Universal Smart Water Metering

Information Paper for Hutt City Councillors

December 2023

Our water, our future.

Table of Contents

1. Universal metering is about water security, not revenue generation

While people might instinctively associate meters with collecting the revenue that pays for the water supply services, in our context their value is improving water management and reducing risk and cost. That is, they are not about making money but about reducing the amount of money you would otherwise have to spend.

Meters do this by telling us where the water is actually going, and whether it is being used or lost. This helps us ensure it is supplied and used efficiently. By losing and using less water, we need less infrastructure. There is also no endless supply of freshwater, and we are already over-using what we have. The more we use and lose, the greater the risk of running out, or of having to move on to sources that require more cost, energy, and carbon to treat and distribute safe and healthy drinking water to the community.

2. The objective is for customers to have sufficient water during typical summer conditions while ensuring the health of the freshwater and minimising infrastructure costs

Achieving a sustainable water supply system involves using only the water that is needed, supplying it effectively and efficiently, and ensuring the long-run health of the rivers and aquifer the water is taken from. Excessive, inefficient water use requires increased water takes and more infrastructure (lakes, pipes, reservoirs, etc.). This problem is compounded if we don't supply it effectively and lose it through leakage. Our freshwater sources are already under-pressure, over-allocated and unable to properly support their connected ecosystems.

The region's level of service for water supply is to have sufficient water available to meet normal customer demand except in a 1-in-50-year or greater drought event (also referred to as 2% annual shortfall probability or ASP). This level of service is relatively low compared to the ASPs of <1% (1-in-100-years or greater) that are typically being used elsewhere, so our customers are already accepting a relatively high level of water supply risk.

The level of service flows through into investment decisions. It recognises there is a trade-off between the costs to customers from water restrictions and shortages, and the cost of investing in infrastructure and services to ensure the water is available[1]. The impacts of water shortages for customers are set out in WWL's Drought Management Plan[2] and can include a need for shorter showers, reduced laundry loads, and a total ban on all outdoor water use.

This issue is here and now, and real – there is a 24% likelihood of severe water restrictions this year.

Understanding our legal obligations

Under the Water Services Act 2021, drinking water suppliers – the councils together with Wellington Water - must ensure that a sufficient quantity of drinking water is provided to each point of supply. Every officer, employee, and agent of the drinking water supplier must exercise due diligence to ensure that the drinking water supplier complies with that duty, including understanding the risks and how these can be controlled or eliminated.

1 As outlined in the text box, there are also legislated obligations for drinking water suppliers. See clauses 25 and 29 of the Water Services Act 2021, available at https://www.legislation.govt.nz/act/public/2021/0036/latest/LMS374564.html.

2 https://www.wellingtonwater.co.nz/assets/Reports-and-Publications/Drought-Management-Plan-Wellington-Metropolitan-Area-revision-G.pdf

Achieving this level of service can include a mixture of supply-side (i.e. water supply and storage) and demand-side (i.e. water use efficiency and leakage management) activities.

3. We have to reduce our water takes to improve freshwater health within the next 10 years

The region's water supply comes from three sources: Te Awa Kairangi/Hutt River, the Waiwhetu Aquifer, and the Wainuiomata and Orongorongo rivers. The aquifer's source water is also from Te Awa Kairangi.

This freshwater is currently over-allocated, that is, more water is being taken than the rivers and their ecosystems can sustain. Almost all the water being removed is for the metropolitan drinking water supply. This means the only way to restore the health of these rivers is to change the way we use water so that we are taking less.

Looking ahead, Greater Wellington Regional Council's Natural Resources Plan will make it harder to get consent to take the same amount of water we are taking now.

To ensure the rivers are restored to health, the Te Whanganui-a-Tara Whaitua Committee has recommended that Greater Wellington Regional Council progressively increase the required minimum river flows[3]. This will reduce the amount of water that can be drawn from them in the summer months. The rivers are considered to be taonga by mana whenua, who support the recommended increase in minimum flows[4]. The required changes to the Natural Resources Plan are expected to commence in 2025 and apply from the mid-2030's.

The Natural Resources Plan already includes provisions that will have consequences for the re-consenting of the existing water allocations in the early 2030's. Schedule P of the Plan[5] will require the submission of a water management plan that demonstrates the volume of water required is justified and that it will be used efficiently.

> In summary, within the next 10 years we will need to shift from the current position where more water is being taken than is sustainable for the rivers, to be taking significantly less water in the summer. We will need to demonstrate ongoing water loss reduction and the efficient use of water. Not doing so will impact on our ability to get consent for this activity, as will impact on the health of the freshwater.

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[3] Recommendation 83 from the Te Whanganui-a-Tara Whaitua Implementation Plan. Available at https://www.gw.govt.nz/environment/freshwater/protecting-the-waters-of-your-area/whaitua-te-whanganui-a-tara/whaitua-implementation-programme-recommendations/

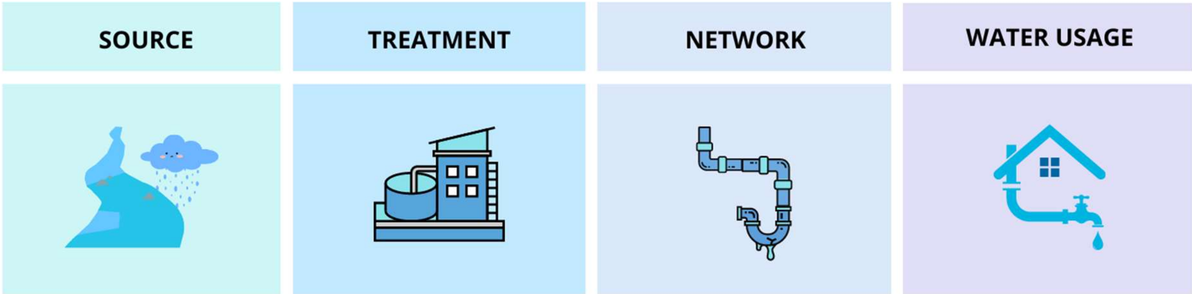
[4] The objectives of mana whenua for the rivers are set out in Te Mahere Wai o Te Kāhui Taiao, available at https://www.gw.govt.nz/environment/freshwater/protecting-the-waters-of-your-area/whaitua-te-whanganui-a-tara/te-mahere-wai-recommendations/

[5] https://www.gw.govt.nz/assets/Documents/2023/07/Chapter-12.pdf

4. There are three pathways to water security, and we'll need to follow them all

Water supply is a system that runs "from catchment to tap" and encompasses supply, delivery, and use.

Figure 1: The main elements of the water supply system



Water security can be supported all the way along this system through applying the following KRAs for water supply:

K	**Keep** the water in the pipes	Water lost to leakage is water that could have stayed in the river, and that has required investment in treatment and supply that does not benefit customers
R	**Reduce** water demand through water metering	Water that has been used inefficiently has required investment in treatment and supply that could have been avoided
A	**Add** more supply so there is enough in summer when river and aquifer availability declines.	We will require more water as the population grows, and to be able to store water in winter so we don't need to take as much in the summer

5. Meters provide multiple benefits

Meters are an essential component of the 'reduce' element. The only way that customers can effectively act to reduce their demand for water and to use it efficiently is by understanding how much water they are actually using. In the absence of information and data specific to them, they can only act on generic messaging and have no way of determining if their actions have been effective.

