2018	The Improvement Programmes show resources (internal/outsource) but doesn't assign specific responsibility to items or estimated time and costs. This undermines the demonstration of commitment to completion of Improvement Items.		2021	Internal time only	Asset Manager	Complete – added owners and timeframes to all items
		Waugh Report 2018	There is no mention of any sensitivity analysis			Internal time only	Asset Manager	

Table 11-1: Improvement Plan

11.3 Monitoring & Review Procedures

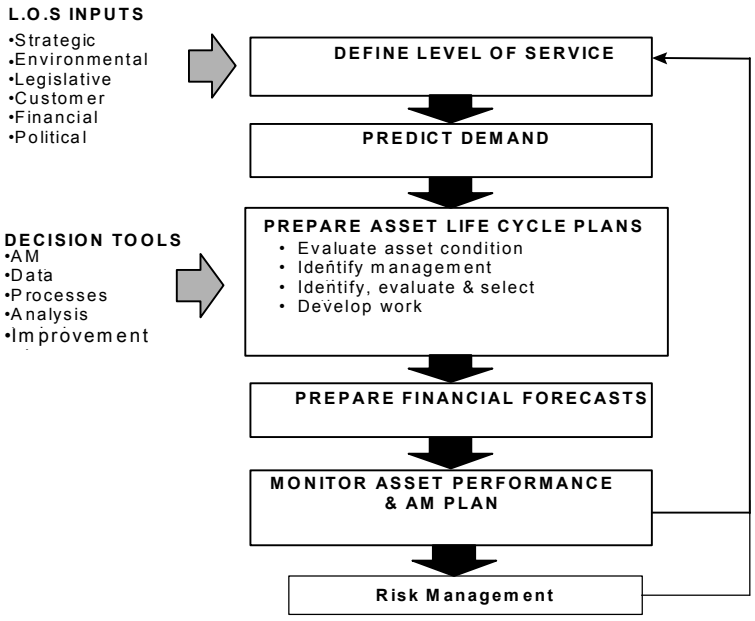
The most important review procedure is the 3-yearly review of the AMP that takes into account asset performance during the previous 3 years and identifies future trends and input into Council's strategic planning process. The 3 yearly cycle of TDC strategic planning is as shown in below.

Figure11-1: TDC Three Yearly Planning Cycle

Year	2022	2023	2024	2025	2026	2027
Activity	Structure planning	Review of asset management plans	LTP amendment	Structure planning	Review of asset management plans	LTP amendment

The framework for the 3-yearly review of the AMP in terms of the breadth of considerations is illustrated in the following figure.

Figure 11-2: Asset Management Plan Review Procedure



GREAT LAKE TAUPŌ
Taupō District Council

Appendix A

ASSET MAINTENANCE, RENEWAL AND CAPITAL EXPENDITURE POLICY

PURPOSE

The Asset Management Policy is aligned with Council's vision "To be the most prosperous and liveable district in the North Island by 2022" and the long-term strategic goals found in the 2018 LTP of:

- Ensure that the Taupo District remains a great place to live
- Promote economic development
- Protect our water resources and use them wisely
- Maintain the quality infrastructure that we have
- Keep rates and debt affordable

OBJECTIVE

The objective of Council's Asset Management Policy is to:

- ensure service delivery is optimized to deliver agreed community outcomes and levels of service for both residents, visitors and the environment
- optimize expenditure over the life cycle of the assets
- risks and opportunities are identified and managed appropriately
- provide a
- service delivery that is sustainable for today and future generations

PRINCIPLES

The following principles will be used by Council to guide asset management planning and decision making:

- effective consultation with the community to determine appropriate levels of service
- Integration of asset management within Council's strategic, tactical and operational planning frameworks including corporate, financial, and business planning
- Informed decision making using lifecycle cost and risk management and the inter-generational approach
- Transparent and accountable asset management decision making
- Sustainable management of assets for present and future needs

CORPORATE FRAMEWORK

This Asset Management Policy links to Council's LTP, Infrastructure and Financial Strategy and Asset Management Plans. It builds on Council's strategic goals by promoting an integrated approach to the management of service delivery and across all asset classes.

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STRUCTURED ASSESSMENT of ASSET MANAGEMENT PRACTICE

Council has undertaken a structured assessment of the appropriate level of asset management practice for each of the asset classes. This structured assessment follows the guidelines provided in Section 2.1.3 of the International Infrastructure Manual (IIMM 2011v4). The level of maturity determined for each asset class can be found in Section 1 - Introduction of the respective Asset Management Plan.

REVIEW of POLICY

This Asset Management Policy has informed the development of the 2018 asset management plans. It will be reviewed prior to undertaking asset management plan updates to support the 2021 LTP.

MATURITY ASSESSMENT

In the first quarter of 2015 the maturity level of each of the Asset Management Plans was assessed through an external review process to determine the actual level of maturity. This review formed the basis for the further refinement of each of the AMP's Improvement plans.

Further assessments will be undertaken every three years to determine the progress of improvements to the maturity level of the AMP's.

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Appendix B

BUSINESS CASES

Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction

Investment/Project Name:	Centennial – Water Treatment Compliance Upgrade
Project Purpose:	Provide safe and compliant water to users on the Centennial Treated water scheme.
Business Need:	Centennial Water Treatment Plant cannot currently provide safe and compliant drinking-water and additional capacity is needed to enable growth to occur. Project provides opportunity to improve reservoir resilience.
Background:	**This project will be designed in 2023/24. This project should not be deferred as it enables major industrial growth plans on Rakanui Rd. If deferred, another major pipeline upgrade project will need to be included.** The treated water at Centennial WTP does not meet the compliance requirements of the Drinking Water Standards New Zealand (DWSNZ). This is largely because the plant does not treat protozoa or arsenic. A study was completed during 2022/23 to determine if it was better to build a new water treatment plant or to connect the Centennial scheme to the Taupo scheme. The study determined that connecting Centennial to the Taupo scheme was the best option.
Project Description:	Pump station and pipeline from Taupo scheme to Centennial and reservoir upgrade and renewal at Centennial.
Project Location:	Taupo
Project Complexity:	Quest

Strategic Case

The primary driver for this business case is Looking after Public Health and Safety. This includes the long-term effects of those drinking water containing low levels of Arsenic, and the risk of widespread illness from a water contamination event such as that caused by Cyanotoxins, Giardia or Cryptosporidium which currently the treatment plant has no barrier to remove. The secondary driver for this business case is regulatory compliance with the Water Services Act 2021 and the Water Services Regulations 2022 (Drinking Water Standards for NZ). The tertiary driver is maintaining levels of service for our current and future customers on the scheme including providing capacity for planned growth and appropriate security of supply and resilience in a disaster.

Primary:	Looking after Public Health & Safety	4
Secondary:	Being Legislatively Compliant	4
Tertiary:	Maintaining Levels of Service	4
Investment objectives:	Providing high quality drinking water to Centennial scheme users that complies with the DWSNZ and reduces risk of public health issues. Reliable water supply that is not prone to shut down due to poor water quality. Improved customer satisfaction with water supply quality. Improved resilience of supply including provision of appropriate reservoir storage that will be available for disaster recovery. Supply has sufficient capacity to cater for industrial growth in the centennial area.	
Opportunities:	As part of the project the existing treated water reservoirs require upsizing. We will take this opportunity to design new resilient reservoirs to importance level 4 standard so they can provide disaster resilience in the area.	

Potential Scope & Contextual Considerations

Minimum scope:	DWSNZ compliant water is supplied to Centennial scheme users from the Taupo scheme with sufficient capacity for existing users and planned growth.
Desirable scope:	**DWSNZ compliant water is supplied to Centennial scheme users from the Taupo scheme with sufficient capacity for existing users and planned growth.**

	Renewal and upgrade of existing treated water reservoirs to ensure sufficient capacity and design for resilience (IL4 structures).
Aspirational scope:	
Excluded scope:	Construction of a new water treatment plant at Centennial.
Stakeholders:	Senior management, Councillors, Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team.
Constraints:	Pipeline route and pump station location to be confirmed.
Assumptions:	
Risks if project was deferred:	Non-compliance with the Water Services Act and DWSNZ Public health risks Community complaints due to poor water quality, loss of supply or sickness Inability to provide sufficient water to cater for planned growth in the area – **If this project is deferred a separate growth project will need to be added.** Lack of disaster resilience of current system
Risks of doing the project:	Additional pump station and network pipelines to manage and operate Community pushback on the costs of the project Project utilises Taupo scheme growth capacity and impacts timing of future upgrade of the Taupo WTP and residential water metering in Taupo.

Options Analysis (add more options if applicable)			
Add more options if applicable	Option One: Change Nothing	Option Two: Upgrade Centennial WTP	Option Three: Connect to Taupo Scheme
Overview:	• The 'do nothing' option means Council will continue to provide water to the community via the current treatment plant at Centennial. • The reservoir and pipeline feeding the plant will still need upgrade to cater for planned growth.	• Upgrade the treatment plant to meet all requirements of the DWSNZ. • New wastewater pipeline from plant back to Taupo wastewater network to transfer plant waste for treatment. • Upgrade the treated water reservoirs and pipeline feeding the plant to cater for planned growth.	• Construct a new pump station and pipeline from the Taupo scheme to feed the centennial treated water reservoirs. • Upgrade the treated water reservoirs to cater for planned growth.
Advantages:	• Lowest budget required • Caters for growth and improves resilience with new reservoir construction	• Significantly improved and DWSNZ compliant Water supply. • Reduced health risks as the community will receive high quality treated water • Independent water treatment plant provides additional resilience. • Caters for growth and improves resilience with new reservoir construction • Compact construction site	• Significantly improved and DWSNZ compliant water supply. • Reduced health risks as the community will receive high quality treated water • Lower capital cost than new plant option. • Lower operational cost than new plant option. • Caters for growth and improves resilience with new reservoir construction • Pipeline between schemes may support future long term resilience in area
Disadvantages:	• Continuation of noncompliant water supply. • Legislative noncompliance with risk of • fines or other legal action • Potential health risks to the community because of consuming potentially contaminated source water. • Reduced or negative community perception of TDC. • Lack of resilience in a disaster	• High capital costs of upgrade. • Additional treatment processes to achieve DWSNZ requirements require high OPEX costs.	• Uses some of Taupo WTP growth capacity which will result in need for earlier upgrade on plant and universal residential water metering • Increases reliance on Taupo WTP • Significant pipeline project with large construction area •
Costs:	Capex $4.5M approximately Opex $ no change	Capex $13.2M Opex $300k/annum	Capex $7.4M ($0.8M budget already available) Opex $no significant change from existing
Achievability:	This option is achievable but not acceptable from a public health and legislative perspective.	This option is highly achievable.	This option is highly achievable.
Recommendation:	The preferred option is option 3, desirable scope. This is based on a detail options assessment including whole of life comparison.		

Delivery		

Delivery details:	Multi-year project delivery to include:
	• Design Year 0 (2023/24)
	  ○ Network modelling – outsourced
	  ○ Network and PS design – outsourced
	• Procurement and Construction Year 1 and 2 (2024-2026)
	  ○ Civil works design and procurement via NZS3910 contract to water reticulation panel contractors
	  ○ Project management – in-house	

Outputs:	Modelling Report	
	Design Report	
	Tender Document	
	Contract Document	
	Construction QA including As Built Drawings and Manuals	

for the recommended option describe and assess the risks (see risk matrix in the appendix):			
Risk	**Likelihood**	**Impact**	**Score**
Construction H&S risks	Unlikely	Major	Medium
Option not acceptable to iwi	Unlikely	Moderate	Medium
Option unacceptable to external parties (NZTA)	Unlikely	Major	Medium
Environmental Risk	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

For example

Estimated Project Start	1-Jul-24 1-Jul-24		**Estimated Project Finish**	30-Jun-26							
	2024/25	**2025/26**	**2026/27**	**2027/28**	**2028/29**	**2029/30**	**2030/31**	**2031/32**	**2032/33**	**2033/34**	**LTP Total**
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	(2,850,000)	(3,750,000)	-	-	-	-	-	-	-	-	(6,600,000)
Implementation Opex	-	-	-	-	-	-	-	-	-	-	-
Direct Opex	-	-	-	-	-	-	-	-	-	-	-
Total Cash Outflow	**(2,850,000)**	**(3,750,000)**	-	-	-	-	-	-	-	-	**(6,600,000)**
Net Cashflow	**(2,850,000)**	**(3,750,000)**	-	-	-	-	-	-	-	-	**(6,600,000)**

Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction

Investment/Project Name:	**District - Chlorine Dosing and pH Correction Improvements**
Project Purpose:	Ensuring our water treatment networks can meet the compliance requirements of the Water Service (DWSNZ) Regulations 2022 in relation to: - Chlorine dosing and monitoring - pH of treated water
Business Need:	Same as Project Purpose
Background:	**This project is required to enable compliance however is not as critical as treatment upgrades and could therefore be deferred to years 4 and 5 if needed for affordability.** The Water Service (DWSNZ) Regulations 2022 have changed from previous standards in relation to chlorine dosing, monitoring and pH levels. The changes include: 1. Maximum treated water chlorine levels have reduced to 1.0mg/L 2. Additional network monitoring of chlorine levels required on large schemes 3. Treated water pH must be maintained between 7.0 and 8.5 to reduce plumbosolvency. To meet these requirements the following upgrades are needed: - Installation of 5 (estimated) chlorine booster dosing sites - Installation of 17 (estimated) chlorine monitoring sites in our networks - Installation of pH correction processes at Mangakino and Turangi
Project Description:	Installation of Cl2 booster dosing stations and Cl2 monitoring sites at a number of points in our larger networks to ensure aesthetic values for chlorine are not exceeded. Installation of pH correction processes to Mangakino and Turangi treatment plants.
Project Location:	District
Project Complexity:	Paint by Numbers

Strategic Case

The primary driver for this business case is Looking after Public Health and Safety. The secondary driver for this business case is regulatory compliance with the Water Services Act within which Council has a duty to ensure that the drinking water supplied is safe. The tertiary driver is maintaining levels of service. Doing this project reduces the chances of losing services which are critical for the townships to operate.

Primary:	Looking after Public Health and Safety	3
Secondary:	Being Legislatively Compliant	4
Tertiary:	Maintaining Levels of Service	3
Investment objectives:	Providing high quality drinking water that complies with the DWSNZ. Providing high quality drinking water that prevents public health issues. Water supply that is not plumbosolvent or corrosive Improved customer satisfaction with water supply quality.	
Opportunities:	Packaging of treatment plant upgrades to allow streamlined procurement and to take advantage of efficiencies in delivery.	

Potential Scope & Contextual Considerations

Minimum scope:	- Installation of 5 (estimated) chlorine booster dosing sites - Installation of 17 (estimated) chlorine monitoring sites in our networks - Installation of pH correction processes at Mangakino and Turangi
Desirable scope:	
Aspirational scope:	

Excluded scope:	
Stakeholders:	Senior management, Councillors, TDC property team Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team, TDC Network Engineers
Constraints:	Existing land availability.
Assumptions:	Source water quality remains the same as current
Risks if project was deferred:	Non-compliance with the DWSNZ and Water Services Act Public health risks Community complaints due to poor water quality, loss of supply or sickness Fines, legal action, enforced upgrade costs.
Risks of doing the project:	Increased operational costs Increased operational complexity Community pushback on the costs of the project

Options Analysis (add more options if applicable)					
Add more options if applicable	Option One: Do Nothing		Option Two: Complete Upgrades as proposed		
Overview:	• The 'do nothing' option means Council will continue to provide water without the identified upgrades		• Installation of 5 (estimated) chlorine booster dosing sites • Installation of 17 (estimated) chlorine monitoring sites in our networks • Installation of pH correction processes at Mangakino and Turangi		
Advantages:	• No capital cost to TDC.		• Significantly improved and DWSNZ compliant Water supply. • Reduced health risks as the community will receive high quality treated water • Reduced plumbosolvency of water		
Disadvantages:	• Continuation of non-compliant water supply. • Legislative non-compliance with risk of fines or other legal action • Reduced or negative community perception of TDC. • Other as detailed under risk of not doing		• High capital costs of upgrade and high ongoing operational costs. • Additional treatment processes to achieve DWSNZ requirements require additional ongoing operating costs.		
Costs:	Capex $0 Opex $No change			Capex	Opex
			Cl2 Monitoring	$0.75M	$49k/annum
			Cl2 Booster	$1.0M	
			pH Correction	$0.75M	$222k/annum
Achievability:	This option is achievable but not acceptable from a public health and legislative perspective.		This option is highly achievable.		
Recommendation:	Proceed with option 2 as this provides the best outcome for the communities.				

