TARARUA
DISTRICT COUNCIL

The Case for Universal Water Meters in the Tararua District

April 2025

Document Control History

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2.1 Background

2.1.1 Our Water Supply Schemes

Tararua District Council currently owns, manages and operates six water supply schemes, supplying water to over 5,000 residential properties across the towns of Dannevirke, Pahiatua, Woodville, Eketāhuna, Norsewood and Ākitio. A seventh scheme, in Pongaroa, is owned under a rural water scheme structure and operated by Tararua District Council.

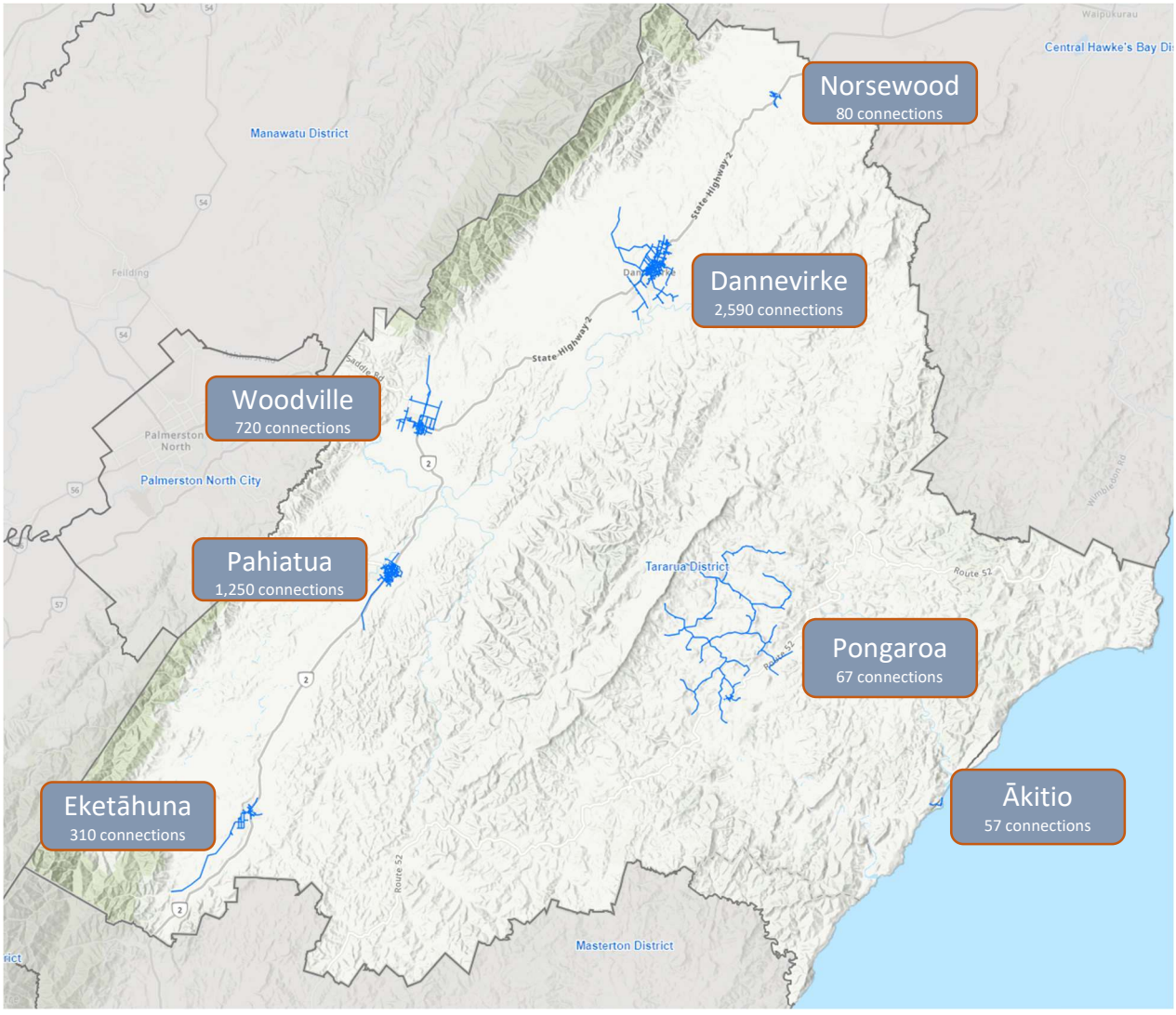


Figure 2-1: Tararua District Water Supply Schemes.

Water is primarily sourced via surface water takes from local rivers (with some ground-source bores) and then stored in raw water storage reservoirs before it is treated and supplied to communities. Water takes are managed through resource consent from the Horizons Regional Council.

2.1.2 Our Current Challenges

As further explored in Section 3.1.1, the Tararua District is a relatively water scarce area. One of the most significant natural hazards for the district is drought, which is expected to become more frequent and severe with climate change. Some of our surface water supplies are within over-allocated zones, and alternative water sources are not reliable or even available in many cases. To meet the future needs of our existing and growing populations, we need a strategy to better manage the water we take in a more efficient, effective manner. This will also help to offset potential future infrastructure upgrade costs.

We have identified the need for a demand management strategy across all the water supplies we own. A core component of this, which is widely recognised nationally and globally, is to install universal water meters so that we better understand water usage, target inefficient water use and drive behavioural change from our connected users.

2.2 Scope and Purpose

The purpose of this report is to outline the case for universal water metering and its role in the wider demand management strategy for the Tararua District. We then identify how the water metering project will be implemented. This report broadly follows a business case approach, and is structured into five key sections, as follows:

- **The Case for Change** – why universal water metering is needed in the context of a wider District wide demand management strategy.
- **Options to be Considered** – specific considerations and options for the implementation of water metering, such as the type of meter, connectivity, and how to address specific challenges.
- **Project Delivery Approach** – required workstreams for a successful project and our approach to procuring the right resources for successful delivery.
- **Project Management** – managing programme, cost, risk and public engagement.
- **Funding and affordability** – including long term financial implications for our community.

3 The Case for Change

3.1 Challenges and Opportunities

3.1.1 District-wide Challenges and Opportunities

In September 2024, Tararua District Council published a Demand Management and Water Conservation Plan as a requirement of its resource consents to extract surface water for the purposes of several water supplies across the district. It provided a comprehensive strategy to manage water demand and promote conservation across the main townships of Dannevirke, Woodville, Pahiatua, and Eketāhuna. The plan collated information on current water supply challenges that are a driving force for demand management and have been summarised below.

Regional Water Management Challenges

The Manawatū Freshwater Management Unit (FMU) has been split into 49 surface water management sub-zones, each with an allocation limit. As of June 2023:

- Four of these are over allocated.
- Two are fully allocated.
- 17 are between 95-100% allocation, and
- 26 are under the allocation limit.

Two of the water supplies for major towns in the Tararua District – Eketāhuna and Dannevirke – lie within over-allocated sub-zones. Further, the Pahiatua surface water supply is within a nearly allocated zone.

Drought as a Natural Hazard

One of the most significant natural hazards in the Tararua District is drought, which is expected to become more frequent and severe with climate change. Resource consents for surface (river / stream) water takes to most of TDC's water supplies are restricted to 'low flow limits' during low river flows.

Meeting the Demands of Growth

According to Tararua District Council's Urban Growth Strategy (2024) the district has grown from a population of 17,500 in 2013 to 19,000 in 2023, an increase of 8.6%. The population is expected to increase by another 8.9% over the next 10 years, and 17% over the next 30 years. Without measures to address demand, substantial investment will be required in infrastructure in some towns to provide water for the growing population at adequate levels of service. Demand management is therefore seen as a growth enabler to ensure that the

district has the headroom in its water supplies to support growth, which is critical to the ongoing economic success of the District.

3.1.2 Specific Supply Challenges and Opportunities

In addition to the Demand Management and Water Conservation Plan of September 2024, Tararua District Council facilitated a workshop with iwi representatives in December 2024 to identify specific challenges in the delivery of water and wastewater services across the district.

The following table provides a summary of critical issues for each water supply.

Table 3-1: Critical Challenges with Tararua District's Water Supply Schemes.

Water Supply Scheme	Critical Challenges
Dannevirke	• 56% of the water supply is estimated to be lost to non-revenue water, including leakage across the public and private water supply infrastructure and unknown rural water connections. • During low river flows, demand can exceed the permitted abstraction rate from the Tamaki River. Alternative sources or additional storage may be required to address this, at significant cost. • The Dannevirke water supply lies within an over-allocated water supply zone. • The impounded water storage facility for storing raw water requires repairs and ongoing maintenance and is a single point of failure in the supply network • Without measures to curb water demand, the capacity of the existing water treatment plant will be reached by 2028. • There is insufficient treated water reservoir capacity.
Woodville	• 33% of the water supply is estimated to be lost to non-revenue water, including leakage across the public and private water supply infrastructure and unknown rural water connections. • During low river flows, demand can exceed the permitted abstraction rate from the Mangapapa River. An abatement notice has been issued by Horizons Regional Council in this regard. Alternative sources or additional storage may be required to address this, at significant cost. • With projected growth and current losses, headroom in the water treatment plant is expected to rapidly deplete and will be exceeded in the foreseeable future.

Water Supply Scheme	Critical Challenges
	• 6km (42%) of the total pipe network is undersized to meet capacity needs. • Additional, resilient reservoir storage is required regardless of non-revenue water improvements.
Pahiatua	• 36% of the water supply is estimated to be lost to non-revenue water, including leakage across the public and private water supply infrastructure and unknown rural water connections. • The Pahiatua water supply lies within nearly allocated water supply zone. • During low river flows, demand will get very close to the permitted abstraction rate from the Mangatainoka River and Pahiatua bore. • There are some areas of the township where the pipes are significantly undersized to meet future growth • No significant impact on water treatment plant because it has been upgraded to meet future demands.
Eketāhuna	• 49% of the water supply is estimated to be lost to non-revenue water, including leakage across the public and private water supply infrastructure and unknown rural water connections. • There is insufficient water treatment plant capacity to meet future growth with current NRW levels.
Norsewood	• No reported issues
Ākitio	• The water supply is from a spring on private land which is limited to a take of 50m³ per day and relies to some extent on the goodwill of the landowner to continue to provide the necessary supply. • In peak summer periods, when the township experiences extremely high population, water shortages are experienced. • Leaks from existing infrastructure (such as the water tanks) contribute to water shortages.

3.1.3 Key Problem Statements

Based on the investigations identified above and further evidence from Tararua District Council's three waters operations and asset management teams, the following key problem statements have been identified:

1. ***While the Tararua District faces significant drought risk and pressure on water allocation to public water supplies, the existing water extracted from these sources is not efficiently used.***

   Water leakage and unknown connections in Tararua District's major networks typically account for one third to one half of all water demand across major townships. There is no data on water losses in the district's smaller water supplies.

   These losses are higher than New Zealand's nationally estimated leakage from public water networks, which is estimated to be 22% of all water supply[1]. New Zealand is identified as a poor performer among OECD countries.

2. ***Without urgent action to address demand, upgrades to water storage, water treatment and/or distribution infrastructure are required in the foreseeable future to address capacity issues.***

   The costs of addressing this are significant in the context of Tararua District's relatively small ratepayer base.