Meters are also fundamental to the 'keep' element, both through detecting private-side leakage and enabling the complete picture of both supply and demand on the public network to be completed. We currently only understand how much water is entering relatively large areas of the networks, but not where it is going and whether it is being used of lost. When we understand both how much water is entering the system and where it is being used, we can better determine how much is being lost, and where we need to look for the leaks.

The meters will provide the following benefits:

- Provide information for customers to support water efficiency and conservation actions ('Reduce')
- Facilitate rapid detection of leaks on customer pipes and property ('Keep')
- Enable faster, more efficient, and more effective public network leak detection than can be achieved with existing approaches ('Keep')
- Optimise operating and capital expenditure through understanding actual water consumption
- Facilitate water efficiency and leakage reduction activities required for re-consenting water takes
- Integrate into 'smart' networks to optimise operations (smart meters only).

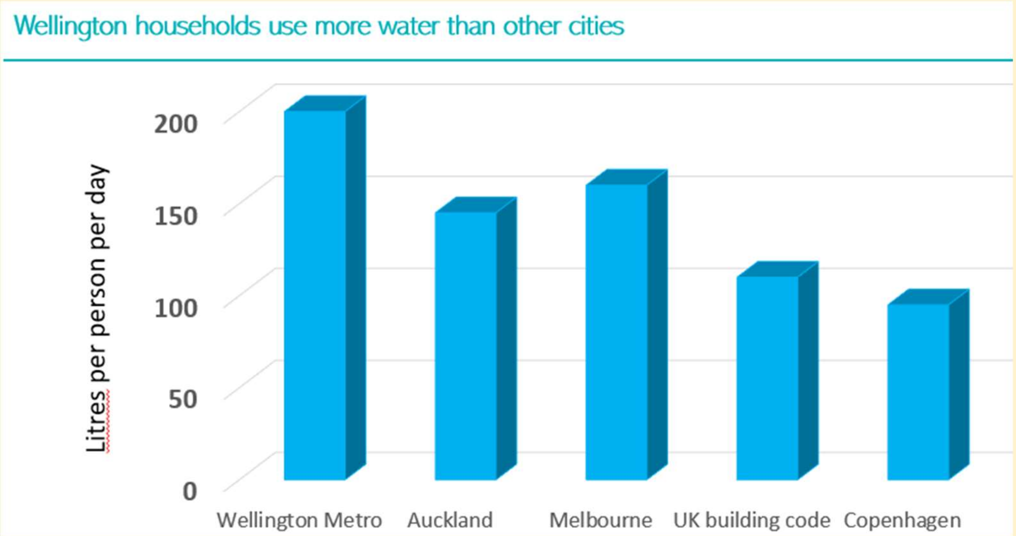
The benefits of metering information were explored in the Economic Case for Providing Residential Water Consumption Information, completed in October 2020 (available from the References list). While the investment context has changed since that report was completed – with the need for action having become more urgent – the description of the benefits remains valid.

Insight: Wellington's high level of water use shows that material reductions are possible

Based on the currently available data, the typical Wellington metropolitan region household uses around 200 litres of water per person per day. This compares unfavourably with other major cities such as Auckland (145 litres/person/day) and Melbourne (160 litres/person/day) and with no evidence that there is something specific about our region that would require the increased use of water.

Globally there is a drive to improve water use efficiency, typically through requirements for water efficient fittings and appliances. The drive is towards use of less than 100 litres per person per day, or around half of our current consumption. The UK building code already requires houses in water stressed areas to be designed for 110 litres/person/day and use in Copenhagen in Denmark is also already at around 100 litres/person/day.

Figure 2: Water use in Wellington compared to other cities



6. Meters support the lowest cost, lowest carbon, best-for-water investment pathway

We've looked carefully at all the options for providing the required level of service into the future and recommend that the best option is a three-part approach of universal smart water meters, increased water loss management, and additional storage lakes.

Meeting the required level of service requires long-run investment that accounts for a range of factors:

- *Water demand* – usage by residents and commercial and other non-residential users, which varies over time as demographics and commercial activity change
- *Water loss* – leakage and other water loss, both in the public network and on private property
- *Population growth* – the number of new customers connecting to the water supply system
- *Climate change* – long-run changes in rainfall patterns and sea level rise can impact both water availability and demand patterns
- *Environmental requirements* – the need to ensure water sources remain healthy and sustainable into the future, including through giving effect to the principles of Te Mana o te Wai[6].

We've considered the full range of options using robust economic and technical analysis

Our options evaluation has considered both the wide range of future scenarios that these factors can produce, and more than 100 different options for ensuring the level of service can be met. Our approach incorporated best practice from the UK and Australia and utilised specialist NZ and global expertise. It is also now being developed as a case study for a global water supply planning guideline. Our process saw the available options (as shown in Figure 3) filtered for their ability to meet the requirements, followed by a more detailed assessment of the costs, benefits and feasibility to establish a shortlist of options. These options were then evaluated in more detail, then developed into potential investment plans and pathways and assessed against the potential future scenarios. The full assessment process is shown in Figure 4.

[6] As required under the National Policy Statement on Freshwater Management and given effect through Greater Wellington Regional Council's Natural Resources Plan.

