

Water 2050: Cost and funding **Meeting the costs of water** **infrastructure**

A stocktake and analysis of actual and potential funding options for local authorities

June 2018



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This paper is based on a report prepared for LGNZ by PwC

**We are.
LGNZ.**

Foreword

Foreword



LGNZ is building on our earlier 3 Waters work through Water 2050, a project that proposes and substantiates the premise for a new, integrated water policy framework. The framework has five components: allocation, water quality, infrastructure, cost and funding, and governance. This report outlines a range of funding options that will be used to feed into the funding policy development programme.

LGNZ is building on our earlier 3 Waters project through Water 2050 which proposes that an integrated water policy framework is needed. What this means is that when new standards are set for water quality we need to understand what the costs are to meet these, how they will be paid for, whether communities can afford them, do they have the tools they need to pay for them and how should water be managed into the future. We are pleased to be working with the Government on this project.

This report focuses on existing funding and cost options that may be applied to the framework. This analysis is crucial due to anticipated new regulation, ageing infrastructure as well as changes in climate and demography in New Zealand.

< Only when the framework for water quality is right will we achieve the water quality that our communities deserve. >

Framework for considering funding options

Only when the framework for water quality is right will we achieve the water quality that our communities deserve. The current system lacks coherence and this inevitably means there are gaps and overlaps. Most critical is that we need to understand the true costs of new standards or new methodologies. Only when we fully understand the true costs can we test our communities' ability to pay and whether this is in fact a realistic expectation. As pressure mounts on our water resources this becomes more urgent.

Cost and funding is an essential component of the Water 2050 project. In developing an understanding of the costs, it is also critical to understand the limits of our existing ability to fund. As such, this report begins very simply. It identifies existing water funding options

and the advantages and disadvantages of different durations of cost recovery. However, these subjects are complicated by the fact that no two communities are the same, and as such there is no "recipe" for implementation. Further, it is incumbent on council leadership to recognise and manage the impact of change and time, where what is considered fair or appropriate funding at one time may not be at another.

Despite changing conditions, councils look to optimise their investments. Decisions made in funding water infrastructure are based on a balance of investments available from taxpayers, ratepayers, users and potentially others including corporates.

Further funding options are needed

Options outlined in this paper do not represent all funding alternatives. In fact most councils frequently draw from only three sources primarily due to equity and simplicity: general rates, variable user charges and development contributions.

As regulation, the climate, and demographics change, local councils will need more funding options to address emerging demands on their financial resources. LGNZ intends to utilise this report, in conjunction with the other Water 2050 components, to advocate and feed into the policy development process for development of new funding options.

A handwritten signature in black ink, which appears to read "Dave Cull". The signature is fluid and cursive, written on a white background.

Dave Cull
President
LGNZ

Executive summary

Executive summary

This paper considers ‘funding’ concerns – that is, who ultimately pays for the infrastructure. It does not consider the ‘financing’ issues – that is, who borrows the funds to enable one-off expenditure, and how. There is a range of potential options for funding three waters infrastructure, most of which are already being used to some extent. This includes general and targeted rates at a local level, regional council rates, fixed and variable user charges, government contributions through general taxpayers, and contributions from corporates, iwi or individuals. There is no single optimal funding method. All possible approaches have advantages and disadvantages. Some options work better in some contexts and some work better in others.

< Multiple options are often used to fund a set of assets. >

Multiple options are often used to fund a set of assets. The challenge for central and local government is to determine which combination of options will work best – across the different council areas, the different infrastructure types, and the different customer types.

Importantly, planned regulation will have an impact on capital expenditure as well as renewals, operations and maintenance. It is likely that government will institute national regulatory standards for water that will be higher than those already used by many at the local

level. Consequently, councils may be saddled with additional costs to meet these standards, which in turn result in both local and national benefit. Evaluation of those additional costs should be quantified, and fair allocation based on local and national outcomes should be determined; local government should pay its fair share, as should central government. Further, both should review available funding resources and coordinate investment to ensure optimum outcomes.

The table below addresses sources of available funding to councils, and applies them to principles noted in Section 1. In general, LGNZ supports high equity outcomes that are relatively simple to implement. Many councils or council controlled organisations use variable user charges due to the progressive nature of these options. LGNZ also supports the use of general rates to fund water infrastructure. Though it has the potential to be regressive, it is one of the most common, easily explained and implemented funding tools. Councils often prefer to use development contributions to fund growth-related capital expenditure. LGNZ supports this mechanism in that growth pays for growth, but recognises development agreements can be complex and there is a gamble that growth may be discouraged.

< Funding must be easily implemented and inexpensive to administer. >

Sources of funding for water infrastructure and assessment against associated principles*

Source	Efficient use of resources	Economic equity	Social equity and access	Easily implemented
Central Government general tax			●	●
Central Government specific tax		●		
City / district general rates			●	●
City / district targeted rates	●	●		
Regional general rates			●	●
Regional targeted rates	●	●		
Groups of cities / districts rates			●	
Fixed user charges		●		●
Variable user charges	●	●		
Development (or financial) contributions		●		
Corporate, iwi or individual contributions			●	●

*Note: The principle of simplicity and understandability has not been included in this table as this depends on the perspective of various parties.