3. ***At present, TDC does not have access to reliable or sufficient data sources to support targeted demand management with the limited resources it has.***

   For example, it is thought that some water supply networks have extensive (but unknown) rural connections that supply commercial / farming operations, but the extent to which these contribute to non-revenue water loss cannot be readily quantified. Further, leak detection relies on highly manual and labour-intensive methods to target network leakage.

3.2 The Role of Universal Water Metering

3.2.1 Demand Management Initiatives

TDC's Demand Management and Water Conservation Plan (2024) identifies a range of possible demand management initiatives, which are summarised in the table below.

[1] https://www.phcc.org.nz/briefing/plugging-gap-aotearoas-piped-water-loss-far-worse-global-leaders

Table 3-2: Demand Management Initiatives.

Water Conservation Initiative	Summary	Degree of Expected Impact
Metering extraordinary users	TDC's Water Supply Bylaw (2019), classifies extraordinary supplies as a "category of on demand supply including all purposes for which water is supplied other than ordinary supply and which may be subject to specific conditions and limitations". It includes users such as fixed garden irrigation systems. Commercial and industrial businesses, agricultural users, lifestyle blocks and fire protection systems. Clause 17.2 of the bylaw states that extraordinary water supplies will normally be metered and charged, other than in circumstances where the extraordinary supply is for fire protection only. However, it is understood that metering has not been consistently adopted across the district.	Moderate to High
Universal water metering and charging	Install meters on all supply connection points and charge for water on a volumetric basis. This is expected to drive behavioural changes in water use and target leaks early.	High
Conservation awareness programmes	Undertake public engagement initiatives and campaigns that provide education on water conservation.	Low to moderate
Water audits	Undertake audits of extraordinary users to benchmark efficiency and identify opportunities for savings.	Low
Water restrictions	As is undertaken at present, place water restrictions on use (such as hose bans) during dry periods.	Low
Infrastructure management, including:		

Water Conservation Initiative	Summary	Degree of Expected Impact
Leak detection and reduction	Undertake leak detection progressively across networks to identify major targets for leak reduction, and then undertake network repairs accordingly.	Moderate (without universal metering) to High
Restrictor checks	Flow restrictors installed on water connections to properties are subject to wear and tear which will gradually increase water consumption. TDC's bylaw stipulates that Council may install restrictors and retains ownership and responsibility for maintenance of these. Clause 33.7 of the bylaw states that restrictors shall be tested by measuring the flow through it under minimum operating pressure requirements. However, there are no restrictors in the network at present.	Moderate to high (if applied across all connections)
Pressure management	Analyse network pressures and install pressure control devices. Doing so reduces leakage by reducing the force through which water passes through holes / cracks in pipes.	Low to moderate
Use of water efficient technologies	Support the public to install water efficient devices, such as water efficient faucets.	Low
Water capture, reuse and recycling	Support the public to install rainwater tanks for non-potable water uses, and/or require developers to install grey water systems.	Low

3.2.2 The Role of Universal Water Metering

Universal water metering is a widely accepted approach to managing water usage and is now adopted in over 50% of water connections in New Zealand. It forms a critical part of demand management programmes.

Water New Zealand's National Performance Review for 2018/19 illustrates a strong correlation between metering and low domestic per capita water consumption. Examples include Western Bay of Plenty, Auckland and Whangarei, all of whom have water use of 120 – 180 l/person/day. This is lower than typically expected demand of 180 – 220 l/person/day for unmetered, well managed networks, and significantly lower than the reported 500 l/person/day or greater across Tararua District's networks.

Therefore, given the large discrepancy between Tararua District's estimated per capita consumption, and that of metered networks, it confirms that universal water metering should form a critical part of TDC's demand management strategy.

3.3 Project Objectives

Based on the problem statement and challenges described above, four key project objectives have been defined as presented below.

Objective 1: By 2030, deliver at least 30% reduction in peak water demand across Tararua District Council's water supply schemes to defer or eliminate capital expenditure in capacity upgrades to these schemes.

A 30% target has been proposed as this aligns to the expected or realised savings from volumetric water charging once universal water metering were installed in other locations New Zealand.

Establishing volumetric charging following the implementation of universal water metering in and of itself will only go so far to achieving this reduction target – by changing behaviours in water demand. Other initiatives, such as a network leak reduction programme, will be required to achieve this target, and this is outside the scope of this universal water metering project. However, universal water metering will make leak detection and management easier in the future.

Objective 2: Enable Tararua District Council to more effectively ringfence and target water revenue to support investment in water services and assets, in line with national policy expectations.

As noted above, legislation relating to Local Water Done Well brings greater focus on sustainable funding of water services using three mechanisms:

- Ensuring water services must generate sufficient revenue, either directly from users or through rates, to cover the costs of maintenance and depreciation of water infrastructure.
- Separating water services' financial requirements from other council operations to prevent cross-subsidisation.
- Water services should have the ability to access borrowing for infrastructure investments, supported by user willingness to pay for the services.

All these mechanisms can be supported by universal water metering and volumetric charging by enabling a direct link between water usage, revenue and water service delivery.

Objective 3: Leverage universal water metering to increase awareness of water consumption and maximise behavioural change in the way that water resources are utilised across the district.

Through effective and ongoing community and wider stakeholder engagement, as described later in this plan, there is a unique opportunity to educate water users on water efficiency and responsible consumption.

Objective 4: Leverage universal water metering to support wider demand management initiatives.

Universal water metering will pinpoint network leaks which will enable TDC to rapidly address water losses in its networks.

3.4 Project Benefits

Related to the project objectives defined above, the following key project benefits have been identified.

Table 3-3: Project Benefit Definition and Measures.

Project Benefit	Description	Key Measure(s)
Water consumption reduction	Water metering, including volumetric billing, has been proven to significantly reduce water demand, particularly peak demand, which is a major driver for new water infrastructure development.	Percentage drop in seasonal peak water demand, year on year, per catchment
Water loss reduction	Water metering helps to identify leaks and benchmark water consumption. By measuring and	Rolling water loss, per catchment, against a

	charging for water use, meters provide essential data that supports various water conservation measures and helps in detecting leaks early. The information provided by water meters is crucial for the Council's water conservation efforts, enabling targeted and effective water-saving initiatives.	baseline flow (which will be defined per catchment)
CAPEX offset	By managing demand and offsetting infrastructure costs, universal metering may help mitigate rate increases. A volumetric-based rate structure reduces overall consumption, deferring capital upgrades to the water supply network, and decreasing operation and maintenance costs for existing infrastructure.	Deference of capital projects relating to water supply schemes when compared to baseline LTP

3.5 Alignment to Strategic, Legislative and Policy Requirements

3.5.1 Local Priorities

Tararua District Council Long Term Plan 2024-34

TDC's Long Term Plan (LTP) 2024-2034 outlines a vision of vibrant, connected communities where land and waters are nurtured, and people flourish. The infrastructure strategy and financial strategy are the enablers that allow the district to plan.

The LTP proposes a conservative approach to investment in three waters to lessen the impacts on rates, while ensuring capacity for future growth. 41% of the total capital projects are in the three waters space, which includes $83.2 million of investment over the next 10 years earmarked for water treatment and supply. This level of investment is intended to address ongoing maintenance and renewal programmes to meet levels of services, extend the life of existing infrastructure (where possible), building understanding of existing infrastructure and address existing deficiencies in key areas such as meeting New Zealand Drinking Water Standards.

Implementing universal water metering aligns strategically with the Council's goals by ensuring revenue sufficiency for maintenance and upgrades and meeting future regulatory requirements. This approach supports informed decision-making, enhances the understanding of the infrastructure's condition, and helps manage growth and environmental impacts.

Tararua Infrastructure Strategy (2021-2051)

The Infrastructure Strategy for Tararua District Council 2021-2051[2] sets out Council's strategic direction for delivery of its key services and the infrastructure assets that support them, over the next 30 years.

Implementing universal water metering aligns strategically with the following key principles for the district's infrastructure:

- **Lifecycle management:** Universal water metering enables precise monitoring of water usage, which can identify inefficiencies and potential leaks within the system. This data assists in planning and prioritising maintenance and renewal activities, which in turn can potentially extend the life of water infrastructure and reducing unexpected failures and maintenance costs. By providing accurate information on water consumption patterns, metering supports evidence-based decision-making for asset management.
- **Demand management:** Water metering is a critical tool for demand management as it promotes water conservation by making users aware of their consumption levels. This awareness can lead to behavioural changes that reduce overall water use, especially during peak periods. By managing demand more effectively, the Council can defer costly infrastructure expansions and reduce the stress on existing water resources.
- **Levels of Service management:** Implementing universal water metering helps maintain high levels of service by ensuring a reliable supply of water. It allows the Council to monitor and manage water distribution more effectively, identifying areas with high usage or potential issues.
- **Risk management:** Water metering mitigates several risks associated with water supply systems. It helps in early detection of leaks and high usage patterns, which may indicate infrastructure issues. By addressing these issues promptly, the Council can prevent major disruptions and reduce the risk of water loss. Data recoded by water metering can better support emergency works, which is less reactive and more proactive response planning.

Urban Growth Strategy 2024-34

[2] https://www.tararuadc.govt.nz/__data/assets/pdf_file/0027/5976/Tararua-District-Council-Long-Term-Plan-2021-2031-Volume-2-Infrastructure-Strategy.pdf

Tararua District Council's Urban Growth Strategy[3] sets out to establish clear, effective direction for the management of projected residential, commercial and industrial growth within the district over the next 30 years. The strategy was developed in response to increased population growth and increased demand for land for development.

With predicted growth expected to have significant impacts on existing infrastructure and expected levels of service, the strategy provides a holistic assessment of core infrastructure and identify key infrastructure deficiencies, supporting effective prioritisation of investment.

As the evidence for growth suggests, water metering supports managing anticipated growth by providing detailed data on water usage, which can inform infrastructure planning and ensure that the existing water supply networks can handle increased demand without overloading the system.

This will ensure that infrastructure development keeps pace with urban growth, promoting sustainable use of resources, supporting evidence-based decision-making, and effectively managing demand. This alignment helps to create resilient, efficient, and sustainable urban environments that can accommodate future growth while maintaining high levels of service and community wellbeing.

Rangitane-o-Manawatu Environmental Management Plan

The Rangitane-o-Manawatu Environmental Management Plan[4] outlines the environmental management framework and cultural values of the Rangitāne o Manawatū iwi. Key elements of the plan include:

1. **Cultural and Environmental Values**: The plan sets out the cultural values and principles of Rangitāne o Manawatū, emphasizing the importance of Te Mana o te Wai, which focuses on the health and well-being of water bodies. This principle is central to their environmental management and decision-making processes.
2. **Holistic Approach**: The plan adopts a Whānau Ora (holistic) approach, integrating environmental sustainability with broader objectives such as whānau cohesion, healthy lifestyles, economic security, and active participation in society. This approach ensures that environmental outcomes are linked to the overall well-being of the community.