Figure 3: Options considered in the future water supply analysis

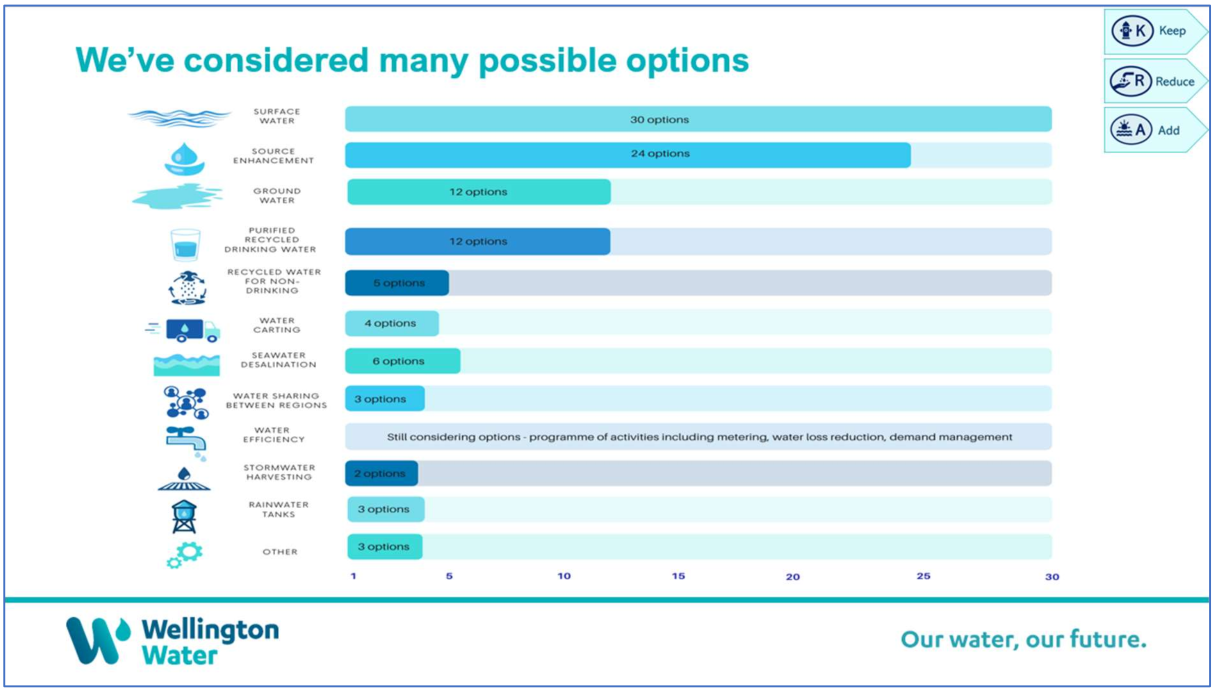
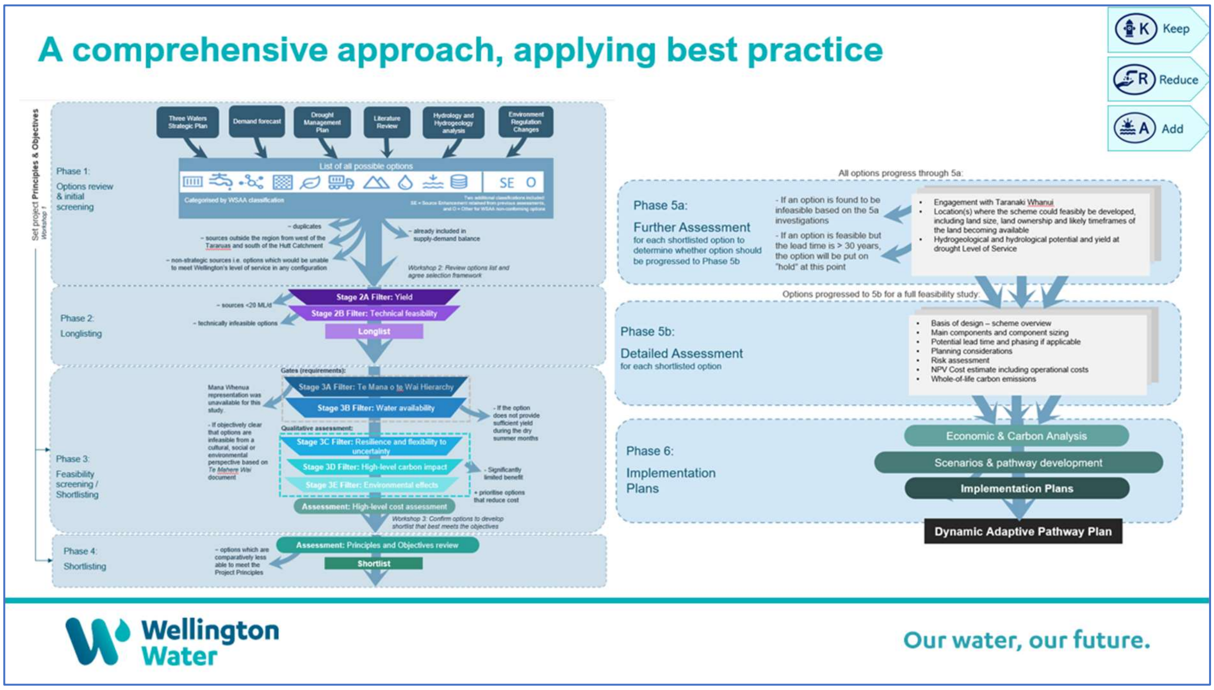


Figure 4: The analysis approach used to identify the recommended approach

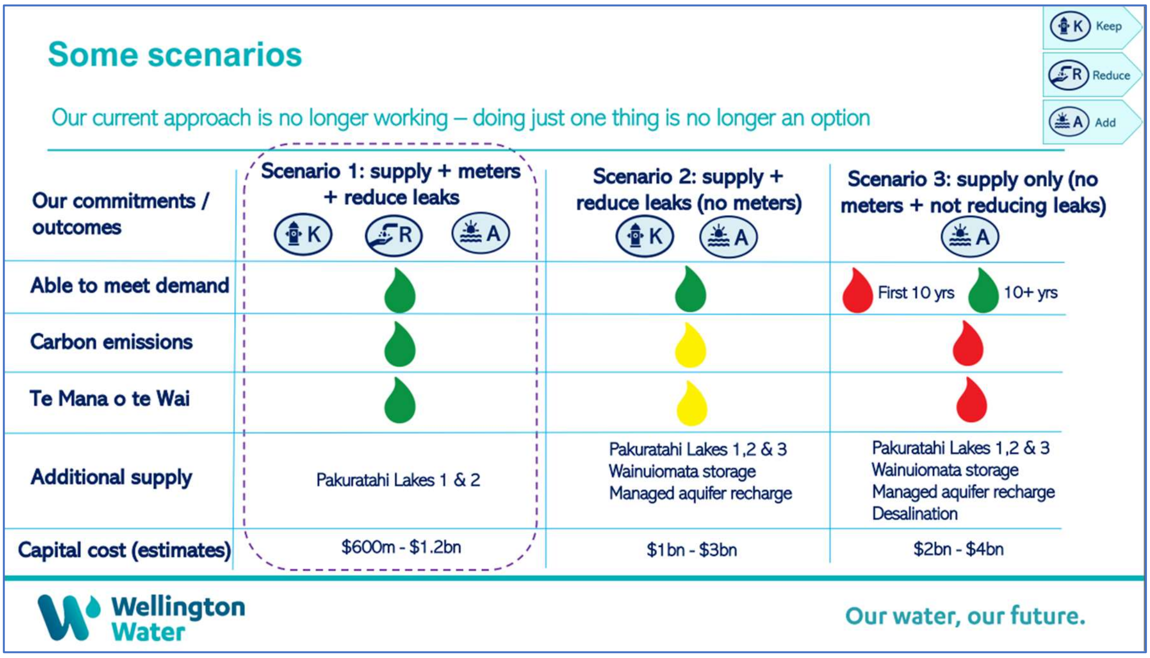


The shortlisted investment pathways were assessed for costs; ability to meet demand; lifetime carbon emissions (i.e. the emissions for both construction and operation); and ability to meet the future minimum flow requirements for the source waters. This meant that the financial, social, and environmental impacts of the options were all considered in the overall analysis.

We've recommended a robust approach that balances the financial, social and environmental impacts

The outcomes of this analysis were presented at the Regional Water Summit[7] in a highly summarised format, see Figure 5 below. The full analysis is available in the detailed project report (see References section) and some examples of the study outputs that highlight the differences between the scenarios are provided in Section 12 of this paper. The results of the analysis are also now being developed into a Programme Business Case that will provide the key reference document for the individual investment activities required across each of the K-R-A workstreams.

Figure 5: Comparison of the ability of the investment pathways to meet financial, social and environmental objectives



The figure highlights that the three-limbed approach of universal smart water meters, increased water loss management, and additional storage lakes ('Scenario 1') is the best option across all the evaluation considerations. This approach was also the most robust to all of the future uncertainty, remaining effective when considering factors such as changing population growth rates.

Options that exclude investment in meters (Scenario 2), and both meters and increased water loss management (Scenario 3) are up to four times more expensive, have higher carbon emissions, and are less able to support the water sustainability requirements.

Putting it another way, the volume of water saved through meters and leakage management is available at a lower cost and environmental impact than supplying that volume through additional sources and supply. This also makes sense intuitively – if our existing, over-allocated water sources have limited ability to provide additional water, we will have to turn to sources that require much higher degrees of treatment to provide safe drinking water.

7 https://www.wellingtonwater.co.nz/assets/Reports-and-Publications/2023-Regional-Water-Shortage-Summit-Final-slide-pack-11-September-2023.pdf, refer to slide 22 of 44.