Funding challenges

In determining which options to use in funding infrastructure as a result of rising standards, climate change impacts and population changes, there are several considerations:

1. Cost

For many districts, the cost of investing in three waters infrastructure, including any additional costs resulting from increased standards and new regulation, will be significant. Central and local government policy development must be managed to consider both existing and potential funding options to ensure every community can successfully balance its investment principles to reach outcomes that benefit their communities and the country. The higher the expenditure, the more important that careful consideration is given to the appropriate balance of social and economic equity, as well as ensuring that the mechanism can be easily understood and implemented.

2. Economic equity

If economic equity – where charges reflect the costs of providing services – is considered as a high priority, then options where users pay based on the extent to which they benefit, and where charges reflect the cost of provision, will be preferred. This means user-pays approaches (ie fixed and/or variable charges) where that is cost-effective, and targeted rates and local general rates otherwise. Variable user charges will also be preferred if ensuring efficient use of water resources is considered most important.

3. Social equity

Social equity is also likely to be a priority. Social equity addresses affordability to residents and that no one is priced out of the market, and also whether it is fair for non-users to pay. Importantly, improving social equity is not only a local issue, but a national one. In the context of water use, local government cannot be expected to carry the full cost of contribution for national benefit, particularly where there may be measurable improvements; central government must work closely with local governments for fair and appropriate sharing of costs for improvement and expansion, and to also share in beneficial outcomes. Evaluation leads to options which include a cross-subsidisation from the relatively well off to the less well off, and from areas with low costs of provision to those with high costs of provision. Options that spread the cost recovery over a larger group of contributors do this, including central government contributions or rates funding at a regional level.

Generally, LGNZ recognises the strong appeal of socialising the cost of infrastructure across as many people as feasible, and in

the most progressive way possible. However, equity issues exist. For example, where a region or council has invested prudently and strategically in its water infrastructure, and its ratepayers cover those costs, it is unfair that those ratepayers are then required to subsidise a neighbouring area that has not invested in the same way.

4. Simplicity and implementability

For a successful funding programme to be supported, it must be easily explained and understood to all levels of governance, management, stakeholders and the public. Further, funding must be easily implemented and not expensive to administer. Most forms of tax outlined are straightforward for the stakeholders and the public to understand, though groups of cities/districts and variable charges do add elements of complexity. Implementation is generally easier with general rates, taxes, and fixed user charges.

5. Conditions and context

It is important to note that the importance of improving access and social equity outcomes may be more prevalent in rural areas. These areas are typically unable to benefit from the same economies of scale that urban areas do, and consequently can have much higher per-person infrastructure costs. While user-charging and local targeted rates are often considered suitable for urban areas, in rural areas these approaches can result in per-person funding requirements that are considered unaffordable. There may be merit, eg from a wider public good perspective, in spreading the costs of rural infrastructure beyond the relevant local council, while at the same time applying more economically efficient approaches in urban centres. However, this approach may mean those living in urban areas carry some cost for rural areas, or vice versa, again potentially creating equity issues.

6. Time

Infrastructure costs can be recovered over different periods, depending on the funding option adopted. This could be as short as one year or spread over many years. Recovering costs over relatively short time periods reduces funding risk and minimises overall debt requirements, but it pushes greater funding requirements onto the early users of long-lived infrastructure.

This report will feed into policy development and will be followed by a report on water infrastructure costs. This report will include estimation of the costs to upgrade and renew infrastructure across New Zealand's councils under various scenarios, including increased capacity for resilience.