Delivery		
Delivery details:	Multi-year approach as programme of works: - Year 0 (2023/24)– Chlorine modelling and design work (underway) - Year 3 – Monitoring installations, design and build - Year 4 – Data Analysis and Booster installation design and build, pH Correction installation at Mangakino and Turangi	
Outputs:	Design reports	
	Engineering Design and Contract Documents	
	Construction QA including As Built Drawings and O&M Manuals	

for the recommended option describe and assess the risks (see risk matrix in the appendix):

Risk	Likelihood	Impact	Score
Construction H&S risks	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

For example

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	7,000	-	-	7,000
Efficiencies	-	-	-	-	-	-	-	1,375	1,500	1,500	7,375
External Funding	-	-	-	-	100,833	9,167	-	-	-	-	110,000
Total Cash Inflows	**-**	**-**	**-**	**-**	**100,833**	**9,167**	**-**	**8,375**	**1,500**	**1,500**	**124,375**
Cash Outflows											
Implementation Cost	-	-	-	-	(201,667)	(220,000)	(220,000)	(18,333)	-	-	(660,000)
Implementation Opex	-	-	-	-	(6,050)	(550)	-	-	-	-	(6,600)
Direct Opex	-	-	-	-	-	-	-	-	(8,067)	(733)	(17,600)
Recurring Opex	-	-	-	-	-	-	-	(2,017)	(2,200)	(2,200)	(10,817)
Total Cash Outflow	**-**	**-**	**-**	**-**	**(207,717)**	**(220,550)**	**(220,000)**	**(20,350)**	**(10,267)**	**(2,933)**	**(695,017)**
Net Cashflow	**-**	**-**	**-**	**-**	**(106,883)**	**(211,383)**	**(220,000)**	**(11,975)**	**(8,767)**	**(1,433)**	**(570,642)**

Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction

Investment/Project Name:	District - Fire Flow Improvements
Project Purpose:	Upgrade of pipe network in Kinloch and Whakamaru to enable residential fire flow standards to be met.
Business Need:	As above.
Background:	**Deferral of this project is not recommended as it will impact development in Kinloch.** Areas of Kinloch and Whakamaru cannot currently achieve residential fire flow standards. In Kinloch, new development areas are affected and the issue needs resolving asap to ensure planned growth areas can be developed. In Whakamaru the issue is historic but still needs resolution. The NZ Firefighting Water Supplies Code of Practice details the flow and pressure requirements needed to provide sufficient fire fighting water. New development areas in Kinloch do not currently meet the required standards including in particular all growth land from the 7 Oaks development north. In Whakamaru the area affected is the area of local shops and surrounding residential housing in the Forest View Road area. To resolve the constraints, approximately 3.5km of new pipelines need to be constructed.
Project Description:	Upgrade of the following pipelines to enable fire flow to be achieved: - 1100m of 150mm pipe in the Kinloch high zone to 250mm PE. - 1100m of 50mm pipe in the Kinloch low zone to 180mm PE. - 1100m of 100mm pipe in Whakamaru to 180mm PE.
Project Location:	District
Project Complexity:	Paint by Numbers

Strategic Case

The primary driver for this business case is maintaining levels of service which are currently not met in relation to providing sufficient fire flow. Due to the lack of fire flow, public health and safety is the secondary driver and legislative compliance to the code of practice is the tertiary driver.

Primary:	Maintaining Levels of Service	2
Secondary:	Looking after Public Health and Safety	2
Tertiary:	Being Legislatively Compliant	1
Investment objectives:	Upgrade of water network in Whakamaru and Kinloch to ensure fire flow can be achieved for all current and future residents.	
Opportunities:	Some funding may be able to be pushed unto developer via developer agreements (DOA).	

Potential Scope & Contextual Considerations

Minimum scope:	Upgrade of the following pipelines to enable fire flow to be achieved: - 1100m of 150mm pipe in the Kinloch high zone to 250mm PE. - 1100m of 50mm pipe in the Kinloch low zone to 180mm PE. - 1100m of 100mm pipe in Whakamaru to 180mm PE.
Desirable scope:	
Aspirational scope:	
Excluded scope:	
Stakeholders:	Senior management, Councillors, TDC property team Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team, TDC Network Engineers
Constraints:	Need to install pipelines through newly developed areas of Kinloch

Assumptions:	Developer pays for 50% of Kinloch high zone pipeline upgrades
Risks if project was deferred:	Fire flow will not be achieved in areas of Kinloch and Whakamaru Non-compliance with our levels of service and the National code of practice Likely to be some challenge from developers regarding the project
Risks of doing the project:	Community pushback on the costs of the project Community may not be happy with the need to install pipelines through newly developed areas of Kinloch

Options Analysis (add more options if applicable)			
Add more options if applicable	Option One: Do not complete project	Option Two: Upgrade networks as planned	Option Three: Complete Whakamaru Upgrade,
Overview:	• No change	• Pipelines upgraded as per programme	• Complete Whakamaru upgrade • Leave Kinloch Upgrade for developers to Fund when needed
Advantages:	• Cheapest capital budget option	• All work completed in timely manner • Costs at Kinloch can be billed to developers through DC contributions / DOAs	• Whakamaru work complete in timely manner • Reduced capital cost over Option 2
Disadvantages:	• Fire flow not achievable in Kinloch and Whakamaru	• Capital Cost	• Major argument with developers likely in Kinloch • Timing of Kinloch upgrades cannot be confirmed
Costs:	Capex $ 0 Opex $ 0	Capex $ 1.45M over 4 years Opex $ 0	Capex $450k over 2 years Opex $0
Achievability:	Yes	Yes	Yes
Recommendation:	Proceed with option 2 which provides the best outcome.		

Delivery		
Delivery details:	Multi-year approach - Planning and designs through consultant panel (in place) - Construction via contractor panel arrangement (in place) - Material supplier via preferred supplier agreements (in place)	
Outputs:	Engineering Design and Contract Documents	
	Construction QA including As Built Drawings and Manuals	

for the recommended option describe and assess the risks (see risk matrix in the appendix):			
Risk	**Likelihood**	**Impact**	**Score**
Construction H&S risks	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

For example

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	7,000	-	-	7,000
Efficiencies	-	-	-	-	-	-	-	1,375	1,500	1,500	7,375
External Funding	-	-	-	-	100,833	9,167	-	-	-	-	110,000
Total Cash Inflows	**-**	**-**	**-**	**-**	**100,833**	**9,167**	**-**	**8,375**	**1,500**	**1,500**	**124,375**
Cash Outflows											
Implementation Cost	-	-	-	-	(201,667)	(220,000)	(220,000)	(18,333)	-	-	(660,000)
Implementation Opex	-	-	-	-	(6,050)	(550)	-	-	-	-	(6,600)
Direct Opex	-	-	-	-	-	-	-	-	(8,067)	(733)	(17,600)
Recurring Opex	-	-	-	-	-	-	-	(2,017)	(2,200)	(2,200)	(10,817)
Total Cash Outflow	**-**	**-**	**-**	**-**	**(207,717)**	**(220,550)**	**(220,000)**	**(20,350)**	**(10,267)**	**(2,933)**	**(695,017)**
Net Cashflow	**-**	**-**	**-**	**-**	**(106,883)**	**(211,383)**	**(220,000)**	**(11,975)**	**(8,767)**	**(1,433)**	**(570,642)**

Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction

Investment/Project Name:	District - Reservoir Resilience, Renewals and Strengthening
Project Purpose:	Improve resilience of all water storage reservoirs to reduce the chances of water loss during a seismic event, network failure or control problem.
Business Need:	As above
Background:	**NOTE – While this is a high value programme of work, the large spend is all beyond the first 3 years of the LTP. Further adjustment is not recommended.** A review of water supply reservoir condition was completed in 2020 and this identified many of our Council reservoirs that do not meet current seismic resilience criteria. A resilient reservoir is one that retains water following a major seismic event and minimises damage requiring repair during the recovery phase. In addition to this many of our reservoir do not have controls to prevent water loss during a major network event (burst control) and lack backup level switches to prevent overflow should control problems occur. To improve resilience work is needed as follows: • Operational Resilience -Installation of 17 high level switches, 15 burst control valves and bypass around Tamatea reservoir in Taupo • Renewal of timbertank reservoirs in Omori, Whakamonega, and Whareroa • Renewal or strengthening of concrete reservoirs in Taupo (7 of), Turangi, Whakamaru, Omori and Atiamuri.
Project Description:	Improve existing reservoir resilience through installation of burst control valves, level switch backups and bypasses at reservoirs. In addition renewal of timbertanks at Whareroa, Whakamoenga, Omori, and renewal or strengthening of concrete reservoirs at Taupo, Turangi, Whakamaru, Omori, Wairakei and Atiamuri.
Project Location:	Taupo
Project Complexity:	Paint by Numbers

Strategic Case

The primary driver for this business case is being resilient and prepared. Doing this project reduces the chances of losing services which are critical for the town/district to operate. The secondary driver is maintaining levels of service as the project will ensure we can continue to deliver services which are critical for the town/district to operate. The tertiary driver is Health and Safety related as reservoir failure could have a severe impact on a small number of people.

Primary:	Being Resilient and Prepared	5
Secondary:	Maintaining Levels of Service	5
Tertiary:	Looking After Public Health and Safety	4
Investment objectives:	Improve resilience of our water supply reservoirs and networks.	
Opportunities:	All new reservoirs will be constructed to importance level 4 standard to ensure they can provide post disaster functions. In some cases reservoir renewal will include increase in water supply volume to cater for projected growth.	

Potential Scope & Contextual Considerations

Minimum scope:	Operational Resilience -Installation of 17 high level switches, 15 burst control valves and bypass around Tamatea reservoir in Taupo Renewal of timbertank reservoirs in Omori, Whakamonega, and Whareroa

	Renewal or strengthening of concrete reservoirs in Taupo (7 of), Turangi, Whakamaru, Omori and Atiamuri.
Desirable scope:	
Aspirational scope:	
Excluded scope:	
Stakeholders:	Senior management, Councillors, TDC property team Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team, TDC Network Engineers, neighbours of each reservoir site.
Constraints:	Maintaining water supply during strengthening works
Assumptions:	
Risks if project was deferred:	Reservoir failure and resulting loss of supply to residents
Risks of doing the project:	Community pushback on the costs of the project Water supply interruptions during works Reservoir damage during works

Options Analysis (add more options if applicable)			
Add more options if applicable	Option One: Change Nothing	Option Two: Operational Resilience and Renew/Strengthen as per programme	Option Three: Complete Operational Resilience and Timber tank Renewals but defer concrete reservoir works.
Overview:	• No change.	• Installation of 17 high level switches • Installation of 15 burst control valves • Installation of a bypass around Tamatea reservoir in Taupo • Renewal of timbertank reservoirs in Omori, Whakamonega, and Whareroa • Renewal or strengthening of concrete reservoirs in Taupo (7 of), Turangi, Whakamaru, Omori and Atiamuri.	• Installation of 17 high level switches • Installation of 15 burst control valves • Installation of a bypass around Tamatea reservoir in Taupo • Renewal of timbertank reservoirs in Omori, Whakamonega, and Whareroa
Advantages:	• No capital cost to TDC.	• Greatest improvement to resilience • Ensures level of service is maintained • Greatest risk reduction	• Some improvement to resilience • Highest risk reservoirs renewed • Capital costs significantly reduced
Disadvantages:	• Risk of loss of water supply during seismic events.	• High capital costs of upgrade.	• Concrete reservoir risks remain
Costs:	Capex $ 0 Opex $ No Change	Capex $27M over 10 years Opex $ minimal change	Capex $3.6M Opex $minimal change
Achievability:	This option is achievable but high risk.	This option is highly achievable.	This option is highly achievable.
Recommendation:	The preferred option is option 2, minimum scope.		

Delivery		

Delivery details:	Multi-year project programme:
	• Operational Resilience in years 1 and 2.
	  ○ Design and construct
	• Reservoir Renewals and Strengthening in years 3 to 10
	  ○ Reservoir contract development and tendering
	  ○ Procurement
	  ○ Construction	

Outputs:	Design Report	
	Tender Document	
	Contract Document	
	Construction QA including As Built Drawings and Manuals	

for the recommended option describe and assess the risks (see risk matrix in the appendix):

Risk	Likelihood	Impact	Score
Construction H&S risks	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

Estimated Project Start	1-Jul-24 1-Jul-24		**Estimated Project Finish**	30-Jun-34							
	2024/25	**2025/26**	**2026/27**	**2027/28**	**2028/29**	**2029/30**	**2030/31**	**2031/32**	**2032/33**	**2033/34**	**LTP Total**
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	(150,000)	(130,000)	(505,000)	(1,000,000)	(1,250,000)	(1,475,000)	(1,200,000)	(6,350,000)	(7,000,000)	(7,300,000)	(26,360,000)
Implementation Opex	-	-	-	-	-	-	-	-	-	-	-
Direct Opex	-	-	-	-	-	-	-	-	-	-	-
Total Cash Outflow	**(150,000)**	**(130,000)**	**(505,000)**	**(1,000,000)**	**(1,250,000)**	**(1,475,000)**	**(1,200,000)**	**(6,350,000)**	**(7,000,000)**	**(7,300,000)**	**(26,360,000)**
Net Cashflow	**(150,000)**	**(130,000)**	**(505,000)**	**(1,000,000)**	**(1,250,000)**	**(1,475,000)**	**(1,200,000)**	**(6,350,000)**	**(7,000,000)**	**(7,300,000)**	**(26,360,000)**

Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction	
Investment/Project Name:	District - Universal Smart Water Metering
Project Purpose:	Implement universal smart water metering across the district
Business Need:	Water metering is needed to ensure the ongoing provision of water at current levels of service, while protecting our environment through reduced wastage and enabling growth in housing across the District by freeing up capacity in our water supply infrastructure.
Background:	***Note - Expenditure in Year 1 to 3 of this business case could be moved to years 4 to 6.*** There is a common perception within the Taupo District that there is a plentiful, unlimited supply of water available now and in the future. For this reason our water usage is high when compared with other Councils across New Zealand. Universal water metering is a water demand management practice commonly used by water suppliers to promote a high level of water conservation by their customers. Universal water metering involves installation of water meters at all property connections and charging for water used by customers. Advantages of universal water metering include: - Knowledge of the water network is vastly improved, allowing suppliers to further advance demand management, reduce water loss in their networks, and to direct spending to where it is needed. - Major reduction in water use is possible e.g. Tauranga achieved a 30% reduction in peak water demand. - Capital deferment possibilities – for instance growth projects may be delayed as capacity is created within existing plants, reservoirs, pumps and pipelines. - Socio-economic benefits realised – customers pay for the water they use. - Assists customers to identify private water leaks and reduce waste. - Imposes a personal responsibility for water use. - Improved environmental and operational cost outcomes from less water use. - Reduced wastewater usage and corresponding treatment and disposal costs Water is expensive to treat and supply to our communities, and water metering is needed to ensure the ongoing provision of water at current levels of service, while protecting our environment through reduced wastage and enabling growth in housing across the District by freeing up capacity in our water supply infrastructure. The growth in housing driver is specifically important for Kinloch, Taupo and Turangi communities where water metering is needed to ensure planned growth can be catered for. The project is proposed to be delivered over the first 6 years of the LTP. The first three years being a continuation of actions setout in the water loss strategy whereby smart water meters are installed but water charging is not implemented. In years 4 to 6 the remaining larger communities will be metered and water charging will begin. <u>Work Completed to Date</u> Over the past 3 years we have been installing smart water meters on all property connections on our smaller schemes. Automated metering will allow higher read frequencies and greater knowledge of water use trends, notification of private leaks via automated meters, reduces lost water and complaints due to high bills and a significant reduction in water meter reading time. Schemes completed so far include: - Hatepe - Whakamaru - Atiamuri - Whakamoenga Point - Waihaha - Whareroa (underway) The meter installations have already proven extremely beneficial in enable prompt resolution of leakage at both Hatepe and Whakamoenga Point. <u>Proposed Work in Year 1</u> The next phase of this project is the upgrade of existing meters on our rural and commercial water supply areas to the Smart technology including: - Bonshaw Park - Centennial

	- Mapara - River Road (including metering currently unmetered residential properties) - Tirohanga - Whakaroa This work will improve efficiency of meter reading in these areas and support leakage improvement work. <u>Proposed Work in Year 2 and 3</u> Smart water meter installation will occur in Kinloch, Mangakino and Motuoapa. <u>Proposed Work in Years 4, 5 and 6</u> Smart water meter installation in Acacia Bay, Omori, Taupo and Turangi. Billing of water use setup and implemented district wide.
Project Description:	Installation of smart water meters on all water connections across the District to allow water use billing.
Project Location:	District
Project Complexity:	Paint by Numbers

Strategic Case

The primary driver for this business case is housing as water metering will create capacity in our water infrastructure to enable growth in Kinloch, Taupo and Turangi. Water metering will also enable ongoing provision of water at current levels of service, while protecting our environment through reduced wastage.