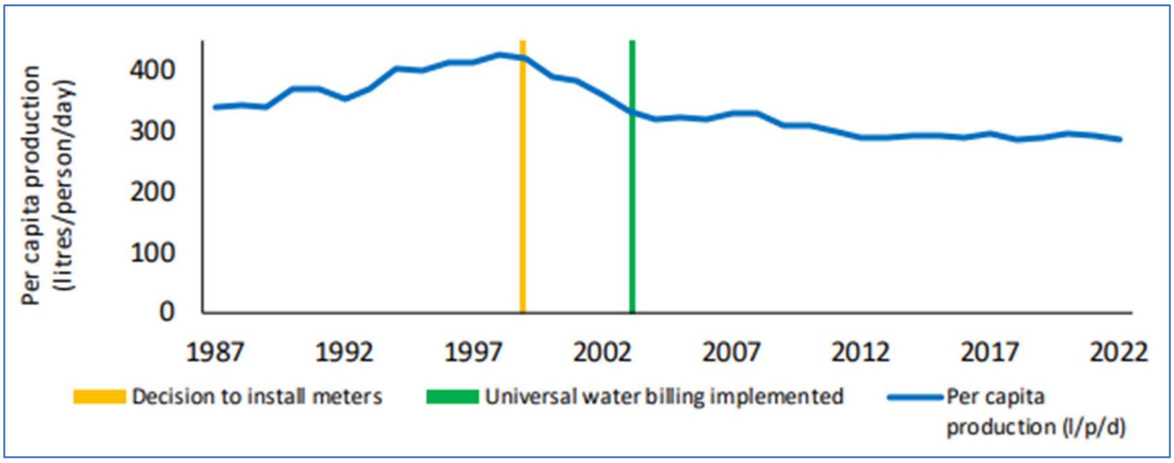
7. Meters have been a demonstrated success for other NZ cities and towns

More than 60% of New Zealand's domestic water customers are already metered. This includes all of Auckland and this, together with the associated charging regime, is likely to be a key factor in their per capita consumption being around 75% of Wellington's (see text box, above).

Tauranga – 30% reduction in water production achieved

Another relevant example of a city successfully adopting water metering is Tauranga (current population ca. 160,000). Faced with rising demand and the pending need for investment in new water sources, a decision was made to progress universal water metering in 1999. Metering and billing commenced in 2002. Over that period per capita water production reduced by more than 20%. Per capita production has continued to progressively decline and is now more than 30% below pre-metering levels.

Figure 6: Per capita drinking water production in Tauranga between 1987 and 2022[8]



Residential consumption in Tauranga is also now comfortably below that for metropolitan Wellington, at around 170 litres per person per day. Water is charged entirely volumetrically with a single rate for all domestic customers. The council also operates a water efficiency programme that provides advice and support for customers[9].

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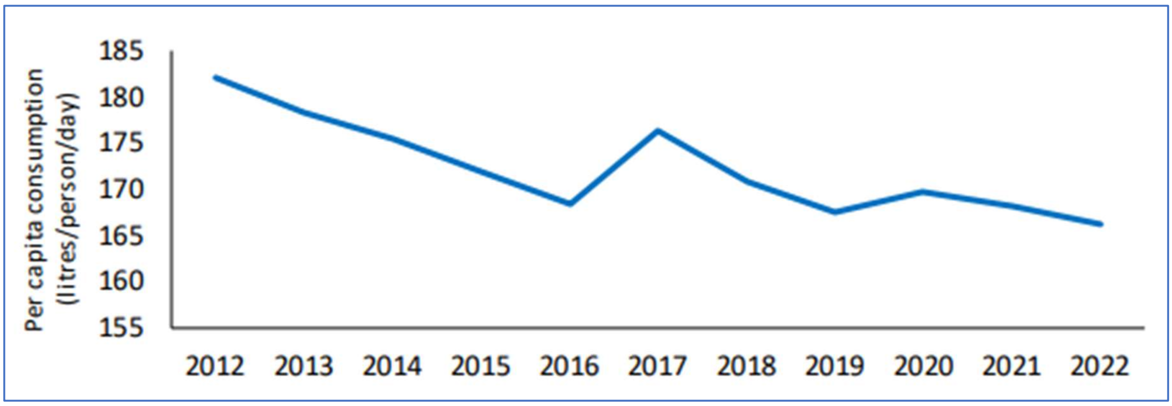
8 https://motu-www.motu.org.nz/wpapers/23_09.pdf. Water production is the total water supplied into the system, including leakage and commercial demand.

9 See https://www.tauranga.govt.nz/council/water-services/the-tauranga-water-conservation-project/water-watchers.

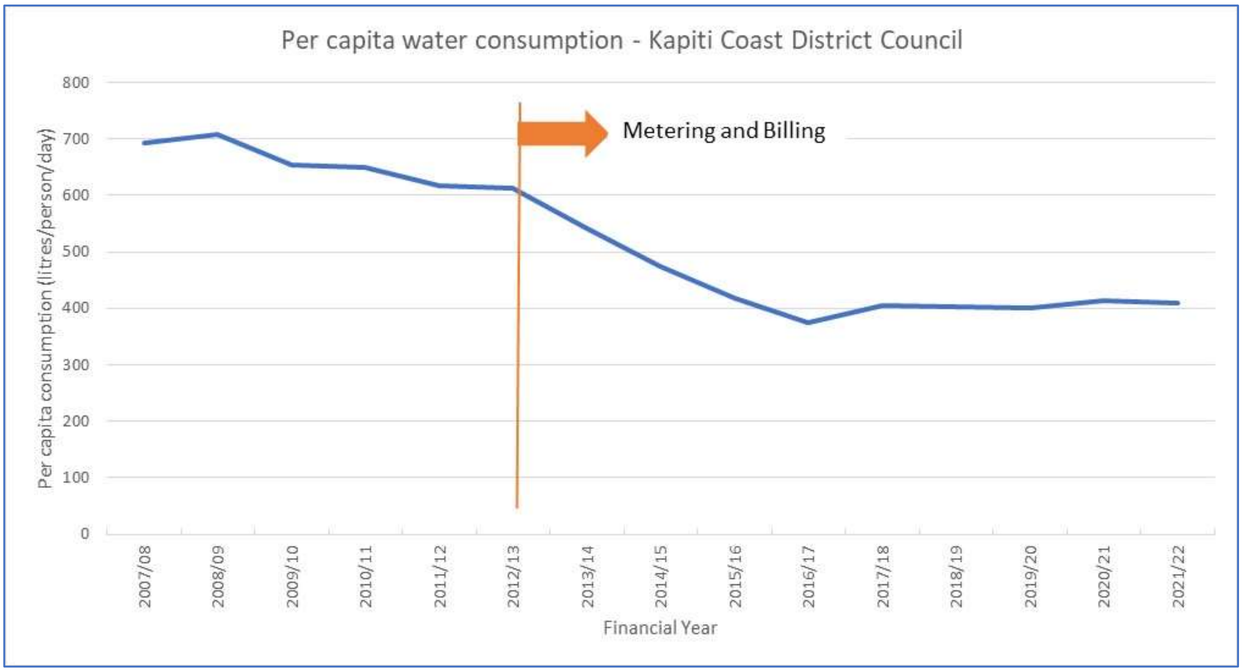
Figure 7: Residential per capita consumption in Tauranga between 2012 and 2022[10]



Kāpiti – an ongoing 26% reduction in peak demand achieved

Closer to home, Kāpiti Coast District Council commenced universal water metering and billing in the 2013/14 financial year. This saw around 23,000 meters installed across the district, with indicative bills provided to customers ahead of the start of formal billing to give them an opportunity to address leaks or high consumption. This project saw peak water demand reduce by 26%. Per capita demand remained at this lower level in the subsequent years.