1

A stocktake of funding options and who pays

Framework for considering funding options

Scope of this paper

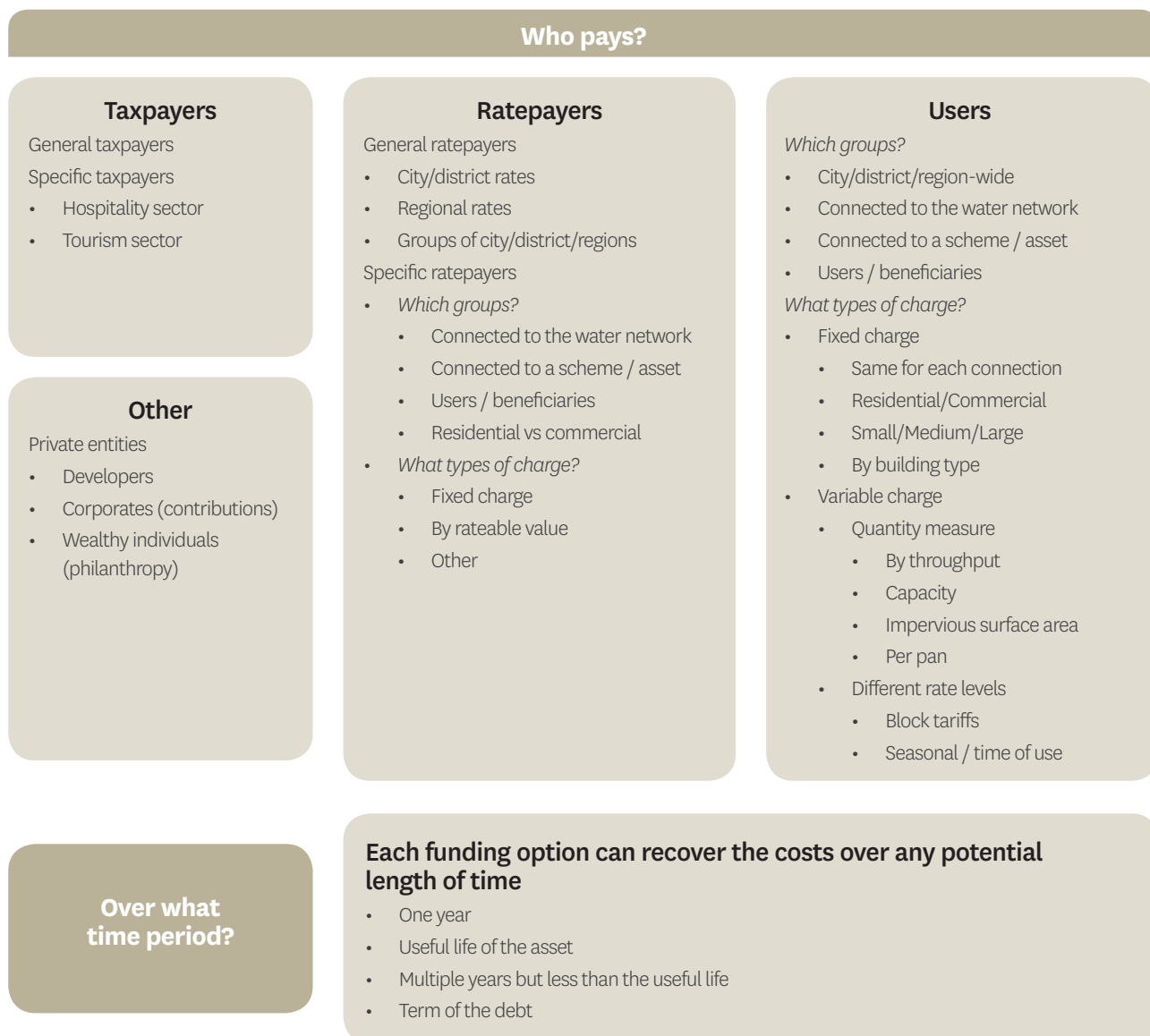
This paper considers ‘funding’ concerns – that is, who ultimately pays for the infrastructure. It does not consider the ‘financing’ issues – that is, who borrows the funds to enable one-off expenditure, and how.

It considers the funding of both capital and operating expenditure. For capex, the focus is on expenditure to improve service levels and renew assets. The funding of growth capex is being specifically considered through a separate workstream.

The types of options considered

The figure below sets out the range of options investigated in this paper. Our focus on ‘funding’ options has concentrated on two issues: who pays, and over what time period.

Figure 1: Funding options and who pays



Assessing the merits of different funding options

There is no single optimal funding method. All possible approaches have advantages and disadvantages.

< There is no single optimal funding method. All possible approaches have advantages and disadvantages. >

Some options work better in some contexts and some work better in others. For example, an option which works well for water may not work as well for stormwater, while an option best for urban areas may not be appropriate for rural areas.

In addition, while this paper considers each option separately, in practice multiple options are often used to fund a set of assets. For example, a combination of ratepayer and taxpayer funding can be used. Alternatively, one approach can be used to recover funds from one group of customers and a different approach for another group, eg fixed charges for residential customers and variable charges for commercial customers.

To assess the merits of the different options, it is helpful to consider a set of criteria or principles which are useful for a funding option to have. The table below shows a list of principles which could be used for this purpose. Our assessment of advantages and disadvantages in the next section is based on these principles.

The challenge for local government is not to determine which single option is best, but rather to determine which combination of options

will work best – across the different council areas, the different infrastructure types, and the different customer types. To do that, local government will need to determine which principle(s) it wishes to give the most weight.

Funding New Zealand's infrastructure

To provide context to an assessment of funding options for the three waters, it is helpful to consider how other infrastructure sectors in New Zealand are currently funded.

At one extreme, public education and health infrastructure is largely funded by central government, through general taxation. At the other extreme, electricity and telecommunications infrastructure is largely funded through a user-charging approach. This difference may implicitly reflect differing weight given to each 'principle', with social equity and access most important for the former sectors and economic equity and efficiency more important for the latter. It may also reflect a view that education and health are (or should be considered as) public goods, with electricity and telecommunications more akin to private goods.

In the transport sector, state highways are funded by central government, which reflects the relatively wide geographical spread of their benefits. Local roads and public transport are funded through a combination of local government rates, central government funding, and user charges for public transport.

Three waters infrastructure in New Zealand is currently funded at a local council level. Some councils adopt user-charging approaches, while others use general or targeted rates. This approach is more local than education, health and some transport infrastructure, but less user-charging than electricity and telecommunications.