Regarding water metering in the district, it is essential to consider the principles and associations outlined in the 'Cultural and Environmental Management Plan' by Rangitāne o Tamaki nui-ā-Rua. This plan documents the cultural values and guides decision-making in resource and environmental management processes. Aligning water metering policies with

[3] https://www.tararuadc.govt.nz/publications/consultation/previous-consultation/district-growth-strategy
[4] https://www.horizons.govt.nz/HRC/media/Media/General/Rangitane-o-Manawatu-Environmental-Management-Plan_1.pdf

these cultural considerations will help ensure sustainable and respectful water management practices. Additionally, consulting with local iwi, including Rangitāne o Manawatū, is crucial for a holistic approach to water management in the region.

3.5.2 National Priorities

Local Water Done Well

Introduced in early-2024, Local Water Done Well[5] is the Government's revised approach to Three Waters Reform. The primary aim of the Local Water Done Well initiative is to ensure that water services are both financially sustainable and compliant with regulatory standards. Councils must develop and present a water service delivery model that meets these criteria, with flexibility in how they generate revenue.

TDC are in the process of developing an integrated strategic plan for their three waters services. This work will form the basis of the required service delivery plan for Local Water Done Well.

The Local Water Done Well plan emphasises the importance of financial sustainability, transparency, and flexibility in water service delivery. Implementing water metering is signalled in the plan to achieving these goals, ensuring that water services are both efficient and equitable for all water users and stakeholders.

Key components of the plan to introduce financial sustainability include:

- **Revenue sufficiency:** Water services must generate sufficient revenue, either directly from users or through rates, to cover the costs of maintenance and depreciation of water infrastructure.
- **Ringfencing:** Financial practices must ensure that water services are self-sufficient, with dedicated funding that does not impact other council services. This involves separating the water services' financials from other council operations to prevent cross-subsidisation.
- **Funding for growth:** Water services should have the ability to access borrowing for infrastructure investments, supported by user willingness to pay for the services. This ensures that necessary upgrades and expansions can be funded as needed.

The success of water service delivery, as highlighted by the Minister of Local Government, has been strongly linked to the effective use of water meters. Metering allows for precise tracking of water usage, enabling councils to implement fair and transparent charging mechanisms. This not only promotes responsible water use but also ensures that the revenue generated is

[5] https://www.dia.govt.nz/Water-Services-Policy-and-Legislation

adequate to sustain and improve water infrastructure, aligning with the broader objectives of the Local Water Done Well approach.

National Policy Statement (NPS) for Freshwater Management 2020

The National Policy Statement for Freshwater Management (NPS-FM)[6] provides direction on how freshwater resources should be managed in New Zealand. It emphasises the concept of Te Mana o te Wai, which prioritises the health and wellbeing of water bodies, followed by the essential needs of people, and then other uses.

Key requirements include involving tangata whenua in decision-making, setting long-term visions, improving degraded water bodies, maintaining or improving water quality, and expanding the national objectives framework to include additional values and attributes for ecosystem health.

The NPS-FM mandates the avoidance of further loss or degradation of wetlands and streams, restoration efforts, addressing fish passage barriers, and regular monitoring and reporting on freshwater quality.

Universal water metering aligns with this concept by setting realistic long-term visions by providing a clear picture of water usage patterns, which is crucial for sustainable planning and prioritising water body health and essential human needs.

Water metering will also enable the identification of excessive water use, allowing for targeted measures to reduce demand and prevent over-extraction, in turn helping to maintain or improve water quality.

3.6 Key Risks

A workshop was undertaken by TDC in January 2025 to identify project risks, which are presented in Section 6.3. The greatest risks identified primarily relate to the potential implications of implementing a water charging regime, which is a critical component in driving water consumption behaviour (i.e. it cannot be achieved by water metering alone). These risks include:

- Erosion of public trust from charging for water, because there is a current precedent to supply water at relatively low cost under a rates-based regime.
- Uncertainty in the future of the water charging regime may cause concerns for the public, especially in an environment of water reform.
- Creating of inequality from the water charging regime, primarily because it might lead to higher per capita costs for smaller households.

[6] https://environment.govt.nz/acts-and-regulations/national-policy-statements/national-policy-statement-freshwater-management/

- The risk of accelerating the programme will be subject to the budget restraints and the council's ability to bring forward funding initially budgeted across a 10-year period, to across a 3–5-year period.

The Project Manager will work closely with finance and Alliance teams to mitigate project delays to budget restraints and will look to create some efficient by staging of product purchasing and workflow management.

TDC has undertaken water charge analysis so that elected members are informed and adopt an appropriate regime for the Tararua District in recognition of its specific challenges and opportunities. Furthermore, early and ongoing community engagement is seen as critical to the success of the programme and is explored later in this document.

The other key risk identified is that the digital meters use a significant portion of their life before the end of the installation programme. This will be considered in project execution planning.

4 Options to be Considered

4.1 Introduction

The purpose of this section is to present the options considered for meter infrastructure and the establishment of a universal water metering system across the Tararua District. Options have then been developed against the investment objectives (as defined in the previous section) and critical success factors (as defined below).

There are two key considerations for which options identification and analysis has been completed, including:

- **Overall universal water metering system type** – this includes consideration of the integrated system of equipment, communications and information management systems for utilities to collect customer water usage (and potentially other information).
- **Complex meter installations**, including those where water is supplied to multiple dwellings / properties through a single connection point at present.

4.2 Consideration 1: Overall Universal Water Metering System Type

The overall system type refers to the integrated system of equipment, communications and information management systems that will be used to collect customer water usage, and potentially other information. Three types of systems are used in universal water metering applications, including:

- AMI (Advanced Meter Infrastructure),
- AMR (Automated Meter Reading), or
- Manual systems.

A brief overview of each is provided below.

4.2.1 Advanced Meter Infrastructure (AMI)

AMI is an integrated system of water meters, communication networks and data management systems infrastructure. This infrastructure facilitates the collection of meter telemetry (e.g. readings, alerts, warnings), over the air via a fixed network, into a cloud data repository system or similar without any human involvement in data collection. The data can then be used to improve operational efficiencies and sustainability by effectively monitoring water usage and system efficiency, detecting malfunctions and recognising irregularities in water use.

A schematic of an AMI system is provided below.

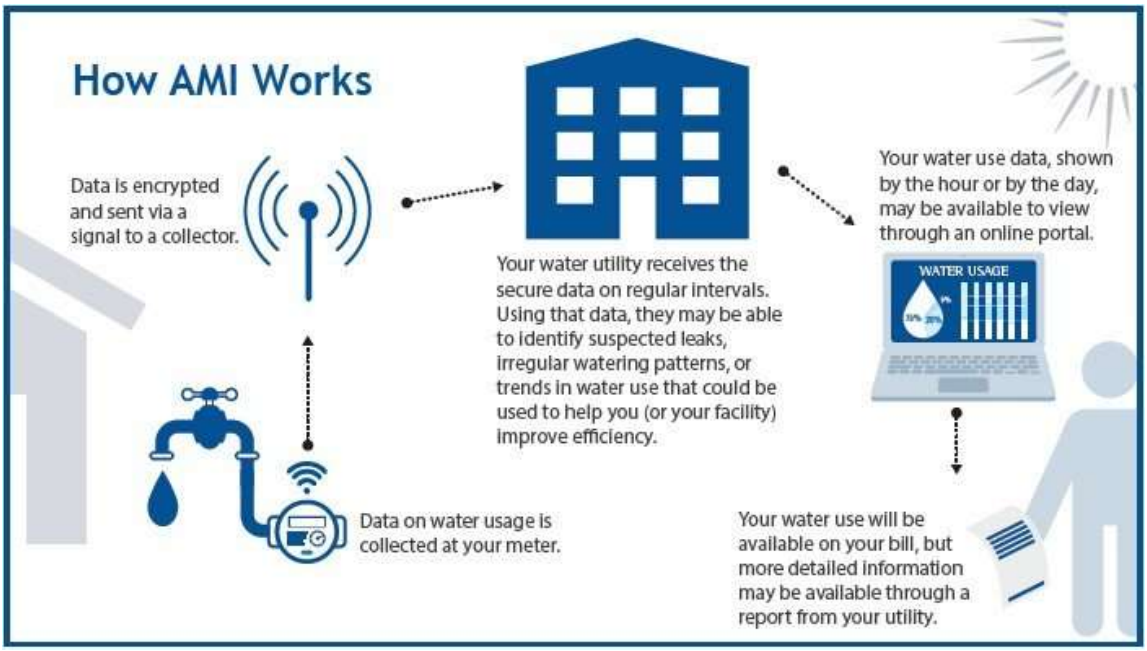


Figure 4-1: Schematic of an Advanced Metering Infrastructure (AMI) System as Applied to Water Metering. Source: Advanced Metering Infrastructure, United States Environmental Protection Agency. https://www.epa.gov/watersense/advanced-metering-infrastructure

As new meter technology has developed rapidly, and systems with advanced features are becoming increasingly available, AMI has emerged as a way to provide real time information to customers to potentially enhance water consumer behaviours to reduce water use. However, determining how to manage the data collected and how to make that data available

in a useful way to customers can be challenging. The American Water Works Association (AWWA) has therefore developed guidelines to support enhanced implementation of AMI in a way that maximises benefits for demand management.

It is unknown to what extent AMI has been implemented in New Zealand. Pilot trials have been undertaken internationally[7] however through early supplier engagement we are aware of "Internet of Things" (IOT) network providers who support investment in IOT networks to manage data for infrastructure, including but not limited to water meters.

4.2.2 Automated Meter Reading (AMR)

In the context of universal water metering, AMR is used to collect water consumption and status data from water meters using a walk-by or drive-by data collector. Water flow and alarm data is captured at the meter. As indicated in the schematic below, A handheld or vehicle mounted data receiver passing in proximity to a registered meter collects data points. Tis data is uploaded to a centralised system where it can be used for billing and to provide customer information that may change water consumption behaviours.

Figure 4-2: Schematic of an Automated Meter Reading (AMR) System as Applied to Water Metering. Source: https://arad.co.il/amr-ami/drive-by-walk-by/.

Aside from manual meter reading, AMR is the common method for "smart" water meter data collection and is commonly being implemented in New Zealand (for example, New Plymouth

[7] Skowron, E. (2018). *Using AMI Technology to Reduce Non-Revenue Water and Enhance Customer Satisfaction.* Water New Zealand Conference Proceedings, September 2018.

District Council have opted for AMR implementation as part of their universal water metering project roll-out). It requires less infrastructure investment to establish a fixed network and potentially complex data management infrastructure but requires greater investment in resources to routinely monitor systems. However, efficiencies can be gained by integrating automated meter reading to other Council operations, such as rubbish collection, given that these operations involve driving past properties on a regular basis, although this may not be applicable to very remote locations who do not receive such services.

While AMR systems are less sophisticated than AMI systems, they do present less opportunity to change water use behaviour through the provision of real-time data. This is because AMR systems provide customer data on a semi-regular basis which can disconnect the behaviour of water consumption from data and be less empowering to consumers to change behaviour without seeing instant results. In terms of leak management, the time delay between capturing data and acting upon it *can* increase costs to repair owing to collateral damage caused by water leaks if not addressed immediately.