Figure 8: Per capita water consumption for Kāpiti Coast District Council[11]



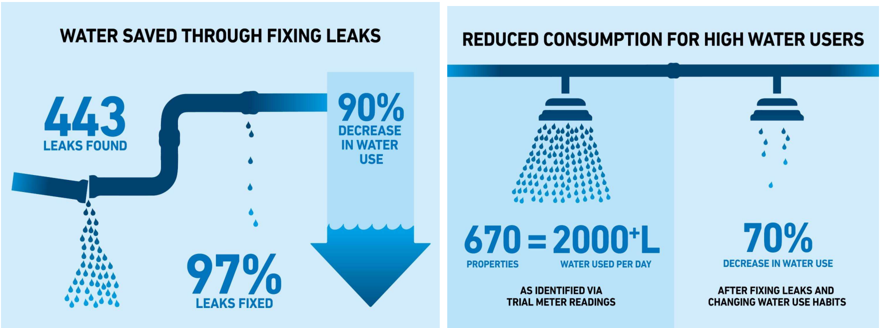
10 Ibid.

11 Data taken from the annual 'Kapiti Coast Water Conservation Reports' and assuming the most recent report reflects a consistent approach for historical data. See https://www.kapiticoast.govt.nz/media/b0xkwa4d/kapiti-coast-water-conservation-report-2021-22.pdf.

Kāpiti Coast District Council apply a 50/50 combination of fixed and variable (volumetric) charges for drinking water supply, together with rebates when private leaks are identified and repaired and rates remission for vulnerable households that have high water use. The Council also uses its bylaws, and the associated powers under the Local Government Act to require customers with identified leaks to take action to address them.

Some ‘snapshot’ highlights of the results from Kāpiti’s meter deployment are provided in the figure below. What these snapshots show is that a relatively small proportion of customers can have a significant impact on total water consumption, whether that is through leaks or excessive water consumption. Supplying all of this ‘extra’ water comes at the cost of increased operating costs (i.e. energy and chemicals) and capital expenditure (treatment plants, storage, etc.) that must be paid for by all customers.

Figure 9: ‘Snapshot’ outcomes from Kāpiti’s universal meter deployment[12]



75% of ratepayers **paid less** for their water after the commencement of metering and billing

This scenario of a small number of customers using a relatively large proportion of the water has been seen in other towns (for example, 65% of Waipa customers also paid less after universal metering was adopted) and has been observed in some of the small number of reference meters deployed in Wellington. The only way that this excessive consumption can be readily identified is through a meter.

The NZ experience is replicated elsewhere. UK data shows that properties in England and Wales with meters use 30% less water than properties without meters[13].

The recent pilot project to install 250 smart meters in Greytown (replacing existing analogue meters) also yielded similar, successful results. 211 leaks were identified across the 250 properties. And despite previously being metered, and charged for their water, the households with smart meters were able to achieve total usage reductions of around 20%.

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[12] First two figures from - https://www.waternz.org.nz/Attachment?Action=Download&Attachment_id=345#:~:text=Residents%20are%20now%20paying%20%24190,metre%20for%20the%20volumetric%20charge and “75% of residents pay less” taken from the news article https://www.stuff.co.nz/dominion-post/news/wellington/107331015/kpiti-coast-residents-tapped-for-increased-water-rates.

[13] Table 2 in the Artesia Consulting report ‘The long term potential for deep reductions in household water demand’ produced for Ofwat, 26 April 2018. Unmetered households used an average of 379 l/property/day vs 266 for metered.

Insight: What did universal metering mean for Kāpiti's growth?[14]

In the late 1990s and early 2000s, Kāpiti Coast District Council (KCDC) exceeded its assigned water take and was issues abatement notices by Greater Wellington Regional Council. After its initial application to expand its supply was refused, KCDC prepared a comprehensive water strategy that would optimise demand and supply. The measures were implemented in phases, and it took about 15 years to complete implementation.

The last phase of the strategy saw KCDC having to make a choice between universal metering and two different water supply schemes: a river recharge system and a dam. The meters were identified as having both the lowest capital and ongoing operational costs, and so the lowest direct cost impact for ratepayers (annual charges were more than 20% lower with the metering option). Without the demand reduction benefits achieved from the meters, additional water source options would have been required within the next 20 years, at a higher cost than the most expensive current source option.

The meters have achieved the expected 25% reduction in peak demand that was forecast and the timing for any additional supplies has been pushed out to around 40 years.

Other benefits have included avoiding the need to apply summer water restrictions and taking more than one million cubic metres less water from the Waikanae River than in past years.

So, while water supply did not prevent or limit growth in Kāpiti, the use of universal smart metering has enabled population growth – and ongoing reliable supply for the existing community - at a significantly lower cost, now and into the future, than following a supply-led approach. At the same time the community has achieved greater water security and helped to preserve healthy river flows.

The story shares many similarities with the metropolitan Wellington story. A successful strategy requires a combination of supply and demand initiatives. Meters, and water conservation, is a lower cost option than taking a supply-led approach. Failing to reduce demand will increase the likelihood of summer water restrictions and will bring forward the need for very expensive water sources such as desalination.

We will further test the proposed investment as we continue our planning

It is difficult to predict the level of savings that will be achieved from the adoption of universal smart water metering, as it is inherent in our problem that we do not know where the water is actually going. Our existing measurement approach, utilising network meters and reference consumption data from the Small Area Monitors gives as an idea of the average usage, private leakage, and network leakage, but these averages will not show the full story. The data from other cities and towns (such as the Kāpiti example, above) suggests there is a 'long tail' of customers with high use and/or leakage that may be contributing significantly to water use. For Kāpiti, 80% of the 26% usage

[14] Source materials include the Office of the Auditor General's report "Managing the supply of and demand for drinking water", September 2018: https://oag.parliament.nz/2018/drinking-water/docs/drinking-water.pdf and the 'The Charging Regime Advisory Group Report to Kāpiti Coast District Council on a Recommended Water Charging Formula', https://www.kapiticoast.govt.nz/media/gomlyhoa/1013-22-kcdc-app-report-crag-sp-12-509.pdf.

reduction was from leaks on private property and lateral pipes, with the remainder saved by customers using less water[15].

As part of developing the final business case for universal metering we will test both the expected and conservative scenarios for usage and loss reduction to ensure that appropriate net benefits are still achieved. It is also important to note that achieving the maximum benefit will require supporting activities – the meters tell us where loss and excessive use is occurring, but do not fix leaks and reduce demand on their own. The expected range of savings, to be refined and tested in the final universal metering business case is set out in the table below.

Table 1: Expected range of water usage reductions from universal smart metering

Source	Current Contribution	Range of expected reduction	Notes
Private-side leakage	Approx. 10% of total demand	5 – 15%[16] of total demand	Requires enforcement of water supply bylaws to require leak repair. Repair also incentivised by any charging regime, if implemented.
Network leakage	Approx. 34% of total demand	5 – 10% of total demand	Requires sufficient funding for associated leak detection and repair activities. Universal smart metering enables faster identification of leakage and more efficient and targeted detection.
Private usage	ca. 200 l/p/d	0 – 5%	Requires enforcement of 'extraordinary use' elements of bylaws. Also incentivised by any charging regime, if implemented.