Primary:	Housing	5
Secondary:	Maintaining Levels of Service	3
Tertiary:	Protecting our Environment	2
Investment objectives:	Installation of smart water meters on all property connections throughout the District. Implementation of a business process to enable billing of water use to all customers.	
Opportunities:	Many opportunities exist and will be explored through the project. Examples include: • Installation of meters during toby renewal and pipeline renewals • Use of refuse trucks to record meter readings from Smart meters	

Potential Scope & Contextual Considerations

Minimum scope:	Year 1 - Upgrade of existing meters on our rural and commercial water supply areas to smart metering technology Year 2 and 3 - Smart water meter installation in Kinloch, Mangakino and Motuoapa. Years 4, 5 and 6 - Smart water meter installation in Acacia Bay, Omori, Taupo and Turangi. - Billing of water use setup and implemented district wide.
Desirable scope:	
Aspirational scope:	
Excluded scope:	
Stakeholders:	Senior management, Councillors, TDC property team Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team, TDC Network Engineers
Constraints:	
Assumptions:	
Risks if project was deferred:	
Risks of doing the project:	

Options Analysis (add more options if applicable)			
Add more options if applicable	Option One: Status Quo	Option Two: Delivery Spread across years 1 to 6	Option Three: Full Programme in Years 4 to 6
Overview:	• Metering of commercial and rural customers only	Year 1 - Upgrade of existing meters on our rural and commercial water supply areas to smart metering technology Year 2 and 3 - Smart water meter installation in Kinloch, Mangakino and Motuoapa. Years 4, 5 and 6 - Smart water meter installation in Acacia Bay, Omori, Taupo and Turangi. Billing of water use setup and implemented district wide.	Years 4, 5 and 6 - Smart water meter installation in all remaining communities including rural Billing of water use setup and implemented district wide.
Advantages:	• No capital cost	• Knowledge of the water networks improves the fastest • Major reduction in water use • Higher chance of taking advantage of capital deferment possibilities – for instance future reservoirs may be build smaller • Imposes a personal responsibility for water use. • Improved environmental and operational cost outcomes from less water use. • Enables growth	• Knowledge of the water networks improves after year 6 • Major reduction in water use after year 6 • Imposes a personal responsibility for water use. • Improved environmental and operational cost outcomes from less water use. • Reduced wastewater usage and corresponding treatment and disposal costs • Enables growth
Disadvantages:	• High water use • High leakage • Growth not enabled • Some assets may be built larger than needed	• High capital cost • High Operational cost	• High capital cost • High operational cost
Costs:	Capex $ 0 Opex $0	Capex $ 10.8M across 6 years Opex $600k/year in years 4-6 for setup of billing Ongoing Opex $200k/year	Capex $ 10.8M across 6 years Opex $600k/year in years 4-6 for setup of billing Ongoing Opex $200k/year
Achievability:	Yes	Yes	Yes
Recommendation:	Proceed with option 2 which provides the best outcome.		

Delivery		
Delivery details:	Multi-year approach - Meter installation via panel contractors - Billing setup and admin internal and external consultant support	
Outputs:	Meter QA Details	
	As Built Drawings	

for the recommended option describe and assess the risks (see risk matrix in the appendix):			
Risk	**Likelihood**	**Impact**	**Score**
Construction H&S risks	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

Estimated Project Start	1-Jul-24 1-Jul-24	**Estimated Project Finish**	30-Jun-30

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	(500,000)	(1,000,000)	(500,000)	(3,000,000)	(3,000,000)	(3,000,000)	-	-	-	-	(11,000,000)
Implementation Opex	-	-	-	(600,000)	(600,000)	(600,000)	-	-	-	-	(1,800,000)
Direct Opex	-	-	-	-	-	-	(250,000)	(250,000)	(250,000)	(250,000)	(1,000,000)
Total Cash Outflow	**(500,000)**	**(1,000,000)**	**(500,000)**	**(3,600,000)**	**(3,600,000)**	**(3,600,000)**	**(250,000)**	**(250,000)**	**(250,000)**	**(250,000)**	**(13,800,000)**
Net Cashflow	**(500,000)**	**(1,000,000)**	**(500,000)**	**(3,600,000)**	**(3,600,000)**	**(3,600,000)**	**(250,000)**	**(250,000)**	**(250,000)**	**(250,000)**	**(13,800,000)**

Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction	
Investment/Project Name:	District - Water Network Renewals
Project Purpose:	Renewal of ageing water network pipelines and associated infrastructure across the District.
Business Need:	TDC has an ageing water pipeline network leading to high failure numbers, opex cost and disruption for the community.
Background:	**NOTE – Programme has been smoothed to reduce network renewals in first 4 years while completing toby upgrades and capital spend is high, before increasing in years 5 to 10 to complete programme. Any further front end smoothing is likely to significantly impact pipe failures.** In 2023 there is in excess of 90 km of water network pipelines in operation across the district that have reached their useful life. Most of these pipelines are asbestos cement or galvanised steel. The risk of pipeline failure increases as these assets near and exceed their asset life. This current construction backlog can be valued at approximately $26M. Without water pipeline renewal spending, the length of pipelines that reach end of life increases such that in 10 years the length of aged pipeline will have doubled. As the pipeline network ages, failures increase. It is estimated that without renewals spending, the number of pipeline failures will increase 3 times in the same 10 years. Pipeline failures impact operational expenditure due both to the loss of valuable water, and due to the cost of repair, including damage to public or private property caused. Operational costs to repair water main bursts and water leaks varies but is currently estimated in the range of $200k to $300k/year. With the proposed water network renewal spending, significant reduction in operational costs is possible. Pipeline failures also impact on our current levels of service including: - System and Adequacy: Sufficient capacity to meet current demands and future growth - Customer satisfaction: Drinking-water pressure, flow or continuity of supply complaints - Fire Water Flows: We provide adequate water for firefighting in urban schemes Additional impacts of pipeline failures include consent non-compliances, demand management issues, disruption to the community, negative community perception, and health and safety risks. In addition to pipeline renewals, renewal of old property connections is required to ensure all properties have backflow device installed which protects the network from contamination and is a requirement of the Water Services Act. It is considered necessary to complete this renewal work within years 1 to 3 to remove this risk promptly. For the reasons above, the main drivers for this business case are maintaining levels of service, looking after public health and safety, and being resilient and prepared. The recommendation is to provide water network renewal budget of $6M per year for the first 4 years of the LTP increasing to $7M per year for years 5 to 10 once all tobys are renewed and capital spend in other areas has reduced. This renewal expenditure is estimated to result in clearance of the current construction backlog in the 10-year LTP, which will significantly reduce failure numbers, and operating cost. Once the construction backlog is cleared, future years renewal budgets will be able to be set proactively to target pipelines that are nearing end of life, so as to further reduce pipeline failure numbers.
Project Description:	Renewal of ageing water network pipelines and associated infrastructure across the District.
Project Location:	District
Project Complexity:	Paint by Numbers

Strategic Case
The primary driver for this business case is maintaining levels of service as our water networks are critical for the District to operate. The secondary driver for this business case is looking after public health and safety as failure to do this

project will have a severe impact on public health and safety and affect a large number of people. . The tertiary driver is being resilient and prepared as water networks are critical for the District to operate.		
Primary:	Maintaining Levels of Service	5
Secondary:	Looking after Public Health and Safety	5
Tertiary:	Being Resilient and Prepared	5
Investment objectives:	Renewal of water network to clear construction backlog within 10 years. Renewal of old property connections to include backflow devices within years 1 to 3 Reducing water main failures and resulting loss of service, H&S risks and disruption. Reducing operating costs. Improved resilience of water network.	
Opportunities:		

Potential Scope & Contextual Considerations	
Minimum scope:	- Renewal of water network to clear construction backlog within 10 years. - Renewal of old property connections to include backflow devices within years 1 to 3.
Desirable scope:	- Increase renewal spending further if budgets allow.
Aspirational scope:	- Increase renewal spending further if budgets allow.
Excluded scope:	
Stakeholders:	Senior management, Councillors, TDC property team Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team, TDC Network Engineers
Constraints:	
Assumptions:	
Risks if project was deferred:	Increased failure numbers, disruption, operating costs, H&S risks, etc
Risks of doing the project:	Community pushback on the costs of the project

Options Analysis (add more options if applicable)			
Add more options if applicable	Option One: No Renewals Budget	Option Two: Status Quo + Inflation	Option Three: Recommended
Overview:	• No renewals budget	• $5.5M/year renewals budget	• $7M/year renewals budget Years 1-3 • $6M/year renewals budget years 4-10
Advantages:	• Cheapest capital budget option	• Renewals backlog caught up in 15 years • Pipeline failures reduce • OPEX costs reduce • Legislative compliance (backflow)	• Renewals backlog caught up in 10 years • Pipeline failures reduce • OPEX costs reduce • Legislative compliance (backflow)
Disadvantages:	• Pipeline failures and OPEX increase drastically (estimate 3 times increase) • Opex likely unaffordable • Legislative non-compliance (backflow) • Increased disruption • High risks	• Longer time to clear construction backlog and therefore risks of major event increased •	• High capital cost
Costs:	Capex $ 0 Opex Must be steadily increased from current $300k to approximately $ 900k/year by year 10	Capex $ 5.5M/year Opex $300k (current) reducing to $100k after 10 years	Capex $6M/yr (Y1-4) $7M/yr (Y5-10) Opex $300k (current) reducing to $50k after 10 years
Achievability:	No – risks and opex costs are too high	Yes – Proven capacity over last 3 years.	Yes – Panel designers and contractors have confirmed additional capacity.
Recommendation:	Proceed with option 3 which provides the best outcome.		

Delivery		
Delivery details:	Multi-year approach - Planning and designs through consultant panel (in place) - Construction via contractor panel arrangement (in place) - Material supplier via preferred supplier agreements (in place)	
Outputs:	Engineering Design and Contract Documents	
	Construction QA including As Built Drawings and Manuals	

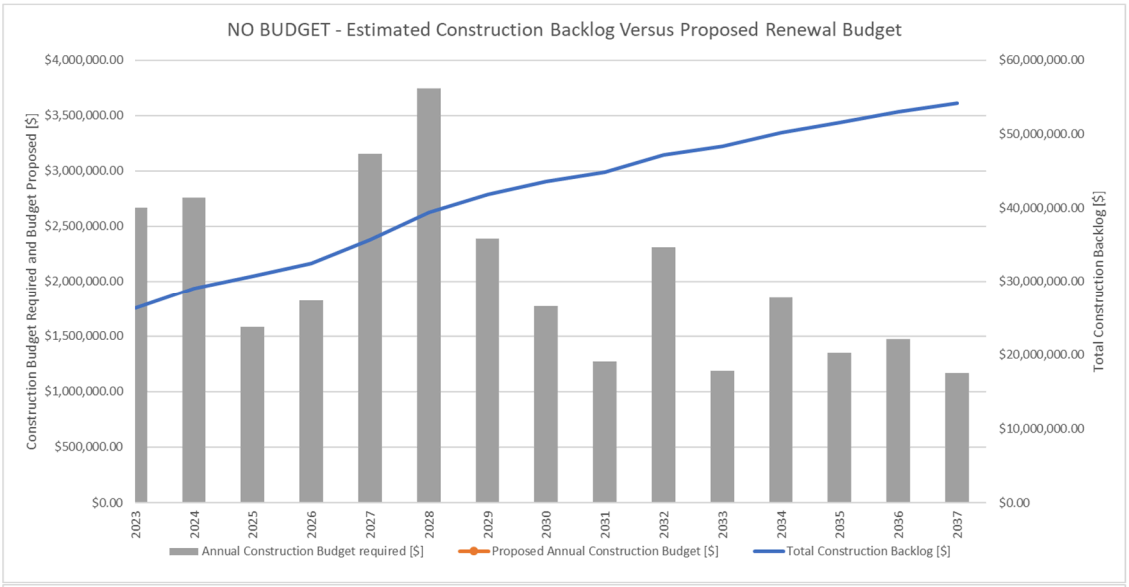
for the recommended option describe and assess the risks (see risk matrix in the appendix):			
Risk	**Likelihood**	**Impact**	**Score**
Construction H&S risks	Unlikely	Major	Medium

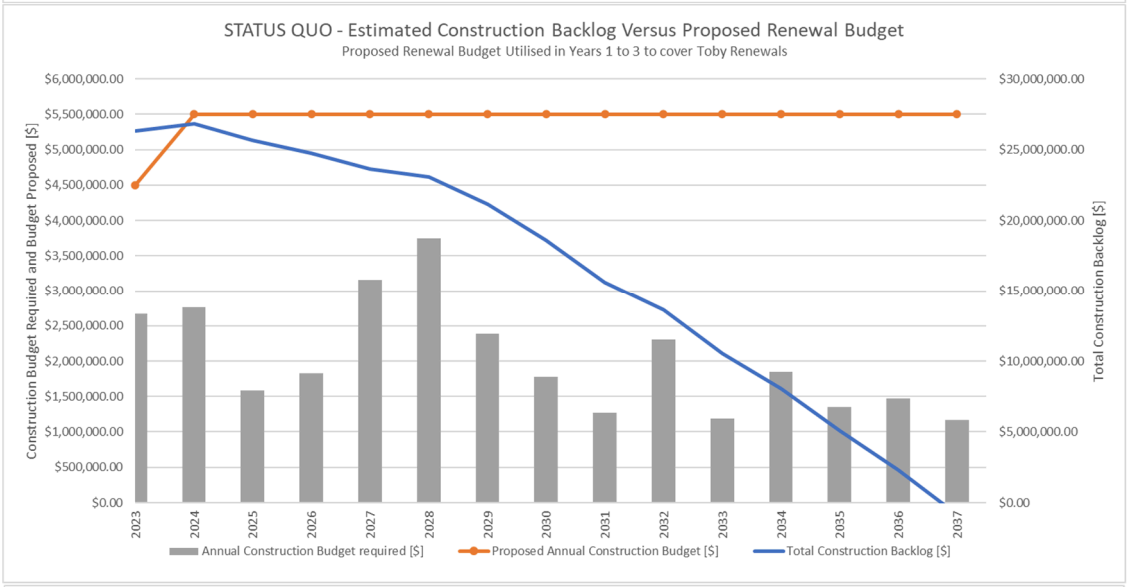
Financials – SNIP from Business Case Model

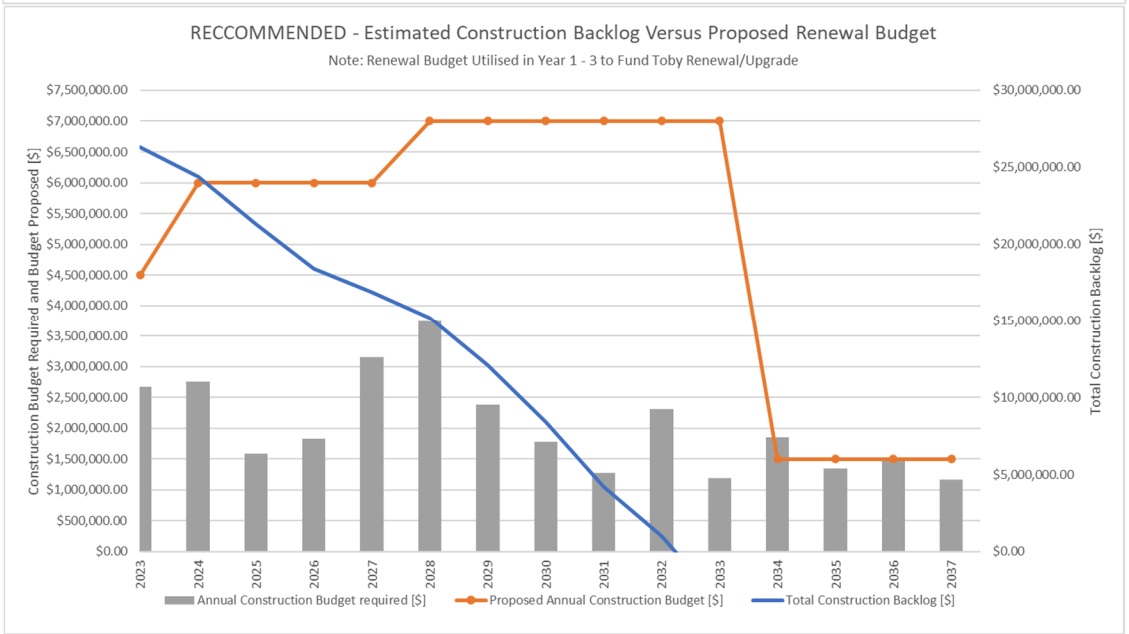
Estimated Project Start	1-Jul-24	**Estimated Project Finish**	30-Jun-34
	1-Jul-24		