4.2.3 Manual Water Meter Reading

Manual water meter reading is the least sophisticated option for capturing limited water consumption data and involves the use of field staff to physically read meters, record this information and log it. Typically, data collection is limited to volumetric use of water. Unusual water usage (leading to leak detection) will only likely be picked up through repetitive meter reading over a long period or through visible identification of leaks, which has the potential to cause collateral damage to infrastructure.

4.2.4 Evaluation of Options

A two-stage evaluation process was used to evaluate the options for water metering system type.

The first stage included an assessment of each option against the key objectives, to identify whether any of the options should be discounted on the basis that they do not materially contribute to the objectives, leaving only “shortlisted options”. This evaluation is shown in **Error! Reference source not found.**.

As indicated in in **Error! Reference source not found.**, of the three options considered, Option 3 (manual metering) is unlikely to support or meet all the project objectives and has therefore been discounted from further consideration. This is because the amount of data and timing of its collection will unlikely achieve the level of behavioural change, or response to leak management, required to meet the objectives. Option 1 (Advanced Metering Infrastructure) and Option 2 (Automated Meter Reading) have both been taken forward, however Option 1 is likely to chieve the objective to the greatest extent owing to the timing of availability of data for both Council staff and water consumers.

The shortlisted options were then assessed against critical success factors, which are the essential elements that must be successfully addressed in this case to demonstrate value.

The critical success factors defined for this options assessment are:

- **Whole of life cost**
- **Health and Safety** – especially speed, ease and safety of collecting the reading data
- **Capability to support improved network operation and resilience**, via alert and diagnostics information such as leaks, tampering, pipe bursts, and backflow.
- **Accuracy** of the readings taken
- **Operational efficiency** – time and effort required to process and bill the readings
- **Meter life**
- **Maturity** – how widely installed and well developed is the option

As shown in Table 4-2, weightings have been placed on each critical success factor. Higher weighting has been placed on the critical success factors that we consider to be most important, including whole of life cost (25%), health and safety (20%), and the ability of the option to contribute to operational efficiency and resilience across the networks (20%).

Each critical success factor has been assigned a score from 1 (does not address at all) to 10 (entirely addresses)

Table 4-1: Assessment of Long List Options for Universal Water Metering System for Tararua District.

Objective	Option 1: Advanced Metering Infrastructure (AMI)	Option 2: Automated Meter Reading (AMR)	Option 3: Manual Metering
1. By 2030, deliver at least 30% reduction in peak water demand across Tararua District Council's water supply schemes to defer or eliminate capital expenditure in capacity upgrades to these schemes.	Fully supports	Fully supports	Partially supports
2. Enable Tararua District Council to more effectively ringfence and target water revenue to support investment in water services and assets, in line with national policy expectations.	Fully supports	Fully supports	Fully supports
3. Leverage universal water metering to increase awareness of water consumption and maximise behavioural change in the way that water resources are utilised across the district.	Fully supports	Fully supports	Partially supports
4. Leverage universal water metering to support wider demand management initiatives.	Fully supports	Partially supports	Does not support
Conclusion:	**Option taken forward for further evaluation**	**Option taken forward for further evaluation**	**Option discounted**
Remarks:	Option 1 provides the highest chance to meet all objectives provided that the data can be collected and managed in a way to support these objectives.	Option 2 is likely to meet the objectives but may not be as effective at doing so due to the lag between receiving data and responding to it (for example, to manage leaks).	The lack of data available means that this option is unlikely to achieve

Table 4-2: Assessment of Short List Options for Universal Water Metering System for Tararua District.

Critical Success Factors	Factor Score		Factor Weighting	Weighted Score	
	Option 1: AMI	Option 2: AMR		Option 1: AMI	Option 2: AMR
Whole of life cost	9	10	25%	2.25	2.5
Health and Safety	10	8	20%	2	1.6
Capability to support improved network operation and resilience	10	8	20%	2	1.6
Accuracy of the readings taken	5	5	5%	0.25	0.25
Operational efficiency – time and effort required to process and bill the readings	5	5	15%	0.75	0.75
Meter life	7	5	5%	0.35	0.25
Maturity – how widely installed and well developed is the option	6	9	10%	0.6	0.9
			Total:	**8.2**	**7.85**
			Rank:	**1**	**2**

As shown in Table 4-2, while both options generally performed well, Option 1 (Advanced Metering Infrastructure) provides distinct advantages in terms of:

- Health and safety, because it does not require the deployment of field staff to undertake routine meter reading.
- The ability to support TDC with improved network resilience.

On the other hand, Option 2 (Automated Meter Reading) scored slightly better in terms of whole of life cost, based on our understanding of the potential costs to establish the network, noting that this will be dependent on the procurement model taken (discussed later). If IOT network providers can be found who can support a fixed network cost effectively, this is likely to further favour Option 1.

4.2.5 Evaluation Outcome

Based on the analysis presented above, we recommend that TDC proceed as follows:

- That they seek supplier input via a procurement process on the track record, capability and capacity of suppliers to provide cost effective IoT networks and compatible meters that would support Advanced Meter Infrastructure (AMI) as the preferred option. Previous analysis undertaken by New Plymouth District Council, albeit 5 – 6 years ago, identified that AMI technology was emerging, and that a certified AMI meter was not yet available in the New Zealand market. However, with the rapid advances in this technology and the time conceded since, it is anticipated that technology is available now and should be tested via supplier engagement.
- That if this cannot be achieved, that Option 2 be reserved as a secondary choice, noting that the types of meters installed for Option 1 and 2 are likely to be AMI or AMR compatible in any case.

4.3 Consideration 2: Addressing Complex Properties

4.3.1 Introduction

In some instances, the existing water reticulation to some properties is not optimal for providing water metering to separately used or inhabited part (SUIP) of rating units. We define these as complex properties, and they include:

- There is no single Council water supply point per SUIP – i.e., the water supply point is shared by neighbours.
- TDC does not own or have legal access to the connecting pipe from the Council water main to each SUIP.

These situations can be typically found where properties have right of ways, cross-leases or blocks of units / flats.

A survey of the district's three largest towns (Dannevirke, Woodville and Pahiatua) has identified that 5% of all water connection points in these towns supply multiple properties. 6% of all existing connection points are on private property, although it is unlikely that all these present a "complex property" situation (i.e., the connection point can be readily moved to provide TDC access).

Based on feedback from other Councils who have faced similar challenges, six options have been identified, as follows:

Option 1: **Only install meters on existing point of supply where one lateral serve one SUIP. Grouped SUIP's would be billed by a uniform annual charge.**

- Under this option, a meter would be installed where a relationship of one meter to one SUIP can be maintained.
- Do not install a meter on any connection points that feed multiple SUIPs (i.e. a 1:1 relationship cannot be maintained). In these cases, bill using a uniform annual charge.

Option 2: **Meter at existing point of supply – uniform annual charge for grouped SUIP's. This differs from Option 1 as every connection has a meter regardless of approach to billing.**

- Install a meter on each rider main or lateral where council ownership currently ends.
- Where a relationship of one meter to one SUIP cannot be maintained, bill using a uniform annual charge.

Option 3: **Meter at existing point of supply – split bill for grouped SUIPs.**

- Install a meter on each rider main or lateral where council ownership currently ends.
- Where a relationship of one meter to one SUIP cannot be maintained, share the volumetric component of the bill equally between each SUIP connected to the meter.

Option 4: **Meter at point of supply with ratepayer option to move point of supply where practical.**

- This is an adaptation of Option 3, where property owners on grouped SUIP's are given the option to either:
  - Vest ownership of the rider main with council to enable the point of supply to be shifted to the lateral. This mainly applies to right of ways.
  - Connect to a specific point of supply provided by council (usually requiring modification of private plumbing by the homeowner). This mainly applies to cross leases.
  - Install a meter on the existing point of supply, and a sub-meter on individual laterals to each SUIP provided that private property access provisions can be met.

Option 5: **Dedicated meter per SUIP.**

- This option involves installing a meter per SUIP whilst minimising changes to the existing pipework.
- Ownership of pipework and where the point of supply is, would need further consideration.
- This requires Council to modify private plumbing in many cases10. Under this option all SUIP's would be directly billed for their use (ie. no uniform annual charges or split bills).

Option 6: **Dedicated private pipe and meter.**

- Install a meter and a dedicated private pipe to each SUIP. This requires council to modify private plumbing.
- Under this option all SUIP's would be directly billed for their use (ie. no uniform annual charges or split bills).

4.3.2 Evaluation of Options

A single stage evaluation process was used to evaluate the options for addressing complex properties, because the decision less influences the overall project objectives (so negates the need for a two-stage process) and can be readily incorporated into a single stage process.

The options have been assessed against critical success factors, which are the essential elements that must be successfully addressed in this case to demonstrate value.

The critical success factors defined for this options assessment are:

- **Consistency and upholding community values.** This considers if the option provides a consistent approach to billing and if the option will support the development of a sense of community or cause social friction.
  A consistent approach to billing is preferred as it promotes a sense of "fairness", in that all usage for all consumers is treated in the same way.
  This is an important consideration because Universal Water Metering is a significant change for the community and will be received in various ways. There will be neighbours willing to embrace the communal aspects of shared billing while for others it may be a cause of social friction. They may not want to split the bill due to existing strained relationships or substantially different usage profiles (large families, swimming pools, lush gardens etc.). Offering the user options, enhances their sense of engagement in the change process.
- **(Potential) legal complexity.** This considers how legally complex is the option to implement, based on feedback from other Councils.
- **Ownership of infrastructure.** This considers if the option requires TDC to work on private infrastructure or to take ownership of infrastructure that is currently private.

Working on private infrastructure is not preferred due to the potential liability incurred by consequential loss or damage.

Taking ownership of private infrastructure is not preferred as it places an additional financial burden on Council to maintain and renew that infrastructure.

- **Implementation complexity.** This considers the degree of complexity that each option presents to physically implement, and how complex the result is for the consumer to understand. Considerations include:
  - Property and asset data – Different options require a different amounts and accuracy of asset and property data. This data may not be currently available.
  - Administration - offering choice to SUIP owners creates a substantial effort to manage including explanation of the options, risks and benefits, negotiations and associated paperwork.
  - Challenges with accessing private property.
- **Capital cost burden to Council.** This considers the capital costs for installing meters under complex property scenarios.
- **Contribution to demand management.** This considers to what extent the option supports the demand management objectives of universal water metering.

It is difficult to fully qualify or quantify the degree to which each option will support each criteria. Therefore, the evaluation approach taken has been to determine whether the option supports, partially supports or does not support each criteria. Options that do not support one or more criteria should be discounted. Options that more fully support a range of criteria are then considered of higher value and ranked higher.

The assessment of these options against the criteria is shown in Table 4-3.

Table 4-3: Assessment of Options for Addressing Complex Properties Under the Universal Water Metering Programme for Tararua District.