The programme for the implementation of universal smart metering across the region is expected to run over about six years. The first two years would involve final design and planning, including procurement and potentially a pilot trial. Installation would commence late in year two, with most of the delivery across years three-to-five, with wrap-up and close out in year 6. The benefits will start to be gained as the deployment progresses, with any private leaks and excessive consumption being progressively identified. The network leakage benefits will be gained as deployment into all, or the majority of a supply zone is completed. The timing of broader private usage benefits will be influenced by the approach taken to providing customers with information, and the introduction of any charging regime.

15 From the OAG report referenced in footnote 14.

16 Experience from other deployments, such as Kāpiti, suggests that actual water loss on the private network can be higher than what is estimated from referencing network meters and SAMs.

8. The costs of meters are appropriately understood

In addition to working to understand the expected benefits of universal smart metering, we have also continued to develop our understanding of the expected costs of the project. This has included engagement with the supply chain (including for meter hardware, installation, and all of the data services), obtaining information from other meter deployments elsewhere in NZ and offshore and collecting data on the expected installation conditions for a local deployment.

The basis for the cost estimate currently being applied in the LTP process has been described in a memo that has been provided to officers (see the list of references at the end of this document).

The cost estimates will continue to be revised as the project progresses and the councils move closer to final investment decisions. This work will include investigating alternative delivery models, utilising "as a service" elements for some or all of the programme. There may also be implications resulting from the new government's approach to three waters reform that need to be considered.

9. Why universal smart meters and not universal analogue meters or more network meters?

The original economic case for providing residential water consumption information (see References) assessed a range of options including business-as-usual, increased network metering, universal analogue metering, and variations on universal smart metering. Only universal smart water metering was found to provide net benefits from investment.

Short descriptions of how network meters and universal analogue (or manually read) meters follow below, but a more comprehensive assessment is provided in Appendix F of the economic case, that sets out the multi-criteria analysis scoring and rationale for the different options.

Network meters do not enable any distinction between customer use and water loss, and do not identify any private-side losses. They may help to identify where material network water loss is occurring, but at a relatively low resolution. Data from network meters does not provide customers with information that can help them adjust their own behaviour or identify leaks. Some additional network metering may ultimately be useful to make optimal use of universal smart metering data.

Universal analogue meters only provide information as often as they are read. This is typically only every 2-3 months, due to the associated operational costs for manual metering reading. At this reading frequency these meters provide limited value for network leakage detection (for example, they will not show night flows), will not reveal small customer leaks, and will delay the time until a private leak is detected. They also provide only averaged usage data, so do not enable a customer to directly see the results of any behaviour change actions. The Greytown pilot project (see earlier text box) showed how customers could make significant usage savings with access to timely smart meter data when compared to their usage with only access to occasional analogue meter data.

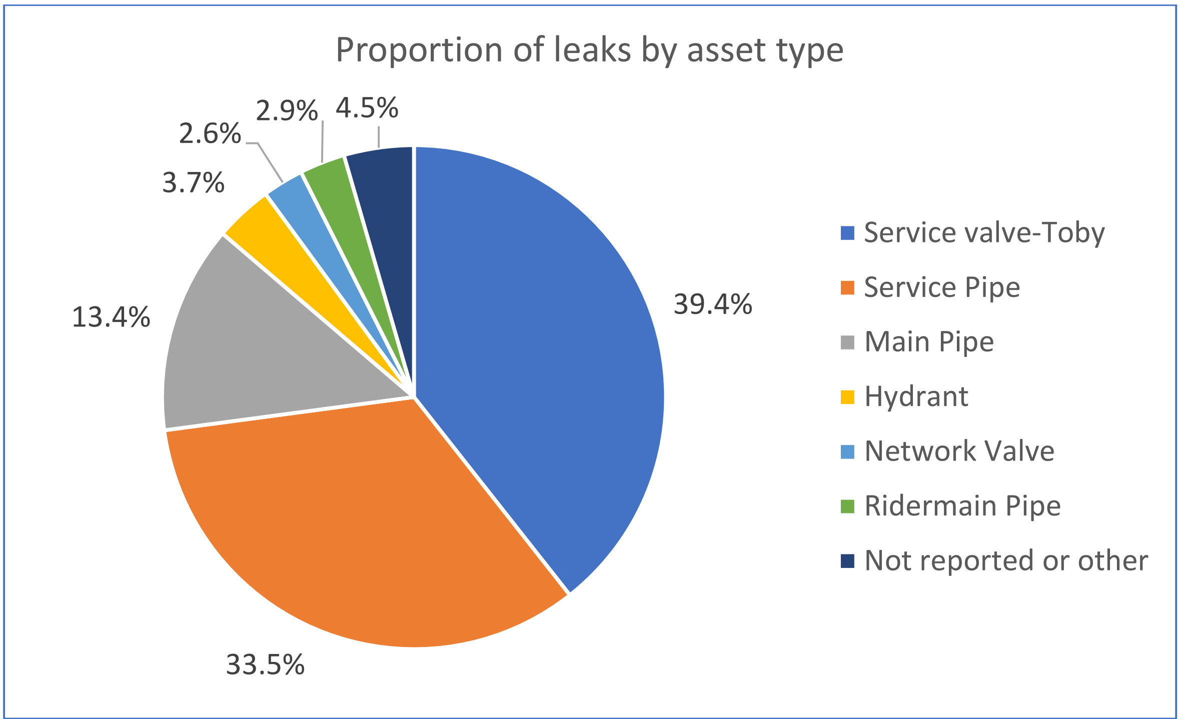
10. Why invest in meters and more water loss reduction, and not pipe renewals?

We have to come at the issue from all sides – reducing demand and reducing loss – and meters are crucial to reducing both.

Water loss and leakage can occur anywhere along the network, from the mains, to supply pipes (laterals), to tobies/manifolds and valves. There can be a range of factors that cause the leak such as the pipe or fitting material, age, and quality, the water pressure (constant and instantaneous), and the operating environment (vibrations from vehicles, land movement and earthquakes, etc.). For this reason, water loss reduction is an ongoing activity that looks at the entire network.

Our data shows that more than 85% of the reported leaks are occurring on service pipes, fittings and valves, and only around 13% on mains pipes (see Figure 10, below). While an aged pipe is generally more susceptible to failure than a new pipe, leaks can also occur on newer pipes and fittings. There is around 2,600 km of drinking water mains pipe across the metropolitan networks. With renewal pipe renewal costs of around $2m per km, the forecast cost of around $280m for the deployment of smart meters across these networks would be equivalent to around 140 km of just 5% of the network, i.e. they would address only a very small component of the leakage problem. Meters, as well as better enabling the detection and location of these network leaks, also help to address the other elements of the demand challenge – private use and leakage.

Figure 10: Sources of network leaks (from WWL data)



The necessary approach is then to not just look at one solution (i.e. not just renewals, or not just meters) but to use a range of the tools and approaches available. Leak detection and management is an ongoing maintenance activity. Water loss reduction involves a full suite of activities encompassing prevention (including renewals of pipes and fittings, and pressure management), awareness (supported by the universal smart meters), location (also supported by the universal smart meters) and maintenance/repair (including the renewal of mains, service pipes, and fittings).

11. What happens if there is no investment in meters and increased water loss management?

There is no ''do nothing" approach that would satisfy the level of service requirement. Even the "supply only" option fails to meet demand. At the strategic and risk level, inaction would mean:

- An ongoing, elevated risk of water shortages for customers and ratepayers[17]
- Proceeding more rapidly to higher cost, high carbon, high environmental impact water supply options such as desalination[18]
- Breaching our existing resource consents and potentially preventing the planned reduction in summer water takes, with adverse impacts for the rivers and Te Mana o te Wai[19]
- Likely reductions in regional growth, as the ongoing water shortage situation acts as a deterrent and impacts economic activity
- Increased likelihood of regulatory compliance and other legal challenges, with consequential reputational issues and the potential for wider impacts on effective service delivery (i.e. reviews, restructures, etc.).