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	(6,000,000)	(6,000,000)	(6,000,000)	(6,000,000)	(7,000,000)	(7,000,000)	(7,000,000)	(7,000,000)	(7,000,000)	(7,000,000)	(66,000,000)
Implementation Opex	-	-	-	-	-	-	-	-	-	-	-
Direct Opex	-	-	-	-	-	-	-	-	-	-	-
Total Cash Outflow	(6,000,000)	(6,000,000)	(6,000,000)	(6,000,000)	(7,000,000)	(7,000,000)	(7,000,000)	(7,000,000)	(7,000,000)	(7,000,000)	(66,000,000)
Net Cashflow	(6,000,000)	(6,000,000)	(6,000,000)	(6,000,000)	(7,000,000)	(7,000,000)	(7,000,000)	(7,000,000)	(7,000,000)	(7,000,000)	(66,000,000)

Construction Backlog Versus Budget Options Graph







Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction

Investment/Project Name:	**Water Supply DWSNZ Membrane Programme**
Project Purpose:	To upgrade 5 of Councils existing water treatment plants to provide safe water to our communities and to ensure compliance with the Water Service Act and supporting Water Services (DWSNZ) Regulations 2022.
Business Need:	Same as Project Purpose
Background:	**NOTE: Deferral of these projects is not recommended. Projects are critical for water safety and a construction contract is signed and delivery underway.** The following Council water supply schemes have been identified as needing additional treatment to ensure the water is safe to drink and to enable compliance with the Water Service (DWSNZ) Regulations 2022. • Hatepe • Kinloch • Motuoapa • Omori • Motutere The treated water at these sites do not meet the compliance requirements of the DWSNZ. This is largely because the supplies do not provide a barrier to protozoa, and because the level of arsenic in the source water exceeds the DWSNZ maximum acceptable value. Cyanobacteria have also been identified in Lake Taupo waters and these can pose a health risk to consumers through the release of toxins into the water. It is proposed to upgrade each of these water treatment plants by the installation of chemical coagulation, membrane filtration, and advanced oxidation processes that will remove sediment, organic matter, arsenic, microbiological contaminants and cyanotoxins. Waste product treatment processes will be needed at Hatepe due to the absence of a wastewater treatment plant to discharge to. At all other sites, waste products will be thickened through clarification before discharge to the sewer. The Motutere plant will not have an advanced oxidation process for removal of cyanotoxins as demand is low enough that in an algal bloom event tankers can be used from other sites. A design and build contract has been awarded for the Kinloch, Omori, Motuoapa and Hatepe sites with delivery underway and expected to be completed by the end of year 2 of the new LTP. It is proposed to deliver an upgrade at the Motutere site starting in year 4 of the new LTP.
Project Description:	Construction of new water treatment facilities at Kinloch, Omori, Motuoapa, Hatepe and Motutere.
Project Location:	District
Project Complexity:	Paint by Numbers

Strategic Case

The primary driver for this business case is Looking after Public Health and Safety. This includes the long-term effects of those drinking water containing low levels of Arsenic, and the risk of widespread illness from a water contamination event such as that caused by Cyanotoxins, Giardia or Cryptosporidium which currently the treatment plant has no barrier to remove. The secondary driver for this business case is regulatory compliance with the Water Services Act within which Council has a duty to ensure that the drinking water supplied is safe. The tertiary driver is being resilient and prepared. Doing this project reduces the chances of losing services which are critical for the townships to operate.

Primary:	Looking after Public Health and Safety	5
Secondary:	Being Legislatively Compliant	4
Tertiary:	Being Resilient and Prepared	5
Investment objectives:	Providing high quality drinking water that complies with the DWSNZ. Providing high quality drinking water that prevents public health issues. Reliable water supply that is not prone to shut down due to poor water quality.	

	Improved customer satisfaction with water supply quality.
Opportunities:	Packaging of multiple treatment plant upgrades to allow streamlined procurement and to take advantage of efficiencies in delivery.

Potential Scope & Contextual Considerations	
Minimum scope:	Upgrade each of the water treatment plants by the installation of chemical coagulation, membrane filtration, and advanced oxidation processes that will remove sediment, organic matter, arsenic, microbiological contaminants and cyanotoxins. Waste product treatment processes will be needed at Hatepe due to the absence of a wastewater treatment plant to discharge to. At all other sites, waste products will be thickened through clarification before discharge to the sewer. The Motutere plant will not have an advanced oxidation process for removal of cyanotoxins as demand is low enough that in an algal bloom event tankers can be used from other sites. All plants built to importance level 4 standards – post disaster function. Land is required to site the new plants at Hatepe and Motutere. Upgrade of the Kinloch intake pump station.
Desirable scope:	Replacement of chlorine contact tank at Omori that has low seismic resilience.
Aspirational scope:	
Excluded scope:	Upgrade of network and reservoirs.
Stakeholders:	Senior management, Councillors, TDC property team Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team, TDC Network Engineers
Constraints:	Existing land availability.
Assumptions:	Growth forecasts are accurate. Source water quality remains the same as current
Risks if project was deferred:	Non-compliance with the DWSNZ and Water Services Act Public health risks Community complaints due to poor water quality, loss of supply or sickness Fines, legal action, enforced upgrade costs. Ongoing operational challenges and reactive operational costs Negative publicity and impact on economic development
Risks of doing the project:	Increased operational costs Increased operational complexity Community pushback on the costs of the project

Options Analysis (add more options if applicable)

Add more options if applicable	Option One: Do Nothing	Option Two: Connect Scheme via Pipelines	Option Three: Construct New Treatment Plants
Overview:	• The 'do nothing' option means Council will continue to provide water to the community via the current treatment facilities.	Pipe water supply from the nearest existing TDC reticulation. All reasonable options for extension of existing schemes have been explored. The capital and operational costs of piping between these remaining schemes is more than the membrane upgrade costs.	• Upgrade the treatment plants to meet all requirements of the DWSNZ.
Advantages:	• No capital cost to TDC.		• Significantly improved and DWSNZ compliant Water supply. • Reduced health risks as the community will receive high quality treated water • Independent water supply provides additional resilience.
Disadvantages:	• Continuation of non-compliant water supply. • Legislative non-compliance with risk of fines or other legal action • Potential health risks to the community because of consuming potentially contaminated source water. • Reduced or negative community perception of TDC. • Other as detailed under risk of not doing		• High capital costs of upgrade and high ongoing operational costs. • Additional treatment processes to achieve DWSNZ requirements require additional ongoing operating costs.
Costs:	Capex $0 Opex $No change		

	Capex	Opex
Kinloch	$3.9M	$437k
Omori	$1.6M	$259k
Motuoapa	$4.5M	$192k
Hatepe	$6.0M	$132k
Motutere	$2.0M	$57k

Achievability:	This option is achievable but not acceptable from a public health and legislative perspective.	No	This option is highly achievable. Contract already in place and construction started on 2 sites.
Recommendation:	Proceed with option 3 as this provides the best outcome for the communities.		

Delivery		
Delivery details:	Multi-year approach as programme of works: - Design build contract awarded and underway - Project management in house - Design reviews and support via external consultant - Construction - underway	
Outputs:	Engineering Design and Contract Documents	
	Construction QA including As Built Drawings and O&M Manuals	

for the recommended option describe and assess the risks (see risk matrix in the appendix):			
Risk	**Likelihood**	**Impact**	**Score**
Construction H&S risks	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

KINLOCH – TREATMENT COMPLIANCE UPGRADE

Estimated Project Start 1-Jul-24 1-Jul-24 **Estimated Project Finish** 30-Jun-25

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	(3,900,000)	-	-	-	-	-	-	-	-	-	(3,900,000)
Implementation Opex	-	-	-	-	-	-	-	-	-	-	-
Direct Opex	-	(437,123)	(437,123)	(437,123)	(437,123)	(437,123)	(437,123)	(437,123)	(437,123)	(437,123)	(3,934,107)
Total Cash Outflow	**(3,900,000)**	**(437,123)**	**(437,123)**	**(437,123)**	**(437,123)**	**(437,123)**	**(437,123)**	**(437,123)**	**(437,123)**	**(437,123)**	**(7,834,107)**
Net Cashflow	**(3,900,000)**	**(437,123)**	**(437,123)**	**(437,123)**	**(437,123)**	**(437,123)**	**(437,123)**	**(437,123)**	**(437,123)**	**(437,123)**	**(7,834,107)**

HATEPE – TREATMENT COMPLIANCE UPGRADE

Estimated Project Start 1-Jul-24 1-Jul-24 **Estimated Project Finish** 30-Jun-26

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	(4,000,000)	(2,000,000)	-	-	-	-	-	-	-	-	(6,000,000)
Implementation Opex	-	-	-	-	-	-	-	-	-	-	-
Direct Opex	-	-	(132,348)	(132,348)	(132,348)	(132,348)	(132,348)	(132,348)	(132,348)	(132,348)	(1,058,784)
Total Cash Outflow	**(4,000,000)**	**(2,000,000)**	**(132,348)**	**(132,348)**	**(132,348)**	**(132,348)**	**(132,348)**	**(132,348)**	**(132,348)**	**(132,348)**	**(7,058,784)**
Net Cashflow	**(4,000,000)**	**(2,000,000)**	**(132,348)**	**(132,348)**	**(132,348)**	**(132,348)**	**(132,348)**	**(132,348)**	**(132,348)**	**(132,348)**	**(7,058,784)**

MOTUOAPA – TREATMENT COMPLIANCE UPGRADE

Estimated Project Start 1-Jul-24 1-Jul-24 **Estimated Project Finish** 30-Jun-26

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	(1,655,000)	(2,900,000)	-	-	-	-	-	-	-	-	(4,555,000)
Implementation Opex	-	-	-	-	-	-	-	-	-	-	-
Direct Opex	-	-	(192,303)	(192,303)	(192,303)	(192,303)	(192,303)	(192,303)	(192,303)	(192,303)	(1,538,424)
Total Cash Outflow	**(1,655,000)**	**(2,900,000)**	**(192,303)**	**(192,303)**	**(192,303)**	**(192,303)**	**(192,303)**	**(192,303)**	**(192,303)**	**(192,303)**	**(6,093,424)**
Net Cashflow	**(1,655,000)**	**(2,900,000)**	**(192,303)**	**(192,303)**	**(192,303)**	**(192,303)**	**(192,303)**	**(192,303)**	**(192,303)**	**(192,303)**	**(6,093,424)**

OMOBI – TREATMENT COMPLIANCE UPGRADE

Estimated Project Start 1-Jul-24 1-Jul-24 **Estimated Project Finish** 30-Jun-25

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	(1,600,000)	-	-	-	-	-	-	-	-	-	(1,600,000)
Implementation Opex	-	-	-	-	-	-	-	-	-	-	-
Direct Opex	-	(259,944)	(259,944)	(259,944)	(259,944)	(259,944)	(259,944)	(259,944)	(259,944)	(259,944)	(2,339,496)
Total Cash Outflow	**(1,600,000)**	**(259,944)**	**(259,944)**	**(259,944)**	**(259,944)**	**(259,944)**	**(259,944)**	**(259,944)**	**(259,944)**	**(259,944)**	**(3,939,496)**
Net Cashflow	**(1,600,000)**	**(259,944)**	**(259,944)**	**(259,944)**	**(259,944)**	**(259,944)**	**(259,944)**	**(259,944)**	**(259,944)**	**(259,944)**	**(3,939,496)**

Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction

Investment/Project Name:	Kinloch – Low Zone Reservoir Construction
Project Purpose:	Improve water supply resilience in Kinloch by providing a new treated water storage reservoir that will provide 24 hours storage while also replacing the current reservoir which has low seismic resilience.
Business Need:	Improve treated water storage requirements in the Kinloch low zone to 24 hours through construction of a new 2 ML water storage reservoir. Remove risk of existing low zone reservoir failing through replacement.
Background:	**Deferral of this project is not recommended. The reservoir is critical for Kinloch resilience and should have been built 10 years ago.** Kinloch The Kinloch water scheme is split into three pressure zones. Treated water storage in the Kinloch low zone is significantly below acceptable levels with only 6 hours of storage currently available. As development continues the available storage will further reduce to a worst case 4.5 hours following completion of the full Kinloch Structure Plan (KSP) development. This project includes construction of a new 2,000m3 reservoir in the Kinloch low zone, with the preferred location, land sale in negotiation, a block of land to the southwest of the Kinloch International Golf Course. Construction of this reservoir will improve storage levels to 24 hours at forecast peak flow for the full KSP development. Once complete the existing low zone reservoir will be decommissioned and a small tank installed in its place to enable the ongoing feed to the Whakaroa rural area.
Project Description:	Improve water supply resilience in Kinloch by providing a new treated water storage reservoir that will provide 24 hours storage while also replacing the current reservoir which has low seismic resilience.
Project Location:	Taupo
Project Complexity:	Paint by Numbers

Strategic Case

The primary driver for this business case is supporting growth in housing. The reservoir enables in excess of 150 houses to be built in Kinloch. The secondary driver for this business case is being resilient and prepared. Doing this project reduces the chances of losing water services to significant areas of Kinloch. The tertiary driver is maintaining levels of service as the projects will enable the continuation of water service delivery to Kinloch water users as growth occurs.

Primary:	Housing	5
Secondary:	Being Resilient and Prepared	5
Tertiary:	Maintaining Levels of Service	5
Investment objectives:	Enable growth in housing to occur. Emergency storage levels improved. Ensuring treated water reservoirs can provide post disaster function. Maintaining service levels to all customer as growth occurs.	
Opportunities:	The new reservoir will be constructed as importance level 4 standard to ensure they can provide post disaster functions.	

Potential Scope & Contextual Considerations

Minimum scope:	New reservoirs and supporting infrastructure as follows: - New 2,000m3 reservoir construction - Pipelines to and from the reservoir - New Pump tank to service Whakaroa scheme - Demolishment of the old Kinloch low zone reservoir

Desirable scope:	
Aspirational scope:	
Excluded scope:	Reservoir land purchase (included in previous project)
Stakeholders:	Senior management, Councillors, TDC property team Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team, TDC Network Engineers, neighbours of each reservoir site, developers of growth lands.
Constraints:	
Assumptions:	Kinloch – land purchase occurs in 2023/24 year
Risks if project was deferred:	Inability to provide sufficient water to cater for planned growth Level of service issues in some areas Lack of disaster resilience Lack of operational resilience Lack of emergency response capability
Risks of doing the project:	Community pushback on the costs of the project

Options Analysis (add more options if applicable)			
Add more options if applicable	Option One: Change Nothing	Option Two: Build reservoir as planned	Option Three: Build reservoir on site of existing reservoir
Overview:	• No change	• Construct new 2,000m3 reservoir in low zone	• Renew and upgrade existing low zone reservoir from 450m3 to 2,000m3
Advantages:	• Lowest budget required	• Improves resilience • Lower capital cost than renewal and upgrade • Improves storage levels	• Renewal of existing tank • Improves storage levels • Existing site available
Disadvantages:	• Emergency storage levels below expected levels which may impact maintenance and emergency response • Lack of resilience in a disaster • Reduced or negative community perception of TDC.	• Capital cost • Land purchase needed	• Capital cost • Existing site too small • Surrounding land is DOC/Iwi land • Difficult site and access • Complex temporary works needed to maintain service to Kinloch Low and Whakaroa zones
Costs:	Capex $0 Opex $ no change	Capex $5.5M Opex $ minimal change	Capex $5.5M (similar to option 2) Opex $150k/annum
Achievability:	This option is achievable but there are risks associated	This option is highly achievable.	This option is difficult to achieve.
Recommendation:	The preferred option is option 2, minimum scope.		