Critical Success Factors	**Option 1:** Only install meters on existing point of supply where one lateral serve one SUIP. Grouped SUIP's billed by UAC	**Option 2:** Install meters on all existing points of supply. Bill volumetrically where one lateral serve one SUIP.	**Option 3:** Install meters on all existing points of supply. Bill volumetrically where one lateral serve one SUIP. Grouped SUIP's split their shared usage.	**Option 4:** Meter at point of supply with ratepayer option to move point of supply or sub-meter where practical.	**Option 5:** Dedicated meter per SUIP	**Option 6:** Dedicated private pipe and meter
Consistency and upholding community values	Does not support	Does not support	Does not support	Supports to some degree	Fully supports	Fully supports
Potential legal complexity	Fully supports	Fully supports	Supports to some degree	Supports to some degree	Does not support	Does not support
Ownership of infrastructure	Fully supports	Fully supports	Fully supports	Fully supports	Does not support	Does not support
Implementation complexity	Fully supports	Fully supports	Fully supports	Supports to some degree	Supports to some degree	Does not support
Capital cost burden to Council	Fully supports	Fully supports	Fully supports	Supports to some degree	Does not support	Does not support
Contribution to demand management	Does not support	Does not support	Supports to some degree	Supports to some degree	Fully supports	Fully supports
Conclusion	**Discounted from further consideration**	**Discounted from further consideration**	**Discounted from further consideration**	**Preferred option**	**Discounted from further consideration**	**Discounted from further consideration**

5 Project Delivery Approach

5.1 Workstreams and Workflow Structure

- Engineering and technical development
- Data management and integration
- Field installation
- Communications and engagement
- Project management
- Other project support services (procurement, administration etc)

5.2 Procurement Strategy

This procurement plan outlines the process in which TDC will engage with suppliers and contractors throughout the Universal Water Metering Program.

TDC intend to engage the Alliance team for the installation of the manifolds and meters, using the current Alliance partnership, unless they are unable to provide the necessary resource and workforce to act as the main contractor. This work will not be publicly tendered and will be delivered by our reticulation team under the existing Alliance contract between TDC and Downer.

The procurement of the meters themselves will be subject to the main contractor engagement and cost efficiencies in purchasing power.

Tararua District Council (TDC) went to market via GETS with a Request for Information (RFI) for market research on potential delivery partners, IoT infrastructure vendors and end-to-end service (Metering as a Service) providers who have had experience with universal water metering programs.

The RFI had a high response rate from a range of metering providers, contractors and IoT infrastructure service providers. This produced much valuable insights and information into AMI and AMR solutions and approaches to implementing a programme here in the Tararua district.

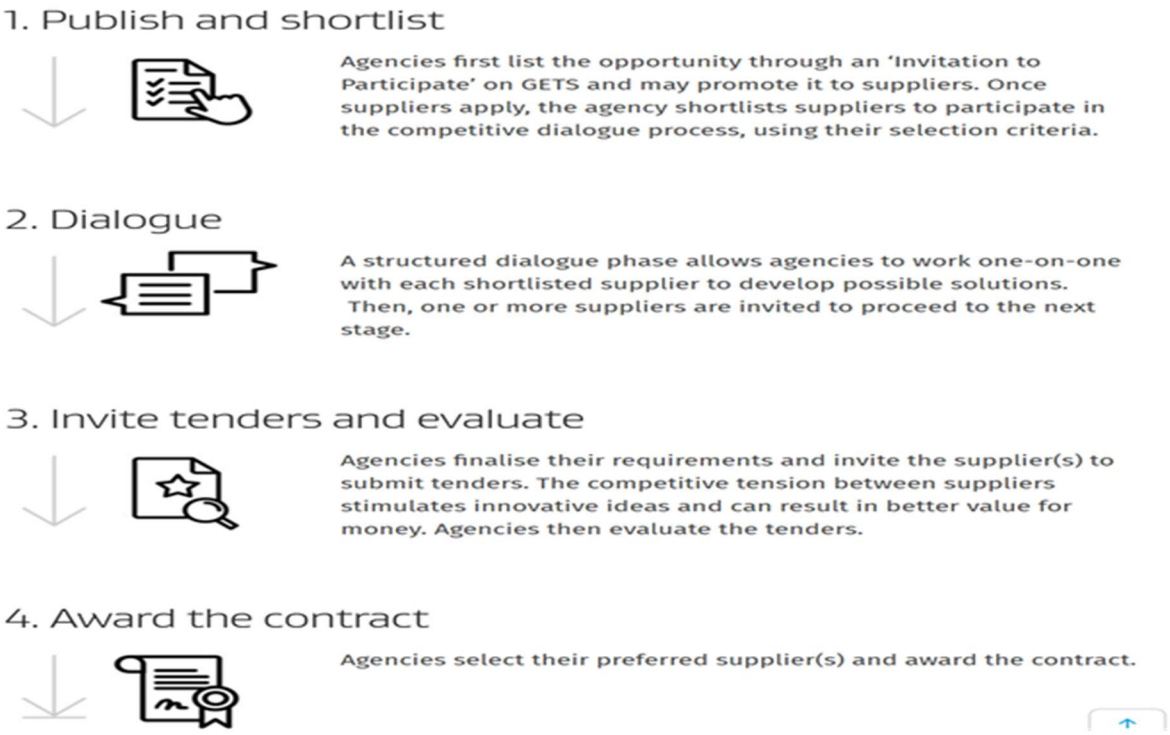
Based on this, the proposed procurement strategy to support the delivery of work is –

- Tararua District Council will issue a closed ITR (Invitation to Register) to ask IoT (Internet of Things) infrastructure service providers into a Competitive Dialogue process.
- These IoT vendors will separately liaise and collaborate with TDC under competitive tension to design a solution and network architecture fit for purpose and to TDC's specifications and requirements.
- Once concluded the IoT vendors will submit their solutions and final pricing for TDC's evaluation. This will involve a proof of concept, including recommendations for sourcing AMI compatible part and components.

Once an IoT vendor is selected, and a contract is awarded -

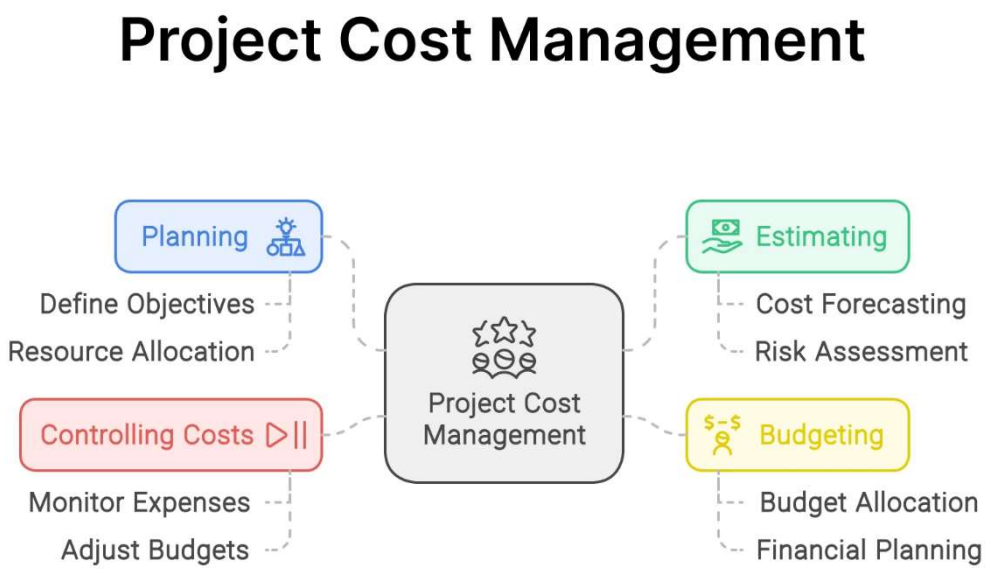
- The IoT vendor will use the Tararua Alliance for the programme implementation and installation in work teams across the network but starting in Dannevirke.
- The IoT vendor will establish network connectivity for data collection and management o support billing and charging. This may adopt, adapt or leverage existing IoT capability where it already exists.
- The IoT vendor will make recommendations (based on their experience) as part of their proposed solution to source water meters and manifolds, taking into consideration the age, quality, materials and inventory of existing water network assets.
- TDC for its part will ensure that they have adopted a backflow prevention policy, including an approach to engaging with high intensity and low intensity water users (commercial and residential), and endorsed and approved a methodology for water rates billing and charging.

Given this procurement strategy, the New Zealand market has 2-3 major IoT network and infrastructure service providers available with end-to-end experience. These providers are SPARK, CHORUS and a third operator from the RFI called Shape Tech. Because of this oligopoly environment the market is limited and concentrated to a few providers, this was the rationale for going for a closed Invitation to Register (ITR).



6 Project Management

6.1 Project Cost Control



Project costs will be managed through PSoda and tracked by the Project Manager. Each workstream will be split to budget allocation managed via an excel workbook to ensure that actuals and forecasted budgets align.

The Project Manager will also work close with the finance team to ensure budget and expenditure is current and accurate.

6.2 Programme

A staged work programme has been developed to guide the detailed establishment of project controls, including cost, time and quality requirements. The table below provides an overview of the stages, and the key tasks and timeframe allocated to each.

The key objective of the work programme is to have rolled out the bulk (at least 80%) of flowmeters, being those that can be rolled out efficiently, within the first four years of the LTP (by

end of 2028/2029). Taking this approach will enable water loss management initiatives to commence and will allow the bulk of meter installations to be undertaken within the years of available budget. It is anticipated that the less straightforward water meters identified in each town will add a substantial 'tail' to the programme.

For further programme timeframe and scheduling we have included a project schedule (attached) these timings are subject to resource and product availability and only provides an estimated timeframe and period for this programme.

Table 6-1: Key Stages of the Tararua District Universal Water Meter Project.

Stage	Key Outcomes
1 – Detailed Planning	• Establish project controls • Confirm project budget • Undertake detailed communications and engagement planning, and undertake early messaging with the community • Make any key technical decisions • Plan procurement for external resources / materials • Current infrastructure data gathering
2 – Mobilisation	• Procure resources • Commence a detailed programme of field inspections and upload into a central data capture system • Identify key tasks for concurrent activity
3 – Roll-out of Straightforward Meters	• Undertake a rolling programme of detailed planning, community engagement and then meter roll-out, town by town, In the order of Dannevirke, Woodville, Pahiatua, Eketāhuna, Norsewood, Pongaroa and Ākitio
4 – Mop-up	• Establish a mock billing regime to familiarise the community with water charging expectations in future years.

The duration and timing of the roll-out programme has been developed to align with funding available in the LTP and based on a maximum meter installation rate of 80 meters per week. This

is at the lower end of the installation rate experienced by other Councils but incorporates a level of conservatism into the programme.

In the following pages a summary table describing the key tasks in each stage is provided.