12. What does it mean for the Bulk Water Levy?

Councils that reduce their demand relative to that of the other councils will pay a reduced share of the Levy, but these savings will be modest compared to the overall benefits of risk and total cost reduction.

Residential customers in the metropolitan Wellington region currently pay for their water services through rates-based charges (i.e. costs are allocated with reference to property value). These charges include the pass through of the costs associated with the bulk water supply – the collection and treatment of the water and its delivery to the reservoirs. These costs are charged to each council as a share of the total water supplied through the Bulk Water Levy. How these charges are allocated is shown in Figure 11, over.

If a council takes a more active approach to reducing the demand for bulk water than its counterparts, for example through investing in universal water meters and increased water loss management, then its share of the water supplied – and so the costs – will be reduced. However, inaction on demand reduction from the other councils will mean that the capital investment to ensure sufficient water is available, such as additional storage lakes, is still required. The costs will then be shared across all councils (though with a reduced allocation to those that are water efficient). In the ideal scenario, all the councils would act together and enable this investment to be deferred.

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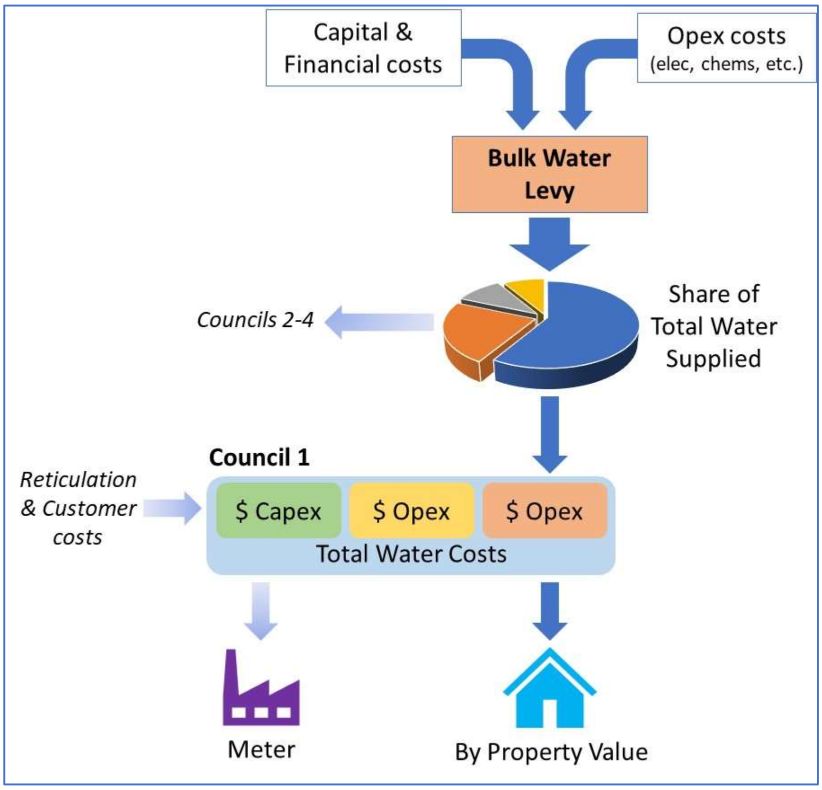
[17] This risk would only briefly be alleviated by Greater Wellington Regional Council's current project to optimise the Te Marua water treatment plant, and the benefits of their investment are also reduced proportionately.

[18] This pathway would also extend the duration of the elevated water shortage risk as these investments all have a very long lead time.

[19] The reconsenting of the water takes in the early-2030's will also require water use efficiency improvements to have been implemented.

Figure 11: How the costs for bulk water supply are passed through to customers



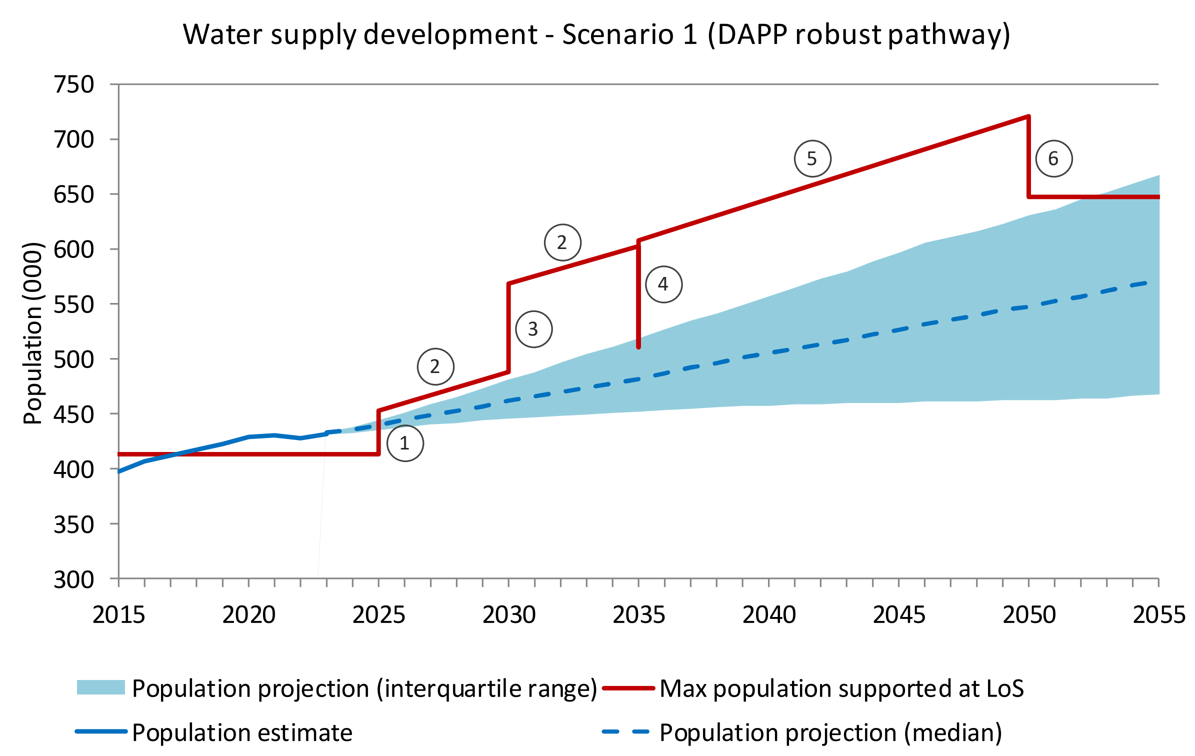
Hutt City Council is currently allocated around 27% of the total Bulk Water Levy. If both Hutt City and Porirua City both remain committed to universal smart water meters and Wellington and Upper Hutt do not, then Hutt City's share of the Bulk Water Levy is estimated to reduce to around 24%. Using the currently forecasted total Bulk Water Levy for 2024/25 as the reference, this would reduce Hutt City's share of the costs by around $2.5m per annum[20]. This is a relatively modest amount reflecting that the main benefit of universal smart water metering is in avoiding or deferring the cost of more significant infrastructure solutions.