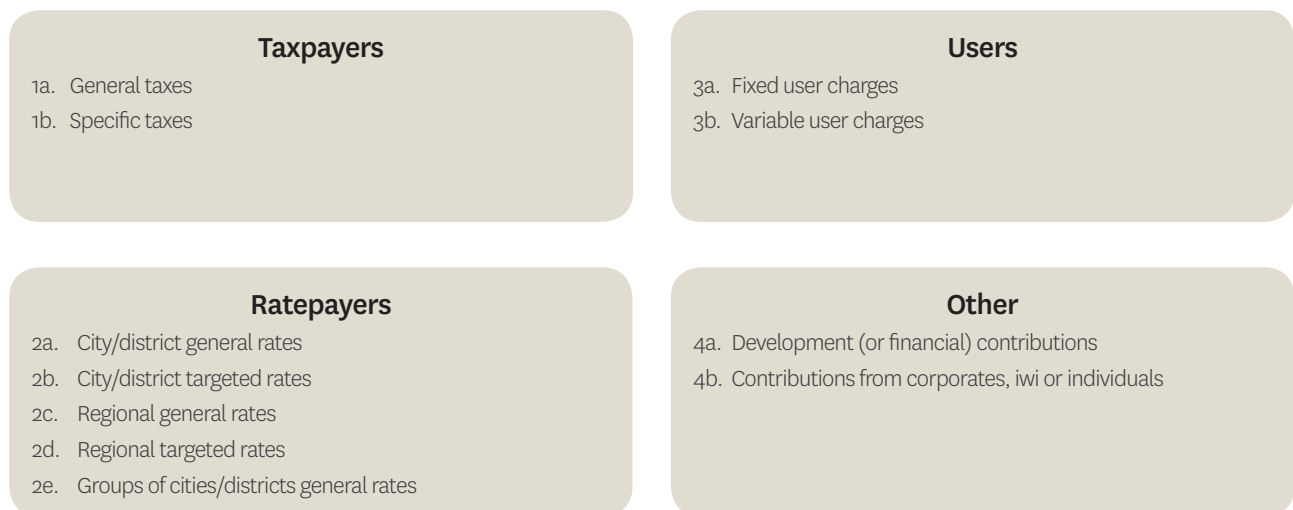
Table 1: Principles to assess funding options

Principle	Description
Efficient use of resources	<ul style="list-style-type: none"> Encourages the efficient use of limited water resources.
Economic equity	<ul style="list-style-type: none"> Charges reflect the costs of providing the services. The cost of providing different services to different users is recovered from those services and users.
Social equity and access	<ul style="list-style-type: none"> Charges are affordable for most consumers/residents through cross-subsidisation. Ensures households, and regions, are not 'priced out' of access to water or, through cross-subsidisation, of good quality infrastructure.
Simplicity	<ul style="list-style-type: none"> Funding and charging structures are simple and easy to understand.
Easily implemented	<ul style="list-style-type: none"> Funding method is easy to implement on an ongoing basis. Funding approach is not prohibitively costly.

Who will ultimately pay? 11 options discussed in detail

In the following pages, 11 distinct options for recovering the costs of three waters infrastructure are discussed. These options are drawn from the wider list of example options in Section 1, and are set out in the diagram below.

Figure 2: Who pays for each option



2

Analysis of 11 funding options

1a General taxes

Central Government funds infrastructure through general taxes. (Using a combination of income, GST and other taxes.)

Description	<p>Either Government provides the infrastructure directly, or it provides funding to the entities (eg councils) who provide the infrastructure.</p> <p>If Government provides funds to council providers, there are different potential triggers for how that could happen, including:</p> <ul style="list-style-type: none"> • For specific projects (eg on a list of Government approved projects) • For a specific type of project (eg water treatment improvements) • Dependent on outcomes (eg if water quality improves) • Dependent on changes to council processes (eg changes to asset management, or more use of shared services)
Examples	<p>Government currently contributes (directly and indirectly) toward some three waters infrastructure using a range of mechanisms, including the Drinking Water Assistance Programme and Housing Infrastructure Fund.</p> <p>Government funds health infrastructure, by providing funds to the local providers.</p> <p>Government directly provides, and funds, some infrastructure, including state highways and schools.</p>
Advantages	<ul style="list-style-type: none"> • Costs are shared over all taxpayers, which reduces the burden on local residents and users. This can improve access to high-quality infrastructure for areas which are less well-off and/or don't benefit from economies of scale (eg some rural areas). • General taxation is progressive, such that a greater contribution is made by relatively well-off taxpayers. This has social equity benefits, and can improve access for the less well-off. • Relatively easy to understand and to administer.
Disadvantages	<ul style="list-style-type: none"> • Poor economic equity, as the cost recovery is not well linked to the beneficiaries. The amount that people pay may be significantly more or less than the benefit they receive from the infrastructure. • Does not encourage efficient use of water resources.
Context the approach is best applied	<p>Assets which provide benefits across a wide geographic area, and to people across New Zealand (eg core transport and health assets).</p> <p>Funding assistance to areas where local funding is very expensive. For example, rural areas which do not benefit from economies of scale, and for which high quality is expensive on a per-person basis.</p>

1b Specific taxes

Central Government funds the infrastructure through specific targeted taxes.