6.2.1 Stage 1: Detailed Planning

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
1.1	Establish Leadership Team	Implement the project leadership structure including the Project Manager (and assistance as required) and Project Governance Role. Develop the Terms of Reference for the Governance Group to provide clarity on roles and responsibilities. Confirm frequency of project leadership meetings.	• Project organisation structure • Terms of Reference	• Terms of Reference for Project Governance Group Agreed	Project Manager	-
1.2	Establish project controls	Establish detailed project plans and project controls in accordance with TDC PMO processes and commensurate with the project complexity, including but not limited to: • Quality Management Plan • Health and Safety Management Plan • Change (cost and time) control requirements • Baseline project schedule • Baseline project budget • Detailed project plan	• Quality Management Plan • Health and Safety Management Plan • Change (cost and time) control requirements • Baseline project schedule • Baseline project budget • Detailed project plan	• All project plans approved by Project Governance Group • Project Budget approved by Project Governance Group • Approval to proceed from ICCEM	Project Manager	1.1

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
1.3	Communications and Engagement Plan	Develop detailed Communications and Engagement Plan as further described in Section **Error! Reference source not found.**, including: • Detailed timeline • Key messages • Q&As • Collateral required • In person engagement requirements (such as drop-in sessions) • Identified spokespeople • Any promotional material and advertising required (incl. paid social media promotion) • Risks and mitigations • Stakeholders	• Communications and Engagement Plan	• Plan approved by Project Governance Group	Comms and Engagement Lead	1.2
1.4	Water Charge Analysis	Establish key goals regarding billing and the rate structure for water; what the council is trying to achieve through volumetric water charging, how this aligns with the overall project objectives and what is important to the district. A well-thought-out billing and rate structure will be critical and that these are communicated to the public early.	• Water Charge Analysis Report	• Report Approved by Governance Group for Council Ratification • Council Approval	Technical Lead (in conjunction with Project Finance Team)	1.2

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
		In accordance with guidance from the American Water Works Association (AWWA), the following three categories of analysis as the generally accepted method for setting rates for water[8]: 1. **Revenue requirement analysis:** analysis of the district's operating and capital costs (covering all costs associated with operating and maintaining the district's water supply system including infrastructure, treatment process, labour and all other costs related to providing water services) to determine the total revenue requirements to deliver water services and the adequacy of existing rates in meeting these costs. 2. **Cost of service analysis:** to determine what cost differences, if any, exist between serving different types of customers (e.g. commercial, residential). The purpose of this analysis is to help inform how the revenue requirements for delivering water				

[8] https://www.awwa.org/portals/0/files/publications/documents/m1lookinside.pdf

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
		services should be equitably distributed between the various customer types. 3. **Rate design analysis** uses the results from the revenue requirement analysis and the cost-of-service analysis to determine how to recover the appropriate level of costs from each customer type. Depending on the goals regarding charging for water, the rate structure could allow full or partial cost recovery and include considerations such as applying a flat rate, a tiered rate based on use, or a combination of both. It is suggested trying to link the timing of setting the rates for water with council's rates review undertaken as part of its Long-Term Plan processes to ensure alignment.				
1.5	Technical Options Development	Undertake options assessments on the following key technical decisions that are required early in the project lifecycle: • Type of water meter. • Type of water meter reading technology.	• Options assessment paper – water meter type • Options assessment paper – water meter reading technology.	• Project Governance Group approval of papers.	Technical Lead	1.4

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
		For each of these, the following needs to be understood: • Scope. • User requirements. • Functional and performance requirements. • Specific options that meet the user and functional requirements. • Selection of a preferred option. Each will be presented in an options assessment paper for endorsement by the Project Governance Group.				
1.6	Procurement Planning	Procurement plans will need to be developed in accordance with TDC procurement plan requirements for the following packages: • Supply of water meters. • Supply of water meter reading technology and software. • Water toby installation services.	• Procurement plan – supply of water meters. • Procurement plan – supply of water meter reading technology and software. • Procurement plan – water toby installation services.	• Project Governance Group approves the procurement plans	Procurement Lead	1.5

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
1.7	Initial Community Engagement	Create awareness with the community on the water metering project including the following topics: • Why the decision has been made (reinforcing the points in Phase two) • The expected benefits • Any decisions around immediate or future use-based charges for water – this needs to be done clearly and honestly. • Q&As • Expected roll-out process, including how they will be installed, where and when • What residents can expect • How the meters will work – how water flows will be measured and how data will be collected • How residents can access their water use	• Fact sheets and resources to support engagement	• TDC standard protocols for approvals before media / social media releases.	Comms and Engagement Lead	

6.2.2 Stage 2: Mobilisation

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
2.1	Contractor procurement	Prepare tender documents and undertake tendering for the provision of flow meter installation services. Undertake tendering, evaluation and selection in accordance with Procurement Plan.	• Tender documents for provision of flowmeter installation services. • Tender evaluation report.	• Approval of Tender evaluation report by the Project Governance Group.	Procurement Lead	1.6
2.2	Flowmeter procurement	Prepare tender documents and undertake tendering for the provision of flow meters and meter reading technology. Undertake tendering, evaluation and selection in accordance with Procurement Plan.	• Tender documents for supply of flowmeter and meter reading technology. • Tender evaluation report.	• Approval of Tender evaluation report by the Project Governance Group.	Procurement Lead	1.6
2.3	Field inspections and data gathering	An app-based platform for use on tablets for field collection of water meters will need to be developed. Upon development and testing, field inspections can commence to: • Pinpoint locations of flowmeters. • Take photographic records of current toby installation.	• Tested field inspection application. • Records of each flowmeter.	• Application tested and certified for release.	Technical Lead	1.5

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
		• Take photographic records of current condition of surrounding areas (for example, condition of driveway) • Record critical information relating to installation such as existing lateral material • Screen the degree of difficulty of information for prioritisation during roll-out. A centralised platform for importing sorting and visualising data will also be required.				
2.4	Detailed planning – Dannevirke Roll-out	Detailed planning of the specific roll-out across Dannevirke is required. This includes: • Plan out street by street prioritisation and order. • Detailed health and safety planning based on specific risks. • Fabrication of tobies and stocking of materials. • Inspection and test plan.	• Detailed roll out plan. • Site specific health and safety plan and hazard registers. • Inspection and test plans.	• Approval of the detailed planning documents. • Materials in stock.	Construction Manager	2.1, 2.2, 2.3
2.5	Community Engagement – Dannevirke	Targeted communication will be undertaken directly with residents as the physical works of installation begins in Dannevirke.	• Communications materials (letters, videos, social media posts etc)	-	Construction Manager	2.4

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
		Specific information will be supplied to each property providing the following: • Maps showing how the roll out will be staged – where/when • Videos from contractors explaining how the meters work/how they will be installed • Information about how long installation takes and any disruptions to water supply • Information on who to contact for those with questions/concerns				

6.2.3 Stage 3: Roll-out of Straightforward Meters

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies

Each of the activities will be undertaken for each water supply network according to the following order: Dannevirke, Woodville, Pahiatua, Eketāhuna, Pangaroa and Ākitio.

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
4.1	Detailed planning	Detailed planning of the specific roll-out across each network is required. This includes: • Plan out street by street prioritisation and order. • Detailed health and safety planning based on specific risks. • Fabrication of tobies and stocking of materials. • Inspection and test plan.	• Detailed roll out plan. • Site specific health and safety plan and hazard registers. • Inspection and test plans.	• Approval of the detailed planning documents. • Materials in stock.	Construction Manager	3.2
4.2	Network Specific Community Engagement	Targeted communication will be undertaken directly with residents as the physical works of installation begins in Norsewood. Specific information will be supplied to each property providing the following: • Maps showing how the roll out will be staged – where/when • Videos from contractors explaining how the meters work/how they will be installed • Information about how long installation takes and any disruptions to water supply	• Communications materials (letters, videos, social media posts etc)	-	Construction Manager	4.1

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
		• Information on who to contact for those with questions/concerns				
4.3	Roll-out	Roll out in each network will be undertaken in work fronts, phased from each other, as follows: 1. A work front to change out water tobies with new smart meter compatible tobies will commence first. This includes changing out the existing isolation valve assembly, installing a toby box, testing the new pipe fittings, and remediating surrounding areas (for example, driveways). 2. Concurrently with the above, smart meters will be installed at each existing/new toby. The smart tester will be tested in situ. 3. Testing will then be undertaken to confirm that the smart meter signal is received. Each work front will use a common field information environment to record details of work undertaken, condition before and after installation, meter serial number, photographic records and the like.	• Data uploads	-	Construction Manager	4.2

6.2.4 Stage 4: Mop-up

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
5.1	Roll-out	Installation of tobies and meters will be undertaken for any challenging installations identified during field data collection at the same time as the body of the works are undertaken. This will be supplemented with specific communications to these property owners.	• Communications materials (letters, videos, social media posts etc) • Data uploads	• Approval of the detailed planning documents. • Materials in stock.	Construction Manager	
5.2	Mock Billing	Establish a billing system and generate mock bills to be issued with rates notices to demonstrate water consumption and the charges that would occur if water charging were implemented.	• Mock bills	• Approval of mock bill format and deployment by the Project Governance Group • Materials in stock.	Project Manager, in conjunction with Council Finance team	5.1

6.2.5 Stage 6: Close-out

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
6.1	System Acceptance	System acceptance involves verifying that the smart metering system meets all requirements and is fully functional as intended. This includes: • Final testing and validation: conduct thorough testing to validate that all components, including the meters, data collection, and billing systems are reliable and function correctly. • Compliance checks: Ensure that the system complies with all regulatory requirements, industry standards, and contractual obligations. • Collect feedback from the community about the transition to smart meters, what benefits and challenges they have experienced, and address any issues that arise during this phase. • Sign-off: Obtain formal sign-off from relevant stakeholders, including technical teams, project managers, and senior management,	• Final testing and compliance reports • Records of community feedback	• Sign-off received from each Workstream Lead	Construction Manager and Project Manager	5.1

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
		confirming that the system is ready for full-scale operation.				
6.2	Lessons Learnt	• Project review meetings: hold review meetings with the project team, including contractors, to discuss what went well, what challenges were encountered, and how they were addressed. • Gather feedback from all involved parties, including installation contractors, council customer service representatives, and end-users. Feedback collated from the system acceptance phase can be used to inform this. • Produce a written report that summarises the key learnings, outlining what went well, and what didn't go well, from the project. The report should include all stages of the project, from start to finish. These insights can help share learnings and benefit other council teams to enhance organisational learning and make future projects better.	• Lessons learnt register / report	-		5.1
6.3	Transition to Operations	Transitioning to operations involves moving from the implementation phase to ongoing management and maintenance. By carefully	• Operational Readiness Plan	• Approval from Project Governance Group to	Project Manager	6.1

#	Key Task	Description	Deliverable(s)	Gateway(s)	Responsible Lead	Dependencies
		managing the close-out stage, the council can ensure a smooth transition to full-scale operation. This includes: • Develop a clear transition plan that outlines responsibilities, timelines, and handover procedures. • Train operational staff who will be responsible for managing the smart meter system. Ensure they are well-versed in system operation, maintenance, and troubleshooting. Teams responsible for customer support and issue resolution should be provided training on how and when certain issues need be escalated. • Establish communication channels between implementation teams and operational teams. • Implement a monitoring and evaluation framework to track the performance of the smart meter system. Review key performance indicators (KPIs) to ensure the system is meeting desired outcomes and the council's objectives.		transition to operations.		