Delivery		

Delivery details:	Multi-year project delivery to include:
	• Year 0 (2023/24)
	  ○ Land acquisition - underway
	  ○ Network modelling – complete
	  ○ Concept design - complete
	• Year 1
	  ○ Detail design and tendering of pipelines
	  ○ Reservoir site geotech investigations
	  ○ Reservoir contract preparation and procurement
	• Year 2
	  ○ Pipeline construction
	  ○ Reservoir construction
	• Year 3
	  ○ Pump tank construction
	  ○ Old reservoir demolishment	

Outputs:	Modelling Report	
	Design Report	
	Tender Document	
	Contract Document	
	Construction QA including As Built Drawings and Manuals	

for the recommended option describe and assess the risks (see risk matrix in the appendix):

Risk	Likelihood	Impact	Score
Construction H&S risks	Unlikely	Major	Medium
Option not acceptable to iwi	Unlikely	Moderate	Medium
Option unacceptable to external parties	Unlikely	Major	Medium
Environmental Risk	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

Estimated Project Start 1-Jul-24 1-Jul-24 **Estimated Project Finish** 30-Jun-27

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	-	(2,500,000)	(1,650,000)	-	-	-	-	-	-	-	(4,150,000)
Implementation Opex	-	-	-	-	-	-	-	-	-	-	-
Direct Opex	-	-	-	-	-	-	-	-	-	-	-
Total Cash Outflow	-	**(2,500,000)**	**(1,650,000)**	-	-	-	-	-	-	-	**(4,150,000)**
Net Cashflow	-	**(2,500,000)**	**(1,650,000)**	-	-	-	-	-	-	-	**(4,150,000)**

Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction

Investment/Project Name:	Omori - WTP Rising Main
Project Purpose:	Alter the Omori water supply network to minimise stress on the network and reduce failures and corresponding water outages.
Business Need:	As above.
Background:	**NOTE: Project could be deferred if funding is tight. Focus could be on renewal of asbestos pipelines rather than construction of a rising main. However as failures have occurred on new pipes as well as old this approach will retain risk of future failures.** Omori network has been subject to numerous failures due to pipe condition and surge events that have caused large outages for the community. To reduce failures, it is proposed to alter the network so the reservoir is fed directly from the treatment plant with gravity mains feeding the network. This will minimise stress on the network and reduce failures and corresponding water outages. Watermain failures on the common rising and falling network between the Omori water treatment plant and reservoirs have occurred regularly over the last 5 years. In the last 6 months, three major failures have occurred that have resulted in significant loss of service for the community. One of the breaks resulted in a boil water notice for the scheme due to challenges restarting the treatment plant with empty reservoirs. This event cost Council in excess of $25k in operational costs to resolve. Investigation has confirmed the watermain failures have been in part caused by surge events that have been affecting the network for many years. The surge events have been partially resolved through control changes at the plant however some risk remains with the current network operation using a common rising and falling network. Conversion of the network to include a dedicated rising main to the reservoirs and gravity supply out of the reservoirs will significantly reduce risk of failures in the network. This coupled with reservoir resilience work (in separate project) will vastly improve resilience of the scheme.
Project Description:	New 2.3km 250mm PE rising main from treatment plant to reservoir.
Project Location:	Omori
Project Complexity:	Paint by Numbers

Strategic Case

The primary driver for this business case is maintaining levels of service which are critical for the Omori township to operate. The secondary driver is resilience as the project will reduce the chances of losing services critical for the town to operate. The tertiary driver is looking after health and safety as with every watermain failure there is the risk of contamination of the network which could affect a large number of people. .

Primary:	Maintaining Levels of Service	5
Secondary:	Being Resilient and Prepared	5
Tertiary:	Looking after Public Health and Safety	5
Investment objectives:	Alter the Omori water supply network to minimise stress on the network and reduce failures and corresponding water outages.	
Opportunities:	Renewal of asbestos mains on the rising main route using renewal budgets to minimise community disruption.	

Potential Scope & Contextual Considerations

Minimum scope:	New 2.3km 250mm PE rising main from treatment plant to reservoir.
Desirable scope:	

Aspirational scope:	
Excluded scope:	
Stakeholders:	Senior management, Councillors, TDC property team Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team, TDC Network Engineers
Constraints:	
Assumptions:	
Risks if project was deferred:	Ongoing watermain failures, disruption, operating costs, H&S risks, etc
Risks of doing the project:	Community pushback on the costs of the project

Options Analysis (add more options if applicable)			
Add more options if applicable	Option One: Do not complete project	Option Two: Complete project as planned	Option 3: Renew asbestos pipes in area
Overview:	• No change	• New 2.3km 250mm PE rising main from treatment plant to reservoir.	• Renewal of all asbestos pipes in area to reduce failure of old pipes.
Advantages:	• Cheapest capital budget option	• Water main failures reduced • Water supply resilience improved • Disruption, OPEX, H&S risks all reduced	• Funded under separate renewal budgets
Disadvantages:	• Ongoing watermain failures • Disruption • H&S risks • OPEX	• Capital Cost	• Many pipe failures have been on PVC pipes impacted by surge events and so risk of failures remains. • If rising main is still needed in the future, then there will extra disruption for the community.
Costs:	Capex $ 0 Opex $ 0	Capex $ 1.8M Opex $ 0	Capex $0 Opex $0
Achievability:	Yes	Yes	Yes
Recommendation:	Proceed with option 2 which provides the best outcome.		

Delivery		
Delivery details:	Multi-year approach - Planning and designs through consultant panel (in place) - Construction via contractor panel arrangement (in place) - Material supplier via preferred supplier agreements (in place)	
Outputs:	Engineering Design and Contract Documents	
	Construction QA including As Built Drawings and Manuals	

for the recommended option describe and assess the risks (see risk matrix in the appendix):			
Risk	**Likelihood**	**Impact**	**Score**
Construction H&S risks	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

For example

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	7,000	-	-	7,000
Efficiencies	-	-	-	-	-	-	-	1,375	1,500	1,500	7,375
External Funding	-	-	-	-	100,833	9,167	-	-	-	-	110,000
Total Cash Inflows	**-**	**-**	**-**	**-**	**100,833**	**9,167**	**-**	**8,375**	**1,500**	**1,500**	**124,375**
Cash Outflows											
Implementation Cost	-	-	-	-	(201,667)	(220,000)	(220,000)	(18,333)	-	-	(660,000)
Implementation Opex	-	-	-	-	(6,050)	(550)	-	-	-	-	(6,600)
Direct Opex	-	-	-	-	-	-	-	-	(8,067)	(733)	(17,600)
Recurring Opex	-	-	-	-	-	-	-	(2,017)	(2,200)	(2,200)	(10,817)
Total Cash Outflow	**-**	**-**	**-**	**-**	**(207,717)**	**(220,550)**	**(220,000)**	**(20,350)**	**(10,267)**	**(2,933)**	**(695,017)**
Net Cashflow	**-**	**-**	**-**	**-**	**(106,883)**	**(211,383)**	**(220,000)**	**(11,975)**	**(8,767)**	**(1,433)**	**(570,642)**

Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction

Investment/Project Name:	Taupo - Mapara Area Capacity Increase
Project Purpose:	Upgrade pump station, pipelines and reservoir to allow further growth in housing in the Mapara area.
Business Need:	As above.
Background:	**Note: Project cannot be deferred as growth is already limited.** Water from the Taupo water supply scheme is pumped to the Acacia Bay reservoir at Cherry Lane, from where it is distributed to the Mapara rural water supply area. The Mapara rural water supply area has seen significant growth in recent years and the network is now at capacity and upgrade is needed to prevent loss of service to existing customers and to enable further growth. The capacity restriction is such that no further water supply connections are currently allowable west of Blue Ridge Drive. This project will remove this restriction and allow growth to continue. The project is planned to include: - addition of another pump in the Mapara pump station - 5km of pipeline upgrades in the network - Upgrade of reservoir from 45m3 to 500m3 Without this project, growth will remain on hold in the Mapara water supply area.
Project Description:	The project is planned to include: - addition of another pump in the Mapara pump station - 5km of pipeline upgrades in the network - Upgrade of reservoir from 45m3 to 500m3
Project Location:	Taupo
Project Complexity:	Paint by Numbers

Strategic Case

The primary driver for this business case is Housing. The project will enable significant housing growth in the Mapara water supply area to continue. The secondary and tertiary drivers are maintaining levels of service and resilience. The project will ensure we can continue to deliver services to existing area customers.

Primary:	Economic Development	5
Secondary:	Maintaining Levels of Service	3
Tertiary:	Being Resilient and Prepared	2
Investment objectives:	Enables growth in connections in area Reliable water supply that is not prone to failure during high demand periods Improved pipeline resilience Improved pumping efficiency	
Opportunities:	Opportunity exists to renew asbestos watermains that have reached their end of life within the Mapara scheme at the same time as the upgrade project to improve efficiency of contract delivery. Funding of this opportunistic scope would be via network renewal budgets. The project will also result in upgrade of the current timbertank reservoir on the scheme which is of low seismic resilience.	

Potential Scope & Contextual Considerations

Minimum scope:	1.75km of 225mm PE, 1km 250mm PE, 1200m of 180mm PE, 1km of 125mm PE, 1km of 63mm PE, additional pump at pump station and a new 500m3 reservoir
Desirable scope:	
Aspirational scope:	
Excluded scope:	
Stakeholders:	Senior management, Councillors, Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team, Developers.
Constraints:	
Assumptions:	
Risks if project was deferred:	Inability to service housing growth Growth in Mapara area restricted.
Risks of doing the project:	Community pushback on the costs of the project

Options Analysis (add more options if applicable)			
Add more options if applicable	Option One: Change Nothing	Option Two: Upgrade	
Overview:	• No change to network.	• Addition of another pump in the Mapara pump station • 5km of pipeline upgrades in the network • Upgrade of reservoir from 45m3 to 500m3	•
Advantages:	• No capital cost to TDC.	• Housing growth enabled • Additional resilience created through replacement of AC mains and upgrade of reservoir	•
Disadvantages:	• Inability to service housing growth • Growth in Mapara area restricted.	• Capital cost	•
Costs:	Capex $ 0 Opex no change	Capex $ 3.65M over 4 years Opex - no change	
Achievability:	This option is achievable.	This option is achievable.	
Recommendation:	The preferred option is option 2, minimum scope.		

Delivery		
Delivery details:	Standard design, tender, construct approach. Year 1 – critical pipeline upgrade on Mapara Rd and pump station upgrade Year 2 – Blue Ridge reservoir pipeline upgrades Year 3 – Blue Ridge reservoir upgrade Year 4 – Tukairangi pipeline upgrades	
Outputs:	Design Reports	
	Tender Documents	
	Contract Documents	
	Construction QA including As Built Drawings and Manuals	

for the recommended option describe and assess the risks (see risk matrix in the appendix):

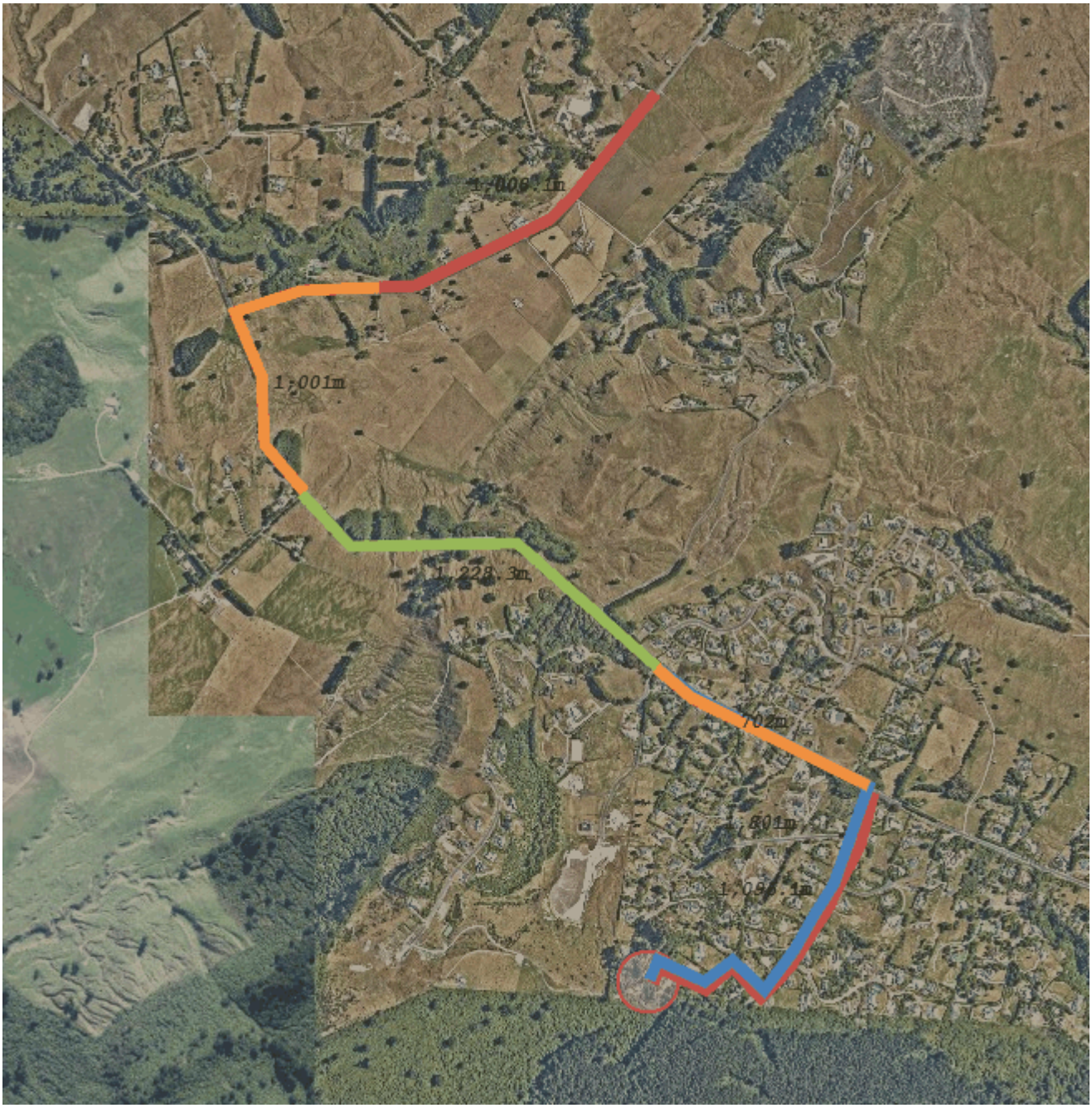
Risk	Likelihood	Impact	Score
Construction H&S risks	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

Estimated Project Start	1-Jul-24	**Estimated Project Finish**	30-Jun-27	
	1-Jul-24			

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	(1,000,000)	(1,400,000)	(1,250,000)	-	-	-	-	-	-	-	(3,650,000)
Implementation Opex	-	-	-	-	-	-	-	-	-	-	-
Direct Opex	-	-	-	-	-	-	-	-	-	-	-
Total Cash Outflow	**(1,000,000)**	**(1,400,000)**	**(1,250,000)**	-	-	-	-	-	-	-	**(3,650,000)**
Net Cashflow	**(1,000,000)**	**(1,400,000)**	**(1,250,000)**	-	-	-	-	-	-	-	**(3,650,000)**

Mapara Area Capacity Upgrades



Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction

Investment/Project Name:	Taupo – Poihipi Reservoir Construction Taupo – Brentwood Reservoir Construction
Project Purpose:	Provide sufficient reservoir storage by constructed 2 new reservoirs.
Business Need:	New reservoirs are needed in two locations in northern Taupo. The reservoir are needed to support growth, maintain levels of service, and support resilience planning by ensuring 24 hours storage is available across our networks.
Background:	**Note: Some adjustment of reservoir timing is possible, but risk of supply loss in a major event will remain until its built.** The Taupo water scheme delivers water from the Lake Terrace Water Treatment Plant to developments north of the river via two water mains over and under the Waikato River. The total water storage available north of the river is 12 hours. The low and high zone areas have no storage available. The growth plan for the Northern side of the Waikato River is to establish two new reservoirs; one in the low zone, Brentwood (2,000m3) and one in the high zone, Poihipi Road (4,750m3). Land has been secured for Brentwood and land acquisition is underway for Poihipi. The priority is to build the larger Poihipi Road reservoir first, as it will improve emergency storage levels to in excess of 24 hours, reduces the risk of pump failures impacting the high zone customers, and supports growth areas north of the river, including the Nukuhau Structure Plan area. The Brentwood reservoir is planned to be built by 2035 when growth increases demand to a point that emergency storage drops to 21 hours. The projects include upgrade of the existing Woodward Street Pump Station, pipelines to the Poihipi Rd reservoir from the pump station and from the reservoir to the Brentwood area, and construction of 2 new reservoirs.
Project Description:	Construction of 2 reservoirs and supporting infrastructure.
Project Location:	Taupo
Project Complexity:	Paint by Numbers

Strategic Case

The primary driver for this business case is housing. Each reservoir enables in excess of 150 houses. The secondary driver for this business case is being resilient and prepared. Doing this project reduces the chances of losing water services to significant areas of Taupo. The tertiary driver is maintaining levels of service as the projects will enable the continuation of water service delivery to Taupowater users as growth occurs.