[20] This calculation is intended to only provide an order of magnitude indication of the potential reduction in bulk water charges. In practice a more detailed assessment would be required than has been undertaken for this exercise. Also note that the Levy for 2024/25 is expected to be significantly higher than the current, 2023/24 amount, and will also have increased further by the time the meters are implemented.

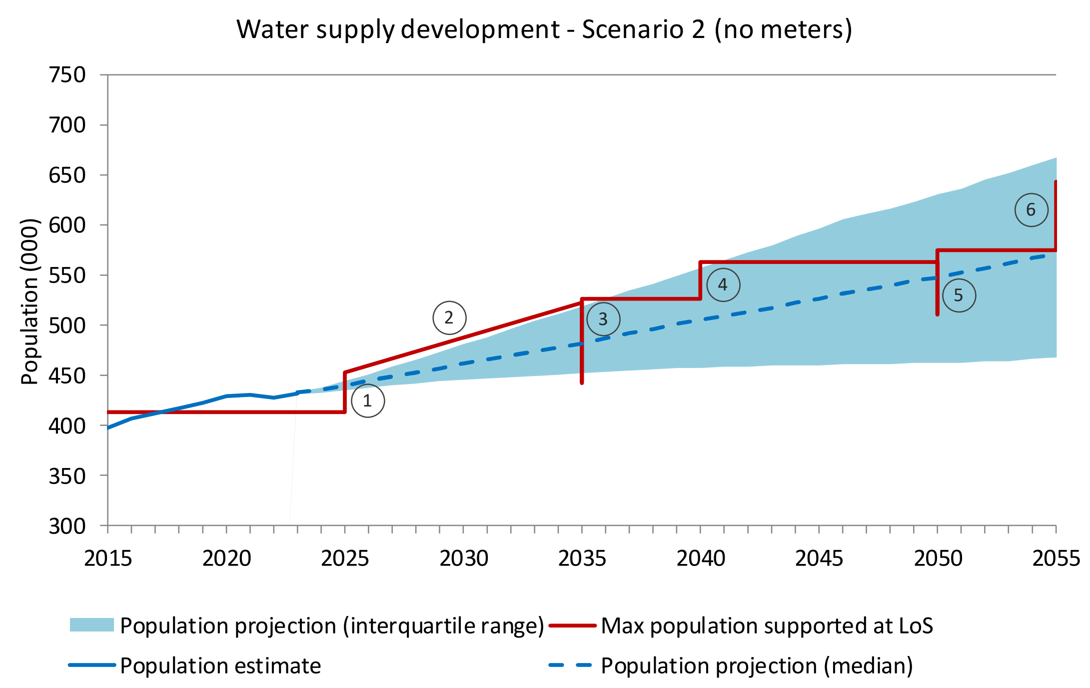
13. Scenario comparison – supply and demand curves

As discussed in section 6, the Water Source Options Assessment (see References, over) completed a detailed and robust assessment of the different possible approaches to achieving a sustainable supply and demand for water. The figures below provide an example of the analysis undertaken, that help to highlight the effectiveness of the recommended approach. The figures compare available supply (red lines) against projected median (blue line) and 25-75% quartile (blue shading) demand. The impact of metering is shown as happening in a single year, for ease of visualisation. The figures show that only the recommended approach can satisfy the forecast demand. Other elements of the analysis then also considered factors such as cost and carbon emissions.

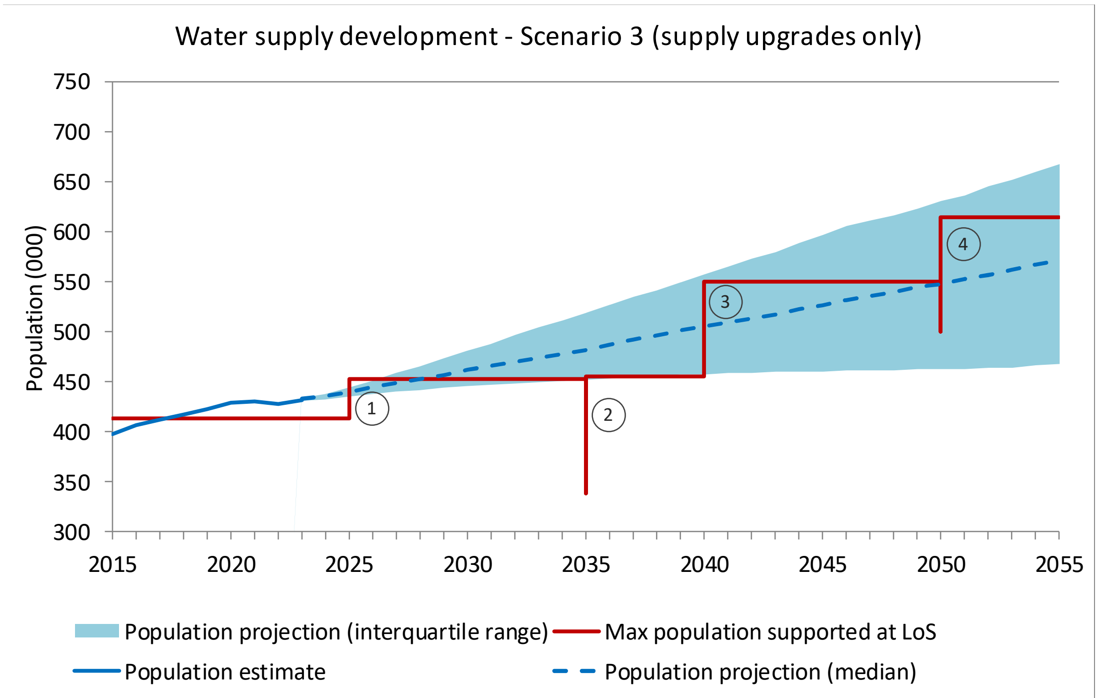
Figure 12: Assessment of adequacy of supply against demand for different investment pathways



Notes on graph:
1. Te Marua WTP optimisation (existing consent limits at 40% MALF)
2. Reduce leakage (medium investment)
3. Residential meters (with volumetric charging)
4. Pakuratahi Lakes 1 & 2 (offsets impact of reconsenting water takes at 60% MALF)
5. Reduce leakage (high investment, requires meters)
6. Reconsent water takes at 80% MALF)



Notes on graph:
1. Te Marua WTP optimisation (existing consent limits at 40% MALF)
2. Reduce leakage (medium investment)
3. Pakuratahi Lakes 1 & 2 (offsets impact of reconsenting water takes at 60% MALF)
4. Managed aquifer recharge + Wainuiomata storage lake
5. Pakuratahi Lake 3 and WTP upgrade (offsets impact of reconsenting water takes at 80% MALF)
6. Porirua desalination (or purified recycled water) 25ML/d



Notes on graph:
1. Te Marua WTP optimisation (existing consent limits at 40% MALF) - Fails to meet LoS from 2028
2. Pakuratahi Lakes 1 & 2 (offsets impact of reconsenting water takes at 60% MALF) - Fails to meet LoS
3. Managed aquifer recharge + Wainuiomata storage lake + Pakuratahi Lake 3 and WTP upgrade - Meets LoS from 2040 (earliest practicable implementation)
4. Porirua desalination (or purified recycled water) 50ML/d (includes reconsenting water takes at 80% MALF)

14. References

Presentation slides from 2023 Regional Water Shortage Summit: https://www.wellingtonwater.co.nz/assets/Reports-and-Publications/2023-Regional-Water-Shortage-Summit-Final-slide-pack-11-September-2023-v2.pdf

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Sustainable Water Supply Strategic Case and 'Case on a page', 2019 (available on request, to be published online shortly)