6.3 Project Risk Management

6.3.1 Risk Management Objectives

The Tararua District Universal Water Metering project is complex in that it requires a significant number of interfaces between various parties, and a significant interface with the community in a way that has the potential to have a significant impact on Council. As such, strong focus needs to be placed on project risk management, so that:

- We increase the likelihood that we achieve the project objectives.
- We appropriately safeguard assets, people, finances and reputation.
- We improve project delivery performance and maximise resource utilisation.
- We integrate risk management into project management, including using a common language, to promote a risk aware culture across the project team.
- We provide a timely response to escalated risks and actual events when they occur.
- We aid decision-making and encourage innovation.
- We apply an appropriate standard to project risk management (i.e. ISO 31000:2009) and good practices generally.

6.3.2 Early Warnings

The large number of interfaces between parties in this project creates a risk that risks will not be identified, communicated and then managed by the appropriate party to do so accordingly, leading to potential cost, time and quality issues.

To manage this, it is recommended that an early warning system is put in place and utilised to drive day-to-day risk management in a no surprises approach. That way, potential risks can be identified early, and appropriate action taken before they manifest themselves, and those risks that cannot be appropriately managed can be elevated to the project risk register, so that this register maintains focus and relevance to key issues.

The following diagram illustrates the proposed process for raising and then addressing early warnings.

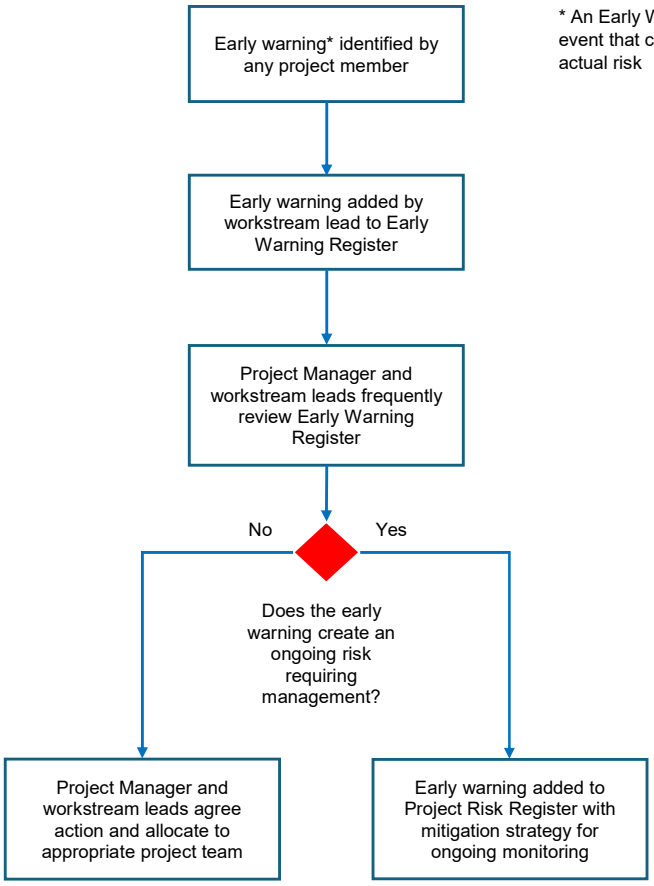


Figure 6-1: Early warning identification and management process.

6.3.3 Key Project Risks

A workshop of key project personnel was held in November 2024 to identify key risks and initial mitigation strategies. A summary of the risks identified, and their initial mitigation strategies is provided below.

Risks are constantly changing due to the evolving nature of the project and Council's operating landscape. Therefore, risks must be monitored, reviewed and reported on a regular basis to ensure that they are current. The minimum requirements for this are shown in Table 6-2.

Table 6-2: Monitoring, Reporting and Review Requirements for Project Risks.

What	Who	When
Review of existing risks on the Project Risk Register	Project Manager with Project Governance Group	Monthly

Review of new risks to confirm proposed treatment strategy / actions	Project Manager and Workstream Leads	For low and medium level risks, review monthly at same time as existing risks For high and extreme risks, review as soon as practicable
Reporting escalated risks to the Project Governance Group	Project Manager	Monthly
Review of escalated risks	Project Governance Group	Monthly, noting additional review for extreme risks below
Review of extreme risks	Executive Leadership Team	As soon as practicable

Table 6-3: Summary of Key Project Risks and Proposed Mitigations.

			Rating With Existing Controls			
Risk	**Consequence of Risk or Opportunity Occurring**	**Current Controls**	**Likelihood**	**Consequence**	**Risk**	**Proposed Mitigations (Beyond Existing Controls)**
There is a risk that the current water structural reform of water entities misaligns with TDC's UVM programme and strategy	Rework at a future date leading to TDC reputational risks and additional costs to TDC ratepayers	-	Likely	Moderate	Medium	To be confirmed later
There is a risk that public trust is eroded by charging for water given precedent of relatively low cost, rates-based charging regime	Project challenges from public or those opposed to UVM leading to delays and potentially additional costs	Early engagement to be undertaken with District ratepayers on needs and benefits of metering.	Possible	Major	High	Ensure communications and community consultation is clear and concise.
There is risk of public antagonism if there is uncertainty in the future water charging regime	Negative press or feedback from public engagement, lack of community trust or faith in project	Undertake early water charging analysis and form key messages for public engagement	Likely	Major	High	Ensure communications and community consultation is clear and concise.
There is a risk that the public do not permit access to property	Additional project delays and costs	Early public engagement. Changes to strengthen water supply bylaw?	Possible	Minor	Low	This will need to be negotiated on a case-by-case bases.
There is a risk that the water charging regime creates inequity	Poor reputation for TDC and public trust damage	Thorough water charging analysis to be undertaken early in the project	Possible	Major	High	Ensure communications and community consultation is clear and concise.

			Rating With Existing Controls			
Risk	**Consequence of Risk or Opportunity Occurring**	**Current Controls**	**Likelihood**	**Consequence**	**Risk**	**Proposed Mitigations (Beyond Existing Controls)**
There is a risk that some existing users face extraordinary and unexpected costs for installation owing to previous TDC decisions	Poor reputation for TDC and public trust damage	Paper to be presented to Councillors on options to address this issue in May 2025.	Possible	Moderate	Medium	Ensure communications and community consultation is clear and concise.
There is a risk that the cost of implementation is greater than anticipated	Cost/benefit predictions are not achieved; project cannot be completed or is delayed until more funding is available	Prepare new cost estimates based on new network data and hardware / installation costs	Likely	Moderate	Medium	Work closely with the project team to ensure that cost saving measures are taken.
There is a risk that there are insufficient resources available to implement the project on top of BAU activities	Project delayed and inefficiencies lead to greater cost	Prepare comprehensive project and resourcing plan	Possible	Moderate	Medium	This project will not be undertaken as BAU.
There is a risk that the public are unsatisfied with the remediation undertaken after toby installation	Rework and additional cost; TDC reputation damaged	-	Possible	Moderate	Medium	This will need to be negotiated on a case-by-case bases and cost implications assessed.
There is a risk that asset management staff unable to deal with large number of new assets	Delays in uploading data	-	Possible	Minor	Low	Early engagement with the Operational team and asset management teams.

			Rating With Existing Controls			
Risk	**Consequence of Risk or Opportunity Occurring**	**Current Controls**	**Likelihood**	**Consequence**	**Risk**	**Proposed Mitigations (Beyond Existing Controls)**
There is a risk of harm to field staff owing to work environment (which is also constantly changing)	Serious harm incident	Health and safety planning to be undertaken. Use of contractor(s) familiar with the conditions and specific risks.	Unlikely	Major	Medium	Strict Health and Safety procedures and staff risk assessment prior to work being undertaken.
There is a risk that connections to very old copper and galvanised pipes are untenable	Additional scope, cost and project delays.	Undertake survey of all existing connections to understand material where possible	Likely	Moderate	Medium	Pre-inspection will identify these connections, and the project team will work closely with the main contractor to identify an appropriate solution.
There is a risk that repeated work is undertaken in the same area through lack of co-ordination between water metering and other programmes of work (e.g. footpath rehabs)	Reputational risk and loss of efficiency / cost saving opportunities		Possible	Minor	Low	Develop GIS or other tool to overlay water meter programme with other key programmes of work
There is a risk that if the digital meters are installed too early, that 33% of their life will be used up before the end of the install programme is reached	Not best use of assets, early replacement costs TDC		Almost Certain	Moderate	High	Do not install digital meters until end of manifold installation programme

			Rating With Existing Controls			
Risk	**Consequence of Risk or Opportunity Occurring**	**Current Controls**	**Likelihood**	**Consequence**	**Risk**	**Proposed Mitigations (Beyond Existing Controls)**
There is a risk of project delays due to budget constraints	Delays to the program roll out and completion.	Working closely with finance and the alliance team to provide best price estimates, that can be used to forecast the budget over the program's life cycle.	Possible	Moderate	Medium	Early warning dialog with contract to ensure that pricing is accurate. 6 monthly review on pricing to capture any program savings i.e workstreams, scope of works, materials etc.

6.4 Communications and Engagement

Engagement is essential to support informed investment decisions and ensure all stakeholders—internal, partners, iwi, and the community—are aligned and aware of the project.

Installing water meters affects all residents with a Council water supply. Other councils have faced concerns about affordability and fairness under user-pays systems.

Early and clear communication about the reasons for metering, along with its benefits, is critical to gaining public support and addressing concerns.

If handled well, strong messaging will help manage the narrative and build understanding. Poor engagement, however, risks backlash, delays, increased costs, or even cancellation of the project.

6.4.1 Engagement Process

The following objectives should guide the engagement process for implementing water meters across the district:

- Ensure the community understands why meters are being installed, the benefits expected and the cost.
- Clearly outline the process for the roll out, when they will be installed and any disruptions this might cause.
- Clearly articulate how and when changes to water charges will occur, and on what basis.
- Reach as many residents as possible, using a wide array of methods and channels.
- Ensure community support for the programme and the outcomes council is seeking to achieve.

6.4.2 Stakeholders

The below table provides a high-level overview of the stakeholders that should be included and their involvement:

Stakeholder	Needs and expectations
Residents and ratepayers – those connected to a TDC water source	Primary audience. Clear information about the project and how this will affect them. A forum to discuss their concerns.
Commercial/retail – those connected to a TDC water source	Businesses will want to understand the impact of meters on their operations. Clear information about the project and how this will affect them. A forum to discuss their concerns.