Description	<p>For example, through a tax on the tourism or hospitality industry (eg bed tax) or on specific products (eg regional fuel tax).</p> <p>As with general taxation, the Government provides the infrastructure directly or provides funding to the infrastructure providers, and if the latter that could be triggered by a range of events.</p>
Examples	<p>Fuel excise taxes, which are used to fund transport infrastructure.</p> <p>Alcohol excise tax, which is used to fund a range of alcohol assistance programmes.</p> <p>Some international jurisdictions levy taxes on tourism (eg bed taxes), in order to fund a range of infrastructure.</p>
Advantages	<ul style="list-style-type: none"> • The ability to target specific groups. Can be broad or narrow, depending on the group(s) being targeted. • Can help recover costs from users of infrastructure, in cases where the majority of funding comes from a non-user pays system. The targeting of users can improve economic equity outcomes, and better encourage efficient use of resources. • Can help expand the base over which costs are recovered, to help reduce the burden on local residents.
Disadvantages	<ul style="list-style-type: none"> • Can be difficult to target specific groups in a robust way. Inferior to pure user-pays systems, in terms of its ability to target users and encourage efficient behaviour. • If not well-linked to the infrastructure usage, can lead to adverse unintended consequences. • More complex than general taxation.
Context the approach is best applied	<p>As a complement to rates funding, in areas where true user pays is not cost effective.</p>

2a City/district general rates

Each city and district council funds infrastructure in its area through general rates.

Description	The majority of councils levy their general rates on the basis of the value of properties owned in their area.
Examples	<p>This is one of the common approaches to funding three waters infrastructure currently used by New Zealand councils.</p> <p>In areas where user-pays approaches are to fund water infrastructure, rates are typically used to fund stormwater and sometimes also wastewater infrastructure.</p> <p>This is also a standard approach to funding local roading and community infrastructure in New Zealand.</p>
Advantages	<ul style="list-style-type: none"> • Costs are recovered from the residents of the council in which the infrastructure exists. This links the group from which costs are recovered to the beneficiaries. • General rates are broadly progressive (at least in terms of asset holding), such that a greater contribution is made by relatively well-off residents. This has social equity benefits, and can improve access for the less well-off. • Relatively easy to understand and to administer.
Disadvantages	<ul style="list-style-type: none"> • Link between funding and benefits is not as strong as for targeted rates or user pays approaches. • Can have poor social equity outcomes in areas which are either less well-off or which have high per-person infrastructure costs. For example, rural areas cannot benefit from the economies of scale in infrastructure that urban areas can, and local rate-based funding can have affordability challenges, which can restrict access to high-quality infrastructure. • Does not encourage efficient use of water resources.
Context the approach is best applied	<p>Areas which can collectively afford to fund the quality of infrastructure demanded.</p> <p>Areas, or infrastructure types, for which user-pays approaches are not cost effective or affordable.</p>

2b City/district targeted rates

Each city and district council funds infrastructure in its area through targeted rates.

Description	A council includes one targeted rate for all properties connected to each of the three networks. Alternatively, it operates multiple targeted rates, with properties levied with a different amount based on their location and the part of the network to which they are connected.
Examples	This is a standard approach to funding three waters infrastructure currently used by New Zealand councils. It is typically used as an alternative to general rates funding, where a council has multiple physically separate networks.
Advantages	<ul style="list-style-type: none"> • Costs are recovered from the residents of the location in which the infrastructure exists. The link between cost recovery and benefits is better than for general rates. • Targeted rates (subject to their underlying allocation mechanism) can be progressive, such that a greater contribution is made by relatively well-off residents. This has social equity benefits, and can improve access for the less well-off. • If set at the level of a physical network, they are relatively easy to understand and to administer.
Disadvantages	<ul style="list-style-type: none"> • Can have poor social equity outcomes in areas which are either less well-off or which have high per-person infrastructure costs. For example, rural areas cannot benefit from the economies of scale in infrastructure that urban areas can, and local rate-based funding can have affordability challenges, which can restrict access to high-quality infrastructure. This issue can be worse than is the case for general rates. • Does not encourage efficient use of water resources.
Context the approach is best applied	<p>Areas which can collectively afford to fund the quality of infrastructure demanded.</p> <p>Areas, or infrastructure types, for which user pays approaches are not cost effective.</p> <p>Council areas which comprise multiple separate infrastructure networks, each with different costs of provision. Or areas with a significant proportion of properties which are not connected to the infrastructure networks.</p>

2c Regional general rates

Each regional council funds infrastructure in its region through general taxes.