Primary:	Housing	5
Secondary:	Being Resilient and Prepared	5
Tertiary:	Maintaining Levels of Service	5
Investment objectives:	Enable growth in housing to occur. Emergency storage levels improved. Maintaining service levels to all customer as growth occurs.	
Opportunities:	All new reservoirs will be constructed as importance level 4 standard to ensure they can provide post disaster functions.	

Potential Scope & Contextual Considerations

Minimum scope:	New reservoirs and supporting infrastructure as follows: - New 4,750m3 reservoir at Poihipi - Supporting pipelines for Poihipi reservoir - Upgrade of Woodward PS - New 2,000m3 reservoir at Brentwood

Desirable scope:	
Aspirational scope:	
Excluded scope:	Reservoir land purchase
Stakeholders:	Senior management, Councillors, TDC property team Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team, TDC Network Engineers, neighbours of each reservoir site, developers of growth lands.
Constraints:	
Assumptions:	Taupo Poihipi – land purchase completed in 2023/24 year
Risks if project was deferred:	Inability to provide sufficient water to cater for planned growth Lack of disaster resilience Lack of emergency response
Risks of doing the project:	Community pushback on the costs of the project

Options Analysis (add more options if applicable)			
Add more options if applicable	Option One: Change Nothing	Option Two: Construct Brentwood reservoir first, followed by Poihipi reservoir	Option Three: Construct Poihipi reservoir followed by Brentwood reservoir
Overview:	• No change	• Brentwood reservoir constructed in year 3 and 4 to bring emergency storage up to 22 hours • Poihipi Reservoir still constructed asap to increase prevent storage dropping further with forecast growth	• Poihipi Reservoir constructed in year 3 to 5 • Brentwood reservoir constructed in 2035, or when growth requires.
Advantages:	• Lowest budget required	• Brentwood reservoir can be constructed quickly as site is available with pipelines in place • Fast improvement to emergency water storage availability	• Emergency storage improved to in excess of 24 hours. • Brentwood and Nukuhau areas no longer on pumped supply. • Brentwood reservoir not needed until 2035
Disadvantages:	• Emergency storage levels below expected levels which may impact maintenance and emergency response • Lack of resilience in a disaster • Need to slow growth in some areas – restrict housing construction • Reduced or negative community perception of TDC.	• Capital cost • 24 hours storage will not be achieved until Poihipi reservoir is built. • Brentwood and Nukuhau areas still reliant on pumps • Poihipi reservoir still needs to be built quickly to alleviate storage issue and reliance on pumps.	• Capital cost
Costs:	Capex $0 Opex - no change	Capex - Poihipi $8.75M - Brentwood $2M Opex - minimal change	Capex - Poihipi $8.75M - Brentwood $2M Opex minimal change
Achievability:	This option is achievable but there are risks associated	This option is highly achievable.	This option is highly achievable.
Recommendation:	The preferred option is option 3, minimum scope as it resolves emergency storage immediately, improves resilience and allows deferral of $3M for approximately 10 years.		

Delivery		

Delivery details:	Multi-year project delivery to include:
	Poihipi
	• Year 0 (2023/24)
	  ○ Land acquisition – underway & Network modelling – complete
	• Year 3
	  ○ Reservoir contract development and tendering - outsource
	  ○ Pump station and pipeline detail design - outsource
	• Year 4 & 5
	  ○ Procurement
	  ○ Construction	

Outputs:	Modelling Report	Design Report
	Tender & Contract Document	Construction QA including As Built Drawings and Manuals

for the recommended option describe and assess the risks (see risk matrix in the appendix):

Risk	Likelihood	Impact	Score
Construction H&S risks	Unlikely	Major	Medium
Option not acceptable to iwi	Unlikely	Moderate	Medium
Option unacceptable to external parties	Unlikely	Major	Medium
Environmental Risk	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

Taupo - Brentwood Reservoir

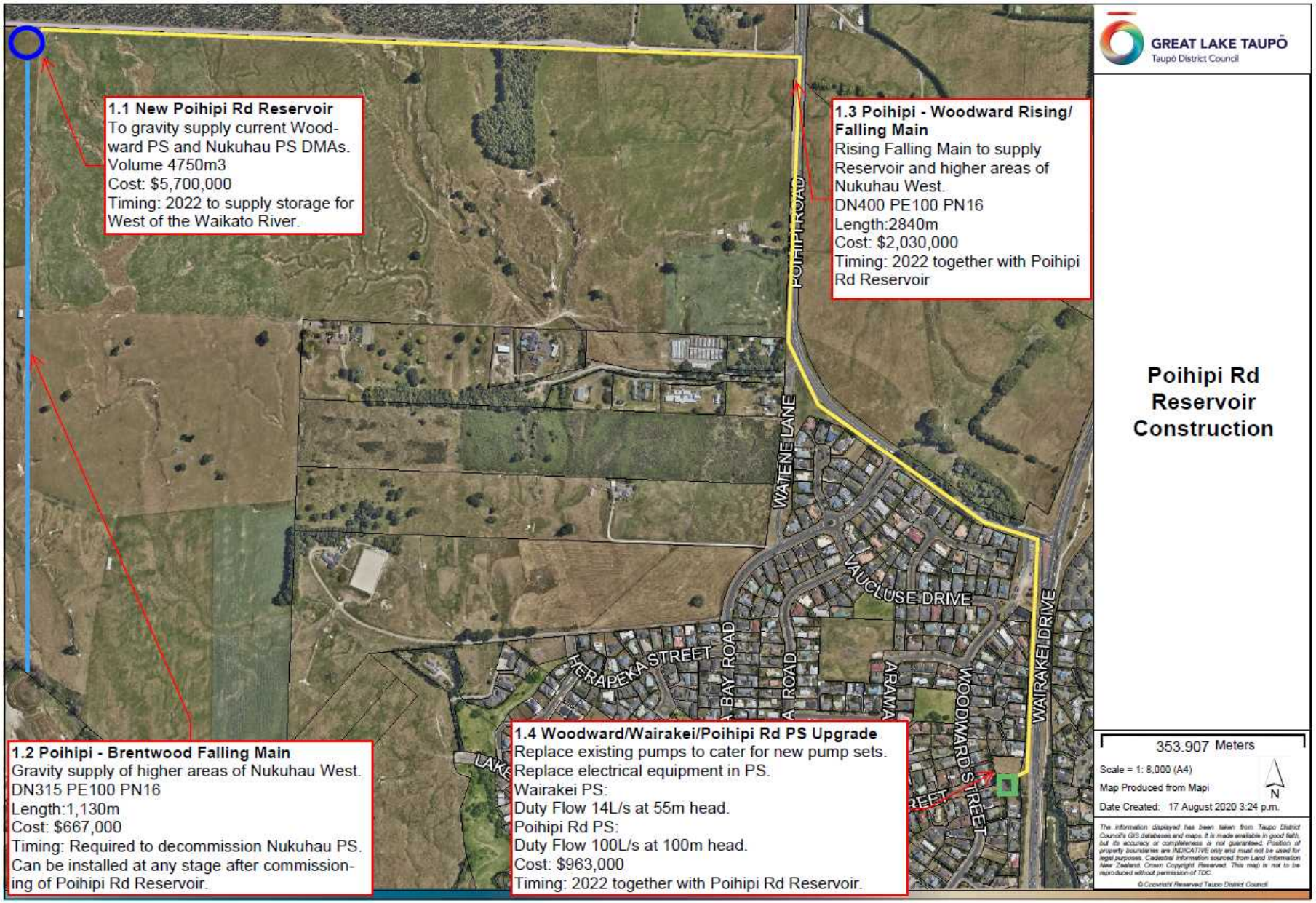
Estimated Project Start 1-Jul-32 (1-Jul-32) **Estimated Project Finish** 30-Jun-34

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	-	-	-	-	-	-	-	-	(150,000)	(1,850,000)	(2,000,000)
Implementation Opex	-	-	-	-	-	-	-	-	-	-	-
Direct Opex	-	-	-	-	-	-	-	-	-	-	-
Total Cash Outflow	-	-	-	-	-	-	-	-	**(150,000)**	**(1,850,000)**	**(2,000,000)**
Net Cashflow	-	-	-	-	-	-	-	-	**(150,000)**	**(1,850,000)**	**(2,000,000)**

Taupo - Poihipi Reservoir

Estimated Project Start 1-Jul-26 (1-Jul-26) **Estimated Project Finish** 30-Jun-29

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	-	-	(1,000,000)	(4,500,000)	(3,250,000)	-	-	-	-	-	(8,750,000)
Implementation Opex	-	-	-	-	-	-	-	-	-	-	-
Direct Opex	-	-	-	-	-	-	-	-	-	-	-
Total Cash Outflow	-	-	**(1,000,000)**	**(4,500,000)**	**(3,250,000)**	-	-	-	-	-	**(8,750,000)**
Net Cashflow	-	-	**(1,000,000)**	**(4,500,000)**	**(3,250,000)**	-	-	-	-	-	**(8,750,000)**


1.1 New Poihipi Rd Reservoir
To gravity supply current Woodward PS and Nukuhau PS DMAs.
Volume 4750m3
Cost: $5,700,000
Timing: 2022 to supply storage for West of the Waikato River.
1.3 Poihipi - Woodward Rising/ Falling Main
Rising Falling Main to supply Reservoir and higher areas of Nukuhau West.
DN400 PE100 PN16
Length:2840m
Cost: $2,030,000
Timing: 2022 together with Poihipi Rd Reservoir
1.2 Poihipi - Brentwood Falling Main
Gravity supply of higher areas of Nukuhau West.
DN315 PE100 PN16
Length:1,130m
Cost: $667,000
Timing: Required to decommission Nukuhau PS.
Can be installed at any stage after commissioning of Poihipi Rd Reservoir.
1.4 Woodward/Wairakei/Poihipi Rd PS Upgrade
Replace existing pumps to cater for new pump sets.
Replace electrical equipment in PS.
Wairakei PS:
Duty Flow 14L/s at 55m head.
Poihipi Rd PS:
Duty Flow 100L/s at 100m head.
Cost: $963,000
Timing: 2022 together with Poihipi Rd Reservoir.
POIHIPI ROAD
WATENE LANE
VAUCLUSE DRIVE
HERAPEKA STREET
WOODWARD STREET
WAIRAKEI DRIVE
GREAT LAKE TAUPŌ
Taupō District Council
Poihipi Rd Reservoir Construction
353.907 Meters
Scale = 1: 8,000 (A4)
Map Produced from Mapi
Date Created: 17 August 2020 3:24 p.m.
N


BRENTWOOD RESERVOIR LOCATION
Hato Patariki Lane
Manunui Street
Humphrey Street
Yellow Lady Court
Penny Grove
Benton Terrace
Olive Avenue
Ngaio Place
Whetu Place
Kahua Road
Marabou Crescent
Blue Dun Place
Chelsea Rise
Harding Close
Docherty Drive
The Grove
Northwood Road
Mansell Road
Mayfly Grove
Sedge Grove
The Pheasant Tail
Garden Grove
Brentwood Avenue
Mareth Street
McLauchlan Terrace
Arihia Street
Morrison Street
Noble Street
Woburn Place
Red Setter Grove
Raupoto Street
Acacia Court
Acacia Bay Road
Redoubt Street

Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction

Investment/Project Name:	Taupo – Seismic Resilience Upgrades for Taupo WTP
Project Purpose:	Strengthening and upgrade of mechanical components of the Taupo water treatment plant to provide appropriate seismic resilience
Business Need:	As above
Background:	**NOTE: Deferral is possible, but resilience risk remains until project is completed.** The Taupo WTP building was designed to importance level 4 standard which is the seismic resilience level recommended for facilities that have critical post disaster function. A recent report determined that the internal mechanical plant and infrastructure has not been designed to this performance level. The results indicate some plant items that are fundamental to the continued operation of the facility achieve a seismic resilience level that is around 10% to 20% of a new and totally compliant installation. These components are at high risk of failure during an event. Scope of this project is to provide strengthening upgrades to the plant components that are required for operation of the facility. This includes the following items: • Membrane Plant • Pipe Rack • Chemical Tanks • Cable Trays / Miscellaneous Unistrut • MCC / MSB • Air Compressors • Generator • Surge Vessel L1 • Air Receiver L1 • Air Receiver GL • Treated Water Tank
Project Description:	Improve Taupo water treatment plant seismic resilience by strengthening of internal components.
Project Location:	Taupo
Project Complexity:	Paint by Numbers

Strategic Case

The primary driver for this business case is being resilient and prepared. Doing this project reduces the chances of losing services which are critical for the town/district to operate. The secondary driver is maintaining levels of service as the project will ensure we can continue to deliver services which are critical for the town/district to operate. The tertiary driver is Health and Safety related as failure could have a severe impact on a small number of people.

Primary:	Being Resilient and Prepared	5
Secondary:	Maintaining Levels of Service	5
Tertiary:	Looking After Public Health and Safety	4
Investment objectives:	Improve seismic resilience of our largest water treatment plant.	
Opportunities:		

Potential Scope & Contextual Considerations

Minimum scope:	Strengthening of the following components: This includes the following items:

	• Membrane Plant • Pipe Rack • Chemical Tanks • Cable Trays / Miscellaneous Unistrut • MCC / MSB • Air Compressors • Generator • Surge Vessel L1 • Air Receiver L1 • Air Receiver GL • Treated Water Tank
Desirable scope:	
Aspirational scope:	
Excluded scope:	
Stakeholders:	Senior management, Councillors, TDC property team Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team, TDC Network Engineers
Constraints:	Maintaining water supply during strengthening works
Assumptions:	
Risks if project was deferred:	Plant failure and resulting loss of supply to residents during a major seismic event
Risks of doing the project:	Community pushback on the costs of the project Water supply interruptions during works

Options Analysis (add more options if applicable)			
Add more options if applicable	Option One: Change Nothing	Option Two: Strengthen/Upgrade as per programme	
Overview:	• No change.	• As presented above	•
Advantages:	• No capital cost to TDC.	• Greatest improvement to resilience • Ensures level of service is maintained • Greatest risk reduction	•
Disadvantages:	• Risk of loss of water supply during seismic events.	• High capital costs of upgrade.	•
Costs:	Capex $ 0 Opex $ No Change	Capex $1M over 2 years Opex $ minimal change	
Achievability:	This option is achievable but high risk.	This option is highly achievable.	
Recommendation:	The preferred option is option 2, minimum scope.		