Elected members	Key community members and representatives for Council. Project updates and key milestone information and reporting
Council staff	Project updates and key milestone information. FAQ information for Customer Services and Communications
Iwi	Iwi are currently being engaged through a 3 Waters Advisory Group on TDC's strategic initiatives, which will include universal water metering. Discussion will be required via this forum to confirm iwi support and modes of engagement.
Contractors/suppliers	Guidelines/requirements to perform their jobs. Clear communication between stakeholders/contractors and out to the public
Horizons Regional Council	Reporting to ensure that the regional consent requirements are being met
Local media	Primary media channel for the local community

6.4.3 Key Engagement Risks

Risk	**Effect**	**Mitigation**
Failure to identify and communicate key changes and the affects this will have on the community	• Community dissatisfaction with Council • Council/contractor reputational damage	• Clear, accurate, timely and transparent communications
Lack of community support	• Negative feedback or lack of feedback	• Ensure information is consistent and clear across all channels • Involve the media by proactive media advisories and key stakeholder groups through direct contact
"Council is just trying to make money from us."	• Residents may feel unfairly targeted or exploited, leading to mistrust and opposition.	• Clearly explain that metering is about fairness — people pay only for what they use • Reassure residents that all revenue will go back into the water network, not into general Council spending. • Emphasise leak detection, waste reduction, and protecting water for future generations.
"I don't understand what this means for me."	• Confusion, anxiety, or disengagement — residents may feel left out of the process or surprised when changes happen.	• Use simple language and relatable examples to explain how meters work, what the rollout looks like, and what changes (if any) to expect in the short and long term

		• Make communications practical and personal, not technical or abstract.
"Will I be hit with a new bill out of the blue?"	• Fear or financial stress if residents think charging is starting immediately or without warning.	• Be honest and clear: no immediate charges. • Share a timeline and explain that there will be plenty of notice and support before any billing begins. • Reinforce that this change won't happen overnight — it's part of a multi-year rollout.
"Is someone tracking what I'm doing with my water?"	• Concerns about surveillance or data privacy may make residents uneasy.	• Explain how water use is measured (volume only, not how it's used) and that data is securely collected for billing and leak detection only. • Be transparent about what information is collected, who has access to it, and how it's protected.
"No one told me this was happening."	• Frustration or resistance if residents feel blindsided when installation begins, or bills change.	• Communicate early and often — using trusted, local channels. Send letters, hold info sessions, post on social media, and engage local community leaders. • Make sure residents in each area know what's happening well before their meters go in.
"Who do I call if I have a problem with my water?"	• Confusion and stress if residents don't know who is responsible, especially as water services shift nationally.	• Acknowledge the bigger water reform picture. Explain that while Council is currently leading the rollout, a new water entity will manage services in the future. • Provide clear, simple contact details and keep residents updated as responsibilities shift.

6.4.4 Approach

A detailed Communications Plan has been developed and will be updated according to changes in the project as it develops. The following stages outline the proposed stages of engagement that are anticipated for consideration and inclusion in detailed planning.

Phase 1: Awareness and education

Proactive, educational communications around the water network and the project including:

- Size of the network (km of pipes, number of connections, amount of water used per household etc)
- "Why water meters?" – long-term benefits, fairness, and futureproofing
- The expected benefits
- How the meters work
- Use simple visuals, infographics, short videos
- Publish stories of water loss, leaks, and usage today (make the invisible visible)
- Backflow prevention – what this is, what the Backflow Prevention Policy will include, how this will affect people (particularly commercial property owners), targeted engagement with those affected

This is an opportunity to raise awareness of the fact that Council is looking at a range of solutions to make the water network more efficient, including water meters.

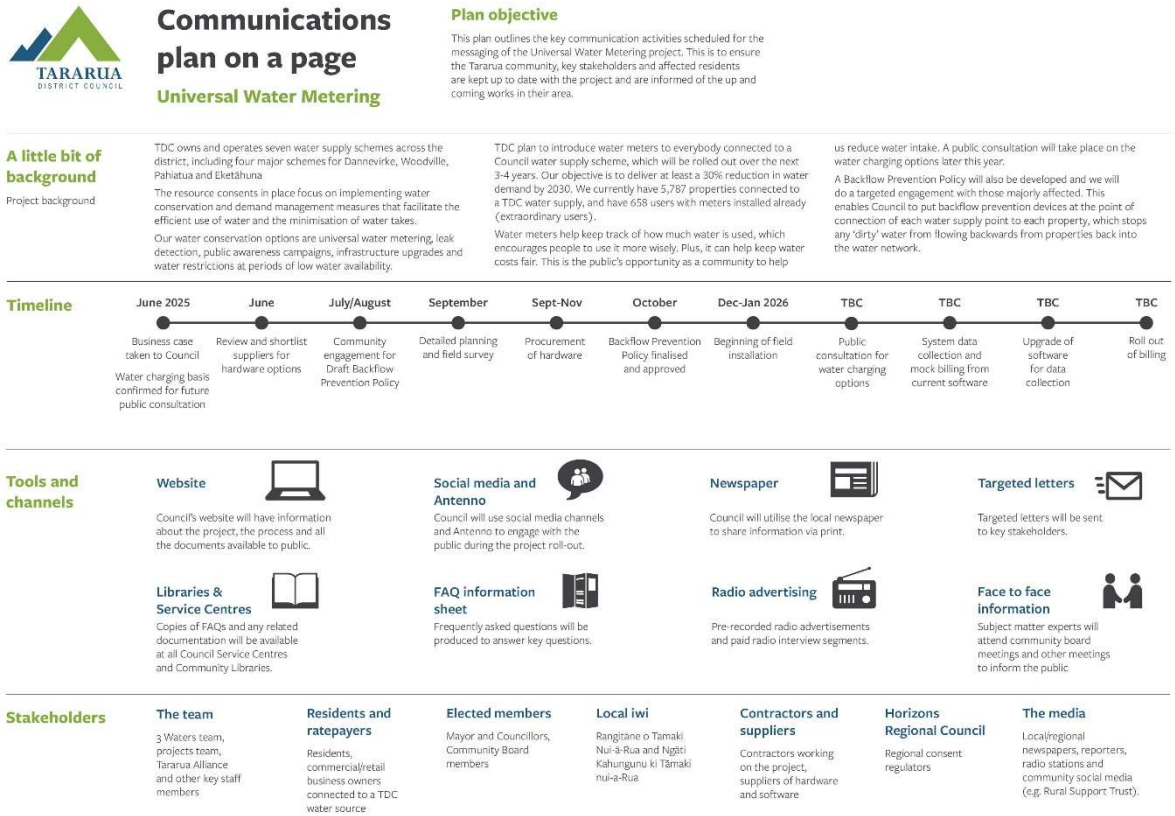
Phase 2: What's happening and when

- Expected roll-out process
- Timeline for installations and when charging starts
- What people can expect (notice periods, how meters will be installed)
- Who to contact for help or concerns

Phase 3: Engagement and feedback

- Public consultation on water charge options
- Public Q&As, pop-up stalls at markets, Facebook Lives
- Community drop-in sessions and a dedicated info line/email
- Myth-busting campaign

6.4.5 Communication Plan at a glance.



7 Project Funding and Affordability

The Tararua District Council (TDC) engaged a third-party consultant (Rationale Limited) to undertake a water charge analysis summary report (Please refer to the attached document for the full report) to provide detailed and informative data, outlining options for the future rate charging strategy and allocation.

The following pricing, evaluation and recommendation have been provided from the Rationale Ltd report, please refer to the full summary attached for further information and breakdown charging examples.

7.1 Existing Water Pricing Structure

A variety of pricing structures for water are applied across New Zealand, and these offer different benefits and challenges. Historically, most councils have generally used a uniform annual general charge (or targeted rate) to charge businesses and households for water services. These charges are simple to administer but do not account for variance in actual use between individual households and businesses, and do not encourage conservation of water by placing a more direct value on water use.

The installation of water meters, particularly modern smart meters, has opened up improved opportunity for councils to implement alternative pricing structures, such as volumetric charging. Generally, pricing structures fit within one or a combination of:

Pricing Structure	Description
Fixed Charge (including uniform annual general charges or targeted rates).	Apply uniform charges to every property. Fixed charges can be applied in conjunction with one of the volumetric based charging schemes below.
Uniform volumetric charges	Apply a consistent price for every cubic metre (m3) of water consumed. Encourages conservation and allows small, low-income households to lower their bills.
Increasing tiered charges	Apply higher volumetric charges when pre-set thresholds are reached. High water-users pay a higher rate than low water-users. Further encourages conservation but may lead to higher costs for households with many people.
Decreasing tiered charges	Apply lower volumetric charges when pre-set thresholds are reached. Advantageous for bulk users but discourages conservation and limits savings opportunities for low users. Use of this scheme is in decline.
Seasonal Charges	Apply higher volumetric charges based on consumption in peak demand periods.

7.2 Evaluation Process

Rationale, based on previous work and knowledge of volumetric charging approaches elsewhere in New Zealand, developed a range of charging options for consideration. This long-list of options included a mix of fixed user charges and volumetric charges, with regular and high user charges included.

These options were then evaluated using the Multi-Criteria Analysis (MCA) framework to evaluate and ultimately reduce this to a short list of options for further analysis / modelling. The MCA framework provides a robust, transparent, and structured method for comparing shortlisted options. The short-listed options were presented to the TDC project team (remotely) on 10 April to confirm our assumptions and scoring before proceeding with further analysis.

The shortlist is assessed against:

- Investment Logic Map benefit statements (investment objectives identified in the previous Three Waters Strategy and Implementation work Rationale supported).

- Business Needs including economic efficiency; fairness to consumers; social orientation; cost-recovery; financial stability; and resource conservation of water)1
- Risks (technical, operational, financial, legal, political, economic, stakeholder, public) which will include those that are sourced from the Baseline Report and Gap Analysis.

7.3 Options Considered

These shorted-listed options included (final MCA scoring below each option):

Option 1	Option 2	Option 3	Option 4	Option 5
Fixed Charge Only (status quo)	**Fixed Charges + Universal Volumetric Charge**	**Fixed Charges + Universal Volumetric Charge with a free water threshold**	**Fixed Charges + increasing tiered volumetric charge**	**Fixed Charges + increasing tiered charge with a free water allocation**
All unmetered properties pay a fixed charge. **All metered properties pay a fixed charge plus a volumetric charge applied in excess of 80m3 of water consumed per quarter. Large water users >2,000m3 per quarter are charged at a discounted volumetric rate.**	All properties pay a fixed charge which is generally set to cover annual depreciation / renewal expenditure. A universal volumetric charge is levied on all water users (e.g., consistent price for every cubic metre of water). Encourages some conservation and allows small, low-income	As for Option 2, but with a free water threshold. Customers only pay volumetric charges above this threshold. The cost of this free allocation is included in the fixed charge.	As for Option 2, but with increasing volumetric charges above pre-set thresholds meaning high water users pay a higher average cost per unit compared with low water users. Encourages water conservation but may lead to high costs, particularly for high commercial users.	As for Option 4, but with a free water threshold.

	households to lower their bills.			
5	**2**	**4**	**1**	**3**

7.4 Recommended Option

Rationale recommends Council proceed with **Option 4: Fixed Charges + an increasing tiered volumetric charge**. The fixed charge combined with an increasing tiered price structure provides a balanced, principled approach to water pricing, aligning with key objectives of economic efficiency, fairness, social orientation, cost recovery, financial stability, and resource conservation. The fixed charge ensures that the essential costs of operating and maintaining the water system are recovered (such as funding depreciation of the assets). The increasing tiered price structure, where the unit price rises with higher levels of water use, directly incentivises water conservation by making excessive consumption progressively more expensive, strongly supporting the resource conservation objective. This model drives economic efficiency by encouraging more environmentally responsible water use, thereby reducing demand pressures and associated costs on infrastructure and supply. Importantly, the structure promotes fairness by ensuring that all consumers pay equitably: low and essential water users are protected with lower charges, while high-volume users, who place greater strain on the system, contribute a proportionate share of costs, minimising the need for cross-subsidisation.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