Description	Either regional councils provide the infrastructure directly, or they provide funding to local councils who provide the infrastructure.
Examples	<p>This is the standard approach to funding elements of river management and flood protection infrastructure in New Zealand, eg by Waikato and Bay of Plenty Regional Councils.</p> <p>Stormwater infrastructure in Auckland is effectively funded this way. Water and wastewater in Auckland is also effectively funded at a regional level, although through user charges.</p>
Advantages	<ul style="list-style-type: none"> • Costs are shared over a greater number of residents than is the case with local rate funding, which reduces the burden on local residents and users. This can improve access to high-quality infrastructure for areas which are less well-off and/or don't benefit from economies of scale (eg some rural areas). • Better linking of cost recovery to beneficiaries than is the case with central Government funding. • General rates are typically progressive (at least in terms of asset holding), such that a greater contribution is made by relatively well-off residents. This has social equity benefits, and can improve access for the less well-off. • Relatively easy to understand and to administer.
Disadvantages	<ul style="list-style-type: none"> • Cost recovery is not as well linked to the beneficiaries as is the case with local funding. • Does not encourage efficient use of water resources.
Context the approach is best applied	<p>Assets which provide benefits across the region, rather than limited to the council area in which it is physically located (eg where local council physical networks are interconnected, or where the residents of one council often use assets in an adjacent council).</p> <p>Funding assistance to areas where local funding is very expensive. For example, rural areas which do not benefit from economies of scale, and for which high quality is expensive on a per-person basis.</p> <p>Regions which have a sufficiently large urban area that they can cross-subsidise the rural areas. (Otherwise multiple regions would be necessary to achieve the access benefits.)</p>

2d Regional targeted rates

Each regional council funds infrastructure in its region through targeted rates.

Description	Similar to city/district targeted rates, a region could include one targeted rate for properties connected to each of the three networks, or alternatively operate multiple targeted rates, with properties levied with different amounts based on their location and the part of the network to which they are connected..
Examples	<p>Waikato Regional Council uses targeted rates to fund a number of its services, including flood protection, catchment management, and public transport.</p> <p>Auckland Council is currently proposing a targeted water rate in its draft 10 year Long-Term Plan to raise \$400 million towards the city's \$1 billion central interceptor project.</p>
Advantages	<ul style="list-style-type: none"> • Costs are recovered from the residents of the location in which the infrastructure exists. The link between cost recovery and benefits is better than for general rates. • Targeted rates (subject to their underlying allocation mechanism) can be progressive, such that a greater contribution is made by relatively well-off residents. This has social equity benefits and can improve access for the less well-off. • If set at the level of a physical network, they are relatively easy to understand and to administer.
Disadvantages	<ul style="list-style-type: none"> • Can have poor social equity outcomes in areas which are either less well-off or which have high per-person infrastructure costs. • Does not encourage efficient use of water resources.
Context the approach is best applied	<p>Areas that can collectively afford to fund the quality of infrastructure.</p> <p>Areas, or for infrastructure types, where a user pays approach is not cost effective.</p> <p>Councils in areas which comprise multiple separate infrastructure networks, each with different costs of provision, or areas with a significant proportion of properties which are not connected to the infrastructure networks.</p>

2e Groups of cities/districts rates

Multiple adjacent councils group together to collectively fund infrastructure within their areas using general or targeted rates.

Description	<p>This occurs through a jointly-owned entity which would provide the infrastructure, or each council contributing to the infrastructure costs of the other councils.</p> <p>The relative contributions from each council could be based on population, total rateable value, asset value, or another factor.</p>
Examples	<p>There are both local and international examples. A local example is Nelson’s Bell Island wastewater treatment plant which is jointly owned and funded by Nelson and Tasman councils, on a 50/50 basis.</p>
Advantages	<ul style="list-style-type: none"> • Costs are shared over a greater number of residents than is the case with local rate funding, which reduces the burden on local residents and users. This can improve access to high quality infrastructure for areas which are less well-off, don’t benefit from economies of scale (eg some rural areas), or provide infrastructure efficiencies across administrative borders. • Better linking of cost recovery to beneficiaries than is the case with regional council or central Government funding. • General rates are typically progressive (at least in terms of wealth), such that a greater contribution is made by relatively well-off residents. This has social equity benefits, and can improve access for the less well-off. • Shared technical expertise (which, in some councils, may be limited).
Disadvantages	<ul style="list-style-type: none"> • Cost recovery is not as well linked to the beneficiaries as is the case with local funding. • More complex to administer than council-specific funding. For example, a mechanism for determining the contribution of each council would need to be determined and agreed to. • Does not encourage efficient use of water resources.
Context the approach is best applied	<p>Assets which provide benefits across multiple council areas (eg where local council physical networks are interconnected, or where the residents of one council often use assets in an adjacent council).</p> <p>Locations where an urban area and surrounding urban outskirts are situated across multiple local councils (eg greater Hamilton, greater Wellington, greater Christchurch).</p>

3a Fixed user charges

Each city and district council funds infrastructure in its area through user charges, on a fixed charge basis.

Description	<p>The user charges are levied on all connections to the infrastructure network, based on a fixed (eg per-day) charge. A different charge may be levied on different types of connections (eg residential and commercial, customer size, amount of impervious surface area).</p> <p>The fixed charge could be used in combination with a variable charge.</p>
Examples	<p>Watercare, Tauranga City Council and Kapiti Coast District Council (among other NZ examples) levy a fixed charge on all connections to their water networks.</p> <p>New Zealand's electricity networks are funded based on fixed (and variable) charges.</p>
Advantages	<ul style="list-style-type: none"> • Costs are recovered from the users of the infrastructure. This achieves better economic equity outcomes than rate or tax-based funding. • In areas which have a significant proportion of non-resident users (eg tourists), user charges spread the cost recovery over a wider group than the local residents. • When combined with a variable charge, a fixed charge recognises the impact of fixed costs and the economies of scale as consumption increases. This can provide better economic equity than with a sole variable charge. • Relatively easy to understand and to administer.
Disadvantages	<ul style="list-style-type: none"> • Can have the same poor social equity outcomes as rate-based funding, as some rural areas have difficulty self-funding the infrastructure in their area. • Does not encourage efficient use of water resources.
Context the approach is best applied	<p>Areas which can collectively afford to fund the quality of infrastructure demanded.</p> <p>Situations where measuring consumption (ie variable charges) is not cost effective.</p>

3b Variable user charges

Each city and district council funds infrastructure in its area through user charges, on a variable charge basis.