Delivery		
Delivery details:	Multi-year project programme: • Year 0 – Design (underway in 2023/24) • Year 1 – Upgrade of smaller components • Year 2 – Upgrade of membrane racks and treated water tanks	
Outputs:	Design Report	
	Tender Document	
	Contract Document	
	Construction QA including As Built Drawings and Manuals	

for the recommended option describe and assess the risks (see risk matrix in the appendix):

Risk	Likelihood	Impact	Score
Construction H&S risks	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

For example

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	7,000	-	-	7,000
Efficiencies	-	-	-	-	-	-	-	1,375	1,500	1,500	7,375
External Funding	-	-	-	-	100,833	9,167	-	-	-	-	110,000
Total Cash Inflows	**-**	**-**	**-**	**-**	**100,833**	**9,167**	**-**	**8,375**	**1,500**	**1,500**	**124,375**
Cash Outflows											
Implementation Cost	-	-	-	-	(201,667)	(220,000)	(220,000)	(18,333)	-	-	(660,000)
Implementation Opex	-	-	-	-	(6,050)	(550)	-	-	-	-	(6,600)
Direct Opex	-	-	-	-	-	-	-	-	(8,067)	(733)	(17,600)
Recurring Opex	-	-	-	-	-	-	-	(2,017)	(2,200)	(2,200)	(10,817)
Total Cash Outflow	**-**	**-**	**-**	**-**	**(207,717)**	**(220,550)**	**(220,000)**	**(20,350)**	**(10,267)**	**(2,933)**	**(695,017)**
Net Cashflow	**-**	**-**	**-**	**-**	**(106,883)**	**(211,383)**	**(220,000)**	**(11,975)**	**(8,767)**	**(1,433)**	**(570,642)**

Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction

Investment/Project Name:	Taupo – Tauhara Ridge and Napier Road Reservoir Construction
Project Purpose:	Construct two new reservoirs to support growth in housing in Taupo.
Business Need:	Two new reservoirs are needed in southern Taupo. The reservoirs are needed to support growth, maintain and improve levels of service, support resilience planning by ensuring 24 hours storage is available across our networks.
Background:	**NOTE: Project should not be deferred as it will impact growth in Taupo including Property team aspirations.** The Taupo water scheme delivers water from the Lake Terrace Water Treatment Plant to the Taupo southern areas via the Titoki rising main and reservoir. There are three main pressure zones in the southern area. The low zone has adequate storage however the higher zones require additional storage to support growth. There is currently no storage in the high zone and by the year 2025 storage in the Medium Zone will have reduced to 16 hours. The Tauhara Ridge and Napier Road reservoirs are part of a masterplan to enable ongoing growth in the area. Land has been secured for the Tauhara Ridge reservoir and is in progress for the Napier Road reservoir. Timing of these reservoirs are linked to the TDC property team development plans and if deferred TDC property development plans will also need deferral. The Tauhara Ridge reservoir including pipelines, pump station and connection of the airport, is needed immediately to prevent level of service issues in Wharewaka and Richmond Heights. This medium zone reservoir will improve water pressure and security of supply to the airport area including drastically improving fire flows. The Napier Road reservoir is planned for construction in years 3 to 5. The project involves a pipeline through development lands from the existing Botanical pump station, upgrade of the pump station, a new reservoir and movement of the Bonshaw PS to the reservoir site. The reservoir will service higher elevation growth land in the EUL and will also allow higher pressure water to be fed through the main Taupo industrial areas (Crown Rd, Miro Street areas) to improve pressure and fire flow.
Project Description:	Construction of 2 reservoirs and supporting infrastructure.
Project Location:	Taupo
Project Complexity:	Paint by Numbers

Strategic Case

The primary driver for this business case is housing. Each reservoir enables in excess of 150 houses. The secondary driver for this business case is being resilient and prepared. Doing this project reduces the chances of losing water services to significant areas of Taupo. The tertiary driver is maintaining levels of service as the projects will enable the continuation of water service delivery to Taupo water users as growth occurs. The reservoirs also contribute to improving levels of service in relation to fire flow in some areas.

Primary:	Housing	5
Secondary:	Being Resilient and Prepared	5
Tertiary:	Maintaining Levels of Service	5
Investment objectives:	Enable growth in housing to occur. Emergency storage levels improved. Maintaining service levels to all customer as growth occurs. Improve fire flows through Taupo industrial area and to the Taupo airport.	
Opportunities:	All new reservoirs will be constructed as importance level 4 standard to ensure they can provide post disaster functions.	

Potential Scope & Contextual Considerations

Minimum scope:	New reservoirs and supporting infrastructure as follows: - New 2,000m3 reservoir at Tauhara Ridge. - Associated pipelines servicing the Tauhara Ridge reservoir. - Upgrade of the Titoki pump station to service the reservoir. - New pipelines at the airport. - New 2,500m3 reservoir at Napier Rd. - Associated pipelines servicing the reservoir. - Upgrade of the Botanical pump station to service the reservoir. - Movement of the Bonshaw Park PS to the reservoir site - Supporting pipelines to enable rezoning of the Taupo industrial land to higher pressure water
Desirable scope:	
Aspirational scope:	
Excluded scope:	Reservoir land purchase
Stakeholders:	Senior management, Councillors, TDC property team Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team, TDC Network Engineers, neighbours of each reservoir site, developers of growth lands.
Constraints:	
Assumptions:	Taupo Napier Rd – land purchase completed in 2023/24 year
Risks if project was deferred:	Inability to provide sufficient water to cater for planned growth Deferral of property team aspirations Level of service issues in some areas Lack of disaster resilience Lack of emergency response
Risks of doing the project:	Community pushback on the costs of the project

Options Analysis (add more options if applicable)			
Add more options if applicable	Option One: Change Nothing	Option Two: Build reservoirs as planned	Option Three: Alter timing of reservoir construction
Overview:	• No change	• Year 1 Construct Tauhara Ridge Reservoir • Year 2 to 4 Construct Napier Rd Reservoir	• Year 1 Construct Tauhara Ridge Reservoir • Later Construct Napier Rd Reservoir
Advantages:	• Lowest budget required	• Improves resilience • Improves storage levels • Supports growth including TDC aspirations • Ensures level of service is maintained • Improves fire flows	• Improves resilience, storage levels and growth aspiration in south EUL (medium zone) • Ensures level of service is maintained in Wharewaka and Richmond Heights • Improves fire flows to airport
Disadvantages:	• Emergency storage levels below expected levels which may impact maintenance and emergency response. • Lack of resilience in a disaster • Need to slow growth in some areas – restrict housing construction. • TDC development aspirations require deferral • Reduced or negative community perception of TDC. • Areas of Wharewaka and Richmond Heights will not receive water at peak times	• High capital costs of upgrade. • Rates impact	• High zone growth needs to be restricted. • TDC development aspirations in high zone deferred. • Lack of resilience in high zone
Costs:	Capex $0 Opex - no change	Capex - Tauhara $3.9M ($1.9M available already) - Napier Rd $5.5M Opex - minimal change	Capex - Tauhara $3.9M ($1.9M available already) - Napier Rd deferred Opex - minimal change
Achievability:	This option is not achievable as customers will not receive water	This option is highly achievable.	This option is highly achievable.
Recommendation:	The preferred option is option 2, minimum scope.		

Delivery		

Delivery details:	Multi-year project delivery to include:
	Tauhara Ridge
	• Year 0 (2023/24)
	  ○ Network modelling – complete
	  ○ Reservoir contract development and tendering – underway
	  ○ Pump station and Pipeline detail design - underway
	• Year 1
	  ○ Construction
	Napier Road
	• Year 0 (2023/24)
	  ○ Land acquisition – underway
	  ○ Network modelling – complete
	• Year 2
	  ○ Reservoir contract development and tendering - outsource
	  ○ Pump station and pipeline detail design - outsource
	• Year 3
	  ○ Procurement
	  ○ Construction
	• Year 4
	  ○ Construction	

Outputs:	Modelling Report	
	Design Report	
	Tender Document	
	Contract Document	
	Construction QA including As Built Drawings and Manuals	

for the recommended option describe and assess the risks (see risk matrix in the appendix):

Risk	Likelihood	Impact	Score
Construction H&S risks	Unlikely	Major	Medium
Option not acceptable to iwi	Unlikely	Moderate	Medium
Option unacceptable to external parties	Unlikely	Major	Medium
Environmental Risk	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

Napier Road Reservoir

Estimated Project Start	1-Jul-25	**Estimated Project Finish**	30-Jun-28
	1-Jul-25		

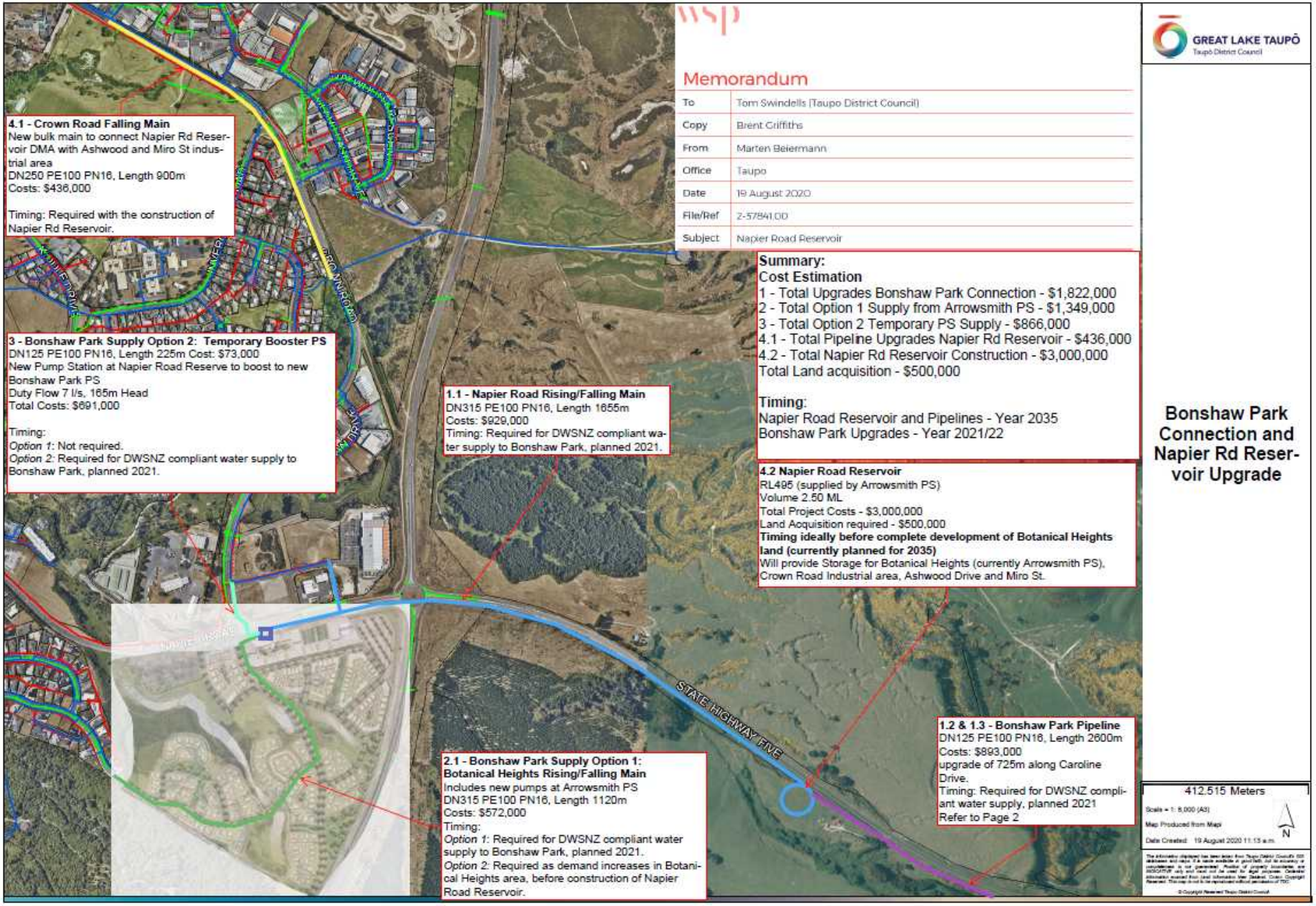
	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	-	(300,000)	(4,300,000)	(900,000)	-	-	-	-	-	-	(5,500,000)
Implementation Opex	-	-	-	-	-	-	-	-	-	-	-
Direct Opex	-	-	-	-	-	-	-	-	-	-	-
Total Cash Outflow	-	**(300,000)**	**(4,300,000)**	**(900,000)**	-	-	-	-	-	-	**(5,500,000)**
Net Cashflow	-	**(300,000)**	**(4,300,000)**	**(900,000)**	-	-	-	-	-	-	**(5,500,000)**

Tauhara Ridge Reservoir

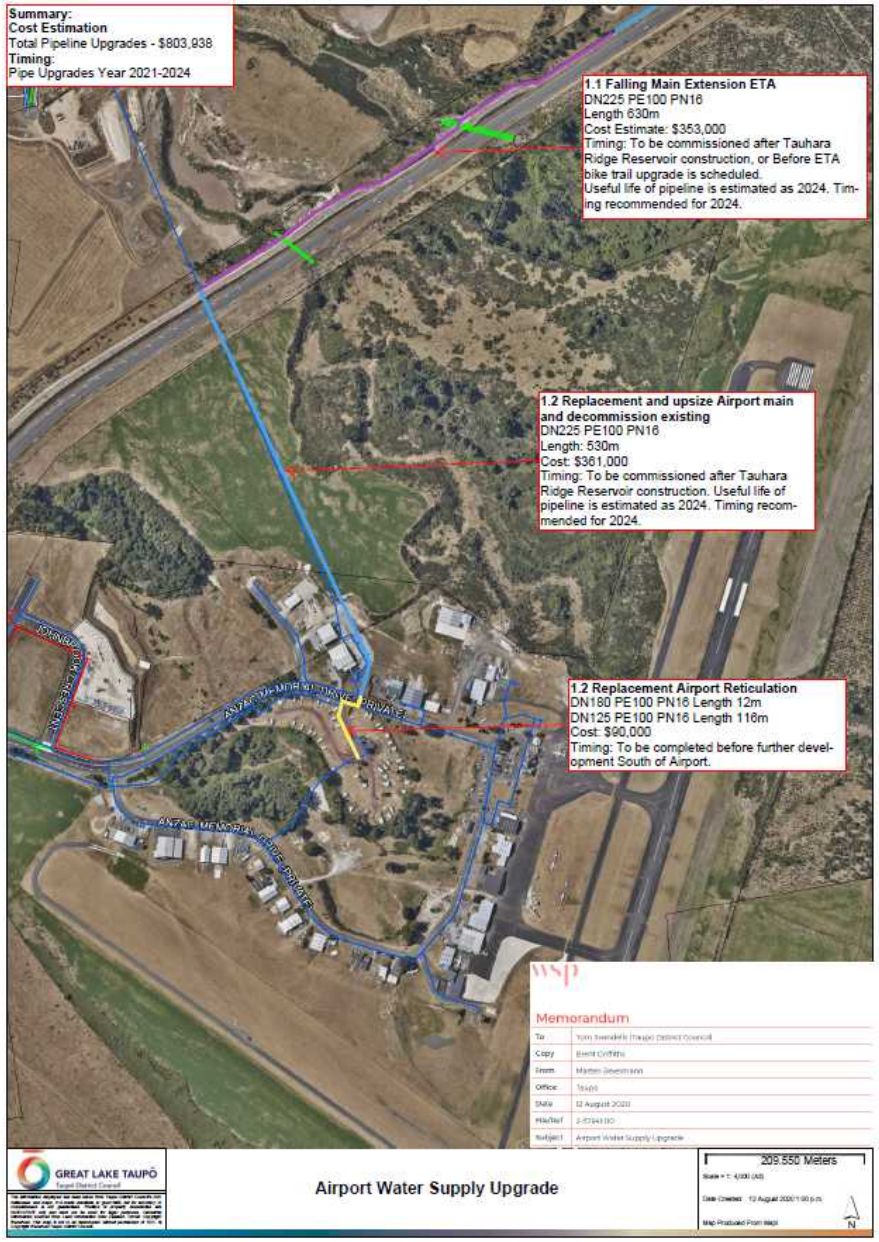
Estimated Project Start	1-Jul-24	**Estimated Project Finish**	30-Jun-25
	1-Jul-24		

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	-	-	-	-
Efficiencies	-	-	-	-	-	-	-	-	-	-	-
External Funding	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflows	-	-	-	-	-	-	-	-	-	-	-
Cash Outflows											
Implementation Cost	(2,000,000)	-	-	-	-	-	-	-	-	-	(2,000,000)
Implementation Opex	-	-	-	-	-	-	-	-	-	-	-
Direct Opex	-	-	-	-	-	-	-	-	-	-	-
Total Cash Outflow	**(2,000,000)**	-	-	-	-	-	-	-	-	-	**(2,000,000)**
Net Cashflow	**(2,000,000)**	-	-	-	-	-	-	-	-	-	**(2,000,000)**

GREAT LAKE TAUPŌ
Taupō District Council



GREAT LAKE TAUPŌ
Taupō District Council


Summary:
Cost Estimation
Total Pipeline Upgrades - $803,938
Timing:
Pipe Upgrades Year 2021-2024
1.1 Falling Main Extension ETA
DN225 PE100 PN16
Length 630m
Cost Estimate: $353,000
Timing: To be commissioned after Tauhara Ridge Reservoir construction, or Before ETA bike trail upgrade is scheduled.
Useful life of pipeline is estimated as 2024. Timing recommended for 2024.
1.2 Replacement and upsize Airport main and decommission existing
DN225 PE100 PN16
Length: 530m
Cost: $361,000
Timing: To be commissioned after Tauhara Ridge Reservoir construction. Useful life of pipeline is estimated as 2024. Timing recommended for 2024.
1.2 Replacement Airport Reticulation
DN180 PE100 PN16 Length 12m
DN125 PE100 PN16 Length 116m
Cost: $90,000
Timing: To be completed before further development South of Airport.
ANZAC MEMORIAL DRIVE PRIVATE
ANZAC MEMORIAL DRIVE PRIVATE
PARKING
wsp
Memorandum
GREAT LAKE TAUPŌ
Airport Water Supply Upgrade
209.550 Meters

Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction

Investment/Project Name:	Taupo - Wairakei Area Capacity Upgrade
Project Purpose:	Upgrade rising main and pump station to improve pump efficiency, prevent failures and allow further growth between Wairakei and Taupo.
Business Need:	As above.
Background:	**NOTE: project can be deferred but growth is currently restricted in the area.** Water from the Taupo water supply scheme is pumped from Woodward Street pump station in Nukuhau, along Wairakei Drive to the Wairakei reservoirs. The scheme feeds residential customers in Wairakei village as well as industrial and commercial customers between Taupo and Wairakei. Recent new connection requests have been received from customers along the pipe route including new developments, existing commercial enterprises and residential properties (Huka Lodge, Wairakei International Golf Course Development, Brewery, BP). A master planning project was undertaken to assess the water infrastructure upgrades needed to ensure levels of service are maintained as growth in connection continues. The master planning exercise found that a 1.5km stretch of pipeline, between Wairakei Resort and Wairakei Village is undersized. The pipeline currently experiences headloss twice that which is normally acceptable, which reduces the efficiency of pumping and increases the probability of pipe failure. The pipeline also limits future connections to the scheme. It is proposed to replace this 1.5km section of pipeline with an upgraded pipeline and upgrade the pump station as soon as possible.
Project Description:	Upgrade of Wairakei Pumps within Woodward Street PS and upgrade of 1.5km of rising main between Taupo and Wairakei village.
Project Location:	Taupo
Project Complexity:	Paint by Numbers

Strategic Case

The primary driver for this business case is Economic Development. Creating additional capacity in the feed to Wairakei will enable additional water supply connections to potential customers on the water main route. Based on queries received this includes possible accommodation developments as well as commercial enterprises. The secondary and tertiary drivers are maintaining levels of service and resilience. The project will ensure we can continue to deliver services to existing Wairakei area customers.