Description	<p>The user charges are levied based on the consumption of each user. Either consumption is measured directly (eg with a water meter) or estimated using a proxy measure (eg per pan, wastewater estimated based on water).</p> <p>Per-unit charges could vary – eg at different consumption levels (block tariffs), or at different times (seasonal tariffs).</p> <p>The variable charge could be used in combination with a fixed charge.</p>
Examples	<p>Watercare, Tauranga City Council and Kapiti Coast District Council (among other New Zealand examples) levy variable charges on water consumption.</p> <p>New Zealand's electricity networks are funded based on variable (and fixed) charges.</p> <p>Per-use charges are used to part-fund a number of toll road state highways in New Zealand.</p>
Advantages	<ul style="list-style-type: none"> • This option achieves the best economic equity outcomes. Costs are recovered from the users of the infrastructure, based on their usage. • Only option which encourages the efficient use of water resources. • Economic equity and resource efficiency outcomes can be improved further through the use of charges which vary by user type, consumption level and/or time. • In areas which have a significant proportion of non-resident users (eg tourists), user charges spread the cost recovery over a wider group than the local residents.
Disadvantages	<ul style="list-style-type: none"> • Can have the same poor social equity outcomes as rate-based funding, as some areas have difficulty self-funding the infrastructure in their area. • Usage based funding can limit access for less well-off users. • The measurement of consumption can be expensive (eg installing and reading water meters), and in some cases prohibitively difficult. • The use of proxy measures for consumption limits the economic efficiency of the charge.
Context the approach is best applied	<p>Areas which can collectively afford to fund high quality infrastructure.</p> <p>Situations where measuring consumption is both possible and cost effective.</p>

4a Development (or financial) contributions

Infrastructure providers (eg local councils) charge property developers for the cost of new infrastructure to serve growth.

Description	<p>Charges are set to recover the costs of growth infrastructure.</p> <p>Charges are either based on the specific cost of the assets required for that customer, or an average over the wider geographical area and/or time period.</p> <p>Different per-unit charges can be levied on different types of development, considering building type (eg residential vs commercial) and location.</p>
Examples	<p>The majority of New Zealand uses development contributions to help fund growth infrastructure, for three waters as well as other transport, parks and reserves, and other community infrastructure.</p> <p>This approach is also commonly used internationally, although the legal frameworks differ between countries.</p>
Advantages	<ul style="list-style-type: none"> • Growth pays for growth. Existing residents and users do not have to pay for infrastructure which is caused by new residents and which will primarily benefit them. • Relatively well understood in New Zealand.
Disadvantages	<ul style="list-style-type: none"> • Designed to target growth capex, not renewals or service level improvement capex or opex. • Can discourage the development of new housing, particularly if charges are not set in a way which is cost-reflective. • Does not encourage efficient use of water resources. • Is typically relatively complex to administer and understand. • Complex projects may have complicated development agreements, and could be subject to changing market conditions, making it less clear when the contributions are required.
Context the approach is best applied	<p>Areas which have a material amount of growth, and consequently require a material investment in new infrastructure to serve that growth.</p>

4b Contributions from corporates, iwi or individuals

Corporate entities, iwi or individual persons provide a contribution toward local provision of infrastructure investment.

Description	Alternatively, businesses, iwi and individuals are required to provide infrastructure themselves, which might otherwise be provided by local councils.
Examples	<p>The new wastewater treatment plant in Gore is being part-funded by the Mataura Valley milk dairy factory.</p> <p>Contributions from both corporates and individuals is a common approach to part-funding education infrastructure in New Zealand. This includes small scale developments (eg school gyms) and large scale buildings (eg the Owen G Glenn building at the University of Auckland).</p> <p>Corporate or individual philanthropic funding is commonly used for three waters infrastructure in developing countries.</p> <p>Requirements for developers to directly provide some local infrastructure assets.</p> <p>Requirements for large industrial customers to provide their own on-site water and wastewater treatment.</p>
Advantages	<ul style="list-style-type: none"> • Reduces the burden on local residents and users. This can improve access to high-quality infrastructure for areas which are less well-off and/or don't benefit from economies of scale (eg some rural areas). • Can be relatively easy to understand and to administer.
Disadvantages	<ul style="list-style-type: none"> • Likely to be difficult to generate significant amounts of funding through this source for three waters infrastructure in New Zealand. • Does not encourage efficient use of water resources.
Context the approach is best applied	<p>Contribution to areas where local funding is very expensive.</p> <p>Situations where self-provision is cost effective, or where individual customers require more infrastructure (or higher service levels) than average customers.</p>

Discussion of trade-offs between options

As discussed in the previous section, determining a preferred funding approach in each circumstance involves a trade-off between different variables, and will depend on which variable(s) is given most weight by local government.