Primary:	Economic Development	3
Secondary:	Maintaining Levels of Service	3
Tertiary:	Being Resilient and Prepared	2
Investment objectives:	Enables growth in connections in area Reliable water supply that is not prone to failure during high demand periods Improved pipeline resilience Improved pumping efficiency	
Opportunities:	Opportunity exists to renew watermains that have reached their end of life within Wairakei Village at the same time as the upgrade project to improve efficiency of contract delivery. Funding of this opportunistic scope would be via network renewal budgets.	

Potential Scope & Contextual Considerations

Minimum scope:	Upgrade of 1.5km of the Wairakei rising main from 100mm PVC to 180mm PE to improve pump efficiency, prevent failures and allow further growth in connections.

	Upgrade of Wairakei pump set to enable additional capacity of pumping volume to support growth in connections.
Desirable scope:	
Aspirational scope:	
Excluded scope:	
Stakeholders:	Senior management, Councillors, Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team.
Constraints:	
Assumptions:	
Risks if project was deferred:	High operating costs – pump set inefficient Pipeline failures Inability to service growth
Risks of doing the project:	Community pushback on the costs of the project

Options Analysis (add more options if applicable)			
Add more options if applicable	Option One: Change Nothing	Option Two: Upgrade	
Overview:	• No change to network.	• Upgrade 1.5km of pipeline • Upgrade pump station	•
Advantages:	• No capital cost to TDC.	• Improved pump efficiency • Reduced probability of failure • Improved growth capacity	•
Disadvantages:	• Poor pump efficiency • Higher probability of failure • No growth capacity	• Capital cost	•
Costs:	Capex $ 0 Opex no change	Capex $ 1,050,000 Opex - no change	
Achievability:	This option is achievable.	This option is achievable.	
Recommendation:	The preferred option is option 2, minimum scope.		

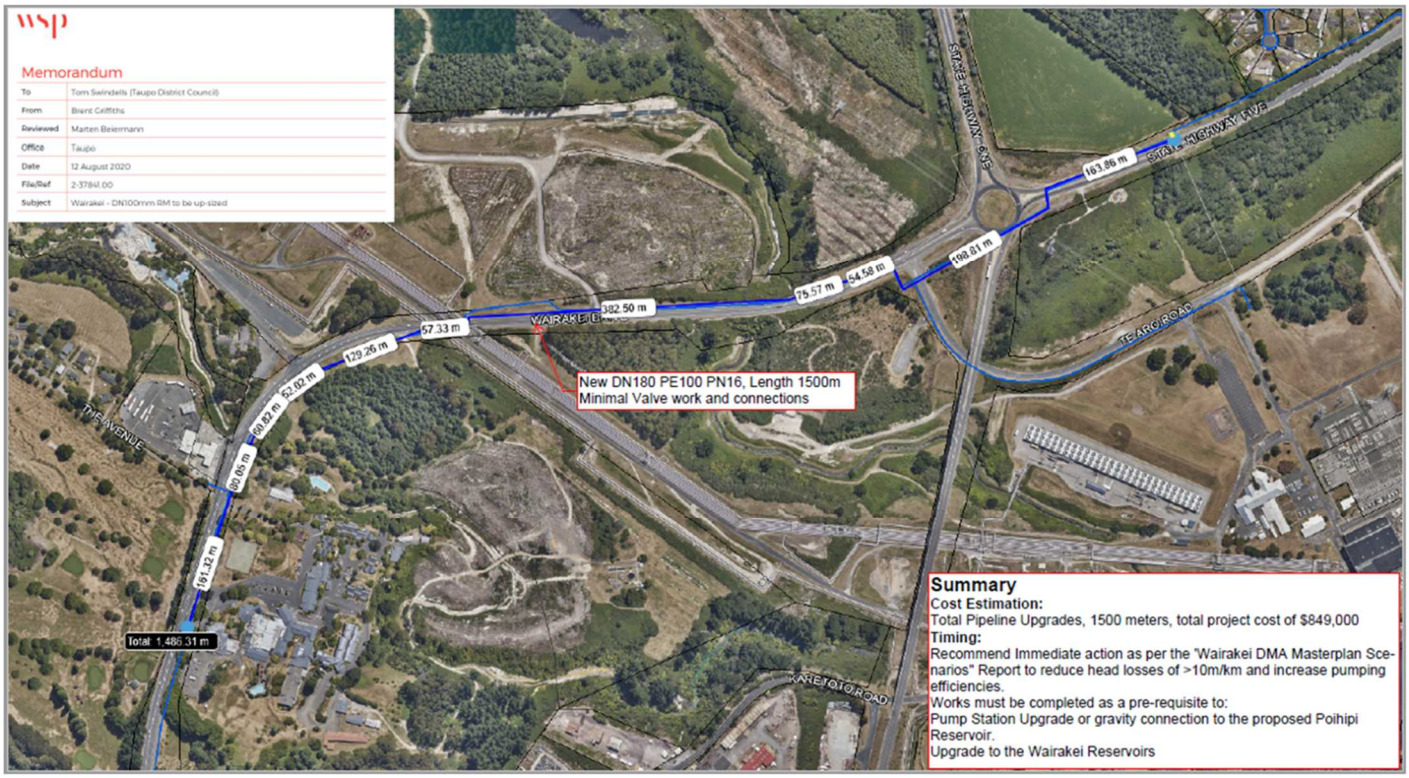
Delivery		
Delivery details:	Standard design, tender, construct approach. Potentially packaged with pipeline renewals in Wairakei.	
Outputs:	Design Report	
	Tender Document	
	Contract Document	
	Construction QA including As Built Drawings and Manuals	

for the recommended option describe and assess the risks (see risk matrix in the appendix):			
Risk	**Likelihood**	**Impact**	**Score**
Construction H&S risks	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

For example

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	7,000	-	-	7,000
Efficiencies	-	-	-	-	-	-	-	1,375	1,500	1,500	7,375
External Funding	-	-	-	-	100,833	9,167	-	-	-	-	110,000
Total Cash Inflows	**-**	**-**	**-**	**-**	**100,833**	**9,167**	**-**	**8,375**	**1,500**	**1,500**	**124,375**
Cash Outflows											
Implementation Cost	-	-	-	-	(201,667)	(220,000)	(220,000)	(18,333)	-	-	(660,000)
Implementation Opex	-	-	-	-	(6,050)	(550)	-	-	-	-	(6,600)
Direct Opex	-	-	-	-	-	-	-	-	(8,067)	(733)	(17,600)
Recurring Opex	-	-	-	-	-	-	-	(2,017)	(2,200)	(2,200)	(10,817)
Total Cash Outflow	**-**	**-**	**-**	**-**	**(207,717)**	**(220,550)**	**(220,000)**	**(20,350)**	**(10,267)**	**(2,933)**	**(695,017)**
Net Cashflow	**-**	**-**	**-**	**-**	**(106,883)**	**(211,383)**	**(220,000)**	**(11,975)**	**(8,767)**	**(1,433)**	**(570,642)**


Memorandum
To Tom Swindells (Taupo District Council)
From Brent Griffiths
Reviewed Marten Beiermann
Office Taupo
Date 12 August 2020
File/Ref 2-37841.00
Subject Wairakei - DN100mm RM to be up-sized
STATE HIGHWAY 5/5
STATE HIGHWAY FIVE
163.86 m
198.81 m
54.58 m
75.57 m
382.50 m
57.33 m
129.26 m
62.02 m
69.82 m
60.05 m
91.32 m
TAF AVENUE
TE ARIKI ROAD
KARETOTO ROAD
Total: 1,486.31 m
New DN180 PE100 PN16, Length 1500m
Minimal Valve work and connections
Summary
Cost Estimation:
Total Pipeline Upgrades, 1500 meters, total project cost of $849,000
Timing:
Recommend Immediate action as per the "Wairakei DMA Masterplan Scenarios" Report to reduce head losses of >10m/km and increase pumping efficiencies.
Works must be completed as a pre-requisite to:
Pump Station Upgrade or gravity connection to the proposed Poihipi Reservoir.
Upgrade to the Wairakei Reservoirs

Business Owner:	T Swindells	Author:	T Swindells
Approver:		Date:	

Introduction

Investment/Project Name:	**Tirohanga and Whareroa Treatment Compliance Upgrade**
Project Purpose:	To upgrade the Tirohanga and Whareroa water treatment plant to provide safe water to our community and to ensure compliance with the Water Service Act and supporting Water Services (DWSNZ) Regulations 2022.
Business Need:	Same as Project Purpose
Background:	**NOTE: Deferral of projects is not recommended as these are critical compliance upgrades to ensure water safety. UV units are already purchased (Govt Funded) and in storage.** The following Council water supply schemes have been identified as needing additional treatment to ensure the water is safe to drink and to enable compliance with the Water Service (DWSNZ) Regulations 2022. • Tirohanga • Whareroa The treated water at these sites does not meet the compliance requirements of the DWSNZ. This is largely because the schemes do not provide a barrier against protozoa, bacterial treatment is insufficient, and the water is plumbosolvent and so requires pH correction. It is proposed to upgrade each of these water treatment plants by the installation of an ultra-violet light (UV) disinfection process (well-known and tested technology) that will provide a treatment barrier to protozoa and bacteria, and a pH correction process. Council has already completed similar upgrades at River Road and Whakamaru, and upgrades are underway at Atiamuri and Waihaha.
Project Description:	Construction of new water treatment facilities at Tirohanga and Whareroa.
Project Location:	District
Project Complexity:	Paint by Numbers

Strategic Case

The primary driver for this business case is Looking after Public Health and Safety. This includes the risk of widespread illness from a water contamination event such as that caused by Giardia or Cryptosporidium which currently the treatment plants have no barrier to remove. The secondary driver for this business case is regulatory compliance with the Water Services Act within which Council has a duty to ensure that the drinking water supplied is safe. The tertiary driver is being resilient and prepared. Doing this project reduces the chances of losing services which are critical for the townships to operate.

Primary:	Looking after Public Health and Safety	5
Secondary:	Being Legislatively Compliant	4
Tertiary:	Being Resilient and Prepared	5
Investment objectives:	Providing high quality drinking water that complies with the DWSNZ. Providing high quality drinking water that prevents public health issues. Reliable water supply that is not prone to shut down due to poor water quality. Improved customer satisfaction with water supply quality.	
Opportunities:	Packaging of treatment plant upgrades to allow streamlined procurement and to take advantage of efficiencies in delivery.	

Potential Scope & Contextual Considerations

Minimum scope:	Upgrade of the water treatment plants by the installation of UV disinfection processes, pH correction and sufficient chlorine contact time for bacterial compliance. The upgrade at Tirohanga will be in a new building. The upgrade at Whareroa will be within an extension to the existing treatment building.

Desirable scope:	
Aspirational scope:	
Excluded scope:	Upgrade of network and reservoirs.
Stakeholders:	Senior management, Councillors, TDC property team Residents/Customers, TMTB, Project Team (TDC staff and Consultants), TDC Treatment Operations Team, TDC Network Engineers
Constraints:	Existing land availability.
Assumptions:	Source water quality remains the same as current
Risks if project was deferred:	Non-compliance with the DWSNZ and Water Services Act Public health risks Community complaints due to poor water quality, loss of supply or sickness Fines, legal action, enforced upgrade costs. Ongoing operational challenges and reactive operational costs Negative publicity and impact on economic development
Risks of doing the project:	Increased operational costs Increased operational complexity Community pushback on the costs of the project

Options Analysis (add more options if applicable)			
Add more options if applicable	Option One: Do Nothing	Option Two: Connect Scheme via Pipelines	Option Three: Construct New Treatment Plants
Overview:	• The 'do nothing' option means Council will continue to provide water to the community via the current treatment facilities.	Pipe water supply from the nearest existing TDC reticulation. All reasonable options for extension of existing schemes have been explored. The capital and operational costs are far in excess of treatment plant construction costs.	• Upgrade the treatment plants to meet all requirements of the DWSNZ.
Advantages:	• No capital cost to TDC.		• Significantly improved and DWSNZ compliant Water supply. • Reduced health risks as the community will receive high quality treated water • Independent water supply provides additional resilience.
Disadvantages:	• Continuation of non-compliant water supply. • Legislative non-compliance with risk of fines or other legal action • Potential health risks to the community because of consuming potentially contaminated water. • Reduced or negative community perception of TDC. • Other as detailed under risk of not doing		• High capital costs of upgrade and high ongoing operational costs. • Additional treatment processes to achieve DWSNZ requirements require additional ongoing operating costs.
Costs:	Capex $0 Opex $No change		Capex / Opex Tirohanga: $2.2M / $76k/annum Whareroa: $1.61M / $35k/annum
Achievability:	This option is achievable but not acceptable from a public health and legislative perspective.	No	This option is highly achievable.
Recommendation:	Proceed with option 3 as this provides the best outcome for the communities.		

Delivery		
Delivery details:	Multi-year approach as programme of works: - Design build contract - Project management in house - Design reviews and support via external consultant - Construction	
Outputs:	Engineering Design and Contract Documents	
	Construction QA including As Built Drawings and O&M Manuals	

for the recommended option describe and assess the risks (see risk matrix in the appendix):			
Risk	**Likelihood**	**Impact**	**Score**
Construction H&S risks	Unlikely	Major	Medium

Financials – SNIP from Business Case Model

For example

	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	LTP Total
Cash Inflows											
Implementation Benefit	-	-	-	-	-	-	-	7,000	-	-	7,000
Efficiencies	-	-	-	-	-	-	-	1,375	1,500	1,500	7,375
External Funding	-	-	-	-	100,833	9,167	-	-	-	-	110,000
Total Cash Inflows	**-**	**-**	**-**	**-**	**100,833**	**9,167**	**-**	**8,375**	**1,500**	**1,500**	**124,375**
Cash Outflows											
Implementation Cost	-	-	-	-	(201,667)	(220,000)	(220,000)	(18,333)	-	-	(660,000)
Implementation Opex	-	-	-	-	(6,050)	(550)	-	-	-	-	(6,600)
Direct Opex	-	-	-	-	-	-	-	-	(8,067)	(733)	(17,600)
Recurring Opex	-	-	-	-	-	-	-	(2,017)	(2,200)	(2,200)	(10,817)
Total Cash Outflow	**-**	**-**	**-**	**-**	**(207,717)**	**(220,550)**	**(220,000)**	**(20,350)**	**(10,267)**	**(2,933)**	**(695,017)**
Net Cashflow	**-**	**-**	**-**	**-**	**(106,883)**	**(211,383)**	**(220,000)**	**(11,975)**	**(8,767)**	**(1,433)**	**(570,642)**