Economic efficiency: If economic efficiency is considered most important, then options where users pay based on the extent to which they benefit, and charges reflect the cost of provision, will be preferred. This means user-pays approaches (ie fixed and/or variable charges) where that is cost-effective, and targeted rates and local general rates otherwise.

User-pays: User-pays approaches will also be preferred if ensuring efficient use of water resources is considered most important.

Social equity: If social equity is considered most important, that leads to options which involve a cross-subsidisation from the relatively well-off to the less well-off, and from areas with low costs of provision to those with high costs of provision. Options which spread the cost recovery over a larger group of contributors do this, including central government contributions or rates funding at a regional level or through a group of local councils.

The importance of improving access and social equity outcomes may be more prevalent in rural areas. These areas are typically unable to

benefit from the same economies of scale that urban areas do, and consequently can have much higher per-person infrastructure costs. While user-charging and local targeted rates are often considered suitable for urban areas, in rural areas these approaches can result in per-person funding requirements that are considered unaffordable. There may be merit in spreading the costs of rural infrastructure beyond the relevant local council, while at the same time applying more economically efficient approaches in urban centres.

The time period for recovering costs

Infrastructure costs will be recovered over differing periods of time, depending on the funding option adopted. This could be as short as one year (effectively operationally funded) or spread over many years.

A council's evaluation of payment duration would be based on several variables, including the amount of debt it currently holds, ratepayers' ability to pay, and additional forecasted improvements that could impact future ability to pay. Further, and as previously noted, a challenge is not to determine which single option is best, but which combination of options will work best provided the quantity and variety of water infrastructure councils own and manage. As such, not only the funding instrument, but the intended payback period is critical to a council's review and management of its funding plans and priorities.

Table 2: Time period for recovering costs

Time period to recover costs	Advantages	Disadvantages
One year	<ul style="list-style-type: none"> Relatively easy, and low funding risk 	<ul style="list-style-type: none"> Very lumpy cost recovery profile, which is poor for those providing the funding Generally unsuitable for expensive long-life infrastructure
Useful life of the asset	<ul style="list-style-type: none"> Spreads cost recovery over time Best link between those funding the infrastructure and those using it 	<ul style="list-style-type: none"> Can be a very long time for some three waters infrastructure, which introduces financing risk and requires debt to be carried for a long time Can involve higher total funding costs than a shorter period
Multiple years but less than the useful life of the asset	<ul style="list-style-type: none"> Requires less long-term carrying of debt than the full useful life 	<ul style="list-style-type: none"> Early users of the infrastructure fund it, and later users do not
Term of the debt	<ul style="list-style-type: none"> Will not require an extension of debt beyond its initial length 	<ul style="list-style-type: none"> Can be much shorter than the useful life of the assets Early users of the infrastructure fund it, and later users do not

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Conclusion

Concluding remarks and next steps

As noted in the Foreword, this workstream is part of the Water 2050 Programme. The Programme intends to review freshwater allocation and quality, cost and affordability and funding. The outcomes sought by the Programme are:

- A coherent regulatory framework for water quality that delivers communities' expectations, meets national standards, and which has a costed understanding of implementation costs.
- Three waters infrastructure that is fit for purpose, resilient and that affordably meets communities' expectations and national standards.
- A comprehensive toolbox for funding three waters infrastructure to meet national standards for water quality.

In order to support intended Programme outcomes, the following summary observations are, and proposed actions should be, considered:

- There is a range of potential options for funding three waters infrastructure, most of which are already being used by councils to some extent.
- There is no single optimal funding method. All possible approaches have advantages and disadvantages. Some options work better in some contexts and some work better in others. Assessing which options are preferred will depend on which 'principles' are the most important.

Following publication of this report, research on the future projected costs of water quality standards and affordability under the current funding model for local government will be completed. Both reports will provide clarity on cost and funding resources available for three waters infrastructure, and will empirically support advocacy and discussion with Government on how to best resource local government needs in meeting demand for appropriate, sustainable and clean water.

- Multiple options are often used to fund a set of assets. The challenge for local government is to determine which combination of options will work best – across the different council areas, the different infrastructure types, and the different customer types.
- If economic efficiency is considered most important, then fixed and/or variable user charges (where that is cost-effective), followed by targeted rates, will be preferred. Variable user charges will also be preferred if ensuring efficient use of water resources is considered most important.
- Conversely, if social equity is considered most important, options which involve cross-subsidisations, and which spread the cost recovery over a larger group of contributors, will be preferred, such as central government contributions or rates funding at a regional level or through a group of local councils.
- Rural areas are typically unable to benefit from the same economies of scale that urban areas do, and consequently can have much higher per-person infrastructure costs. There may be merit, eg from a wider public good perspective, in spreading the costs of rural infrastructure beyond the relevant local council, while at the same time applying more economically efficient approaches in urban centres.
- Recovering costs over relatively short time periods reduces funding risk and minimises overall debt requirements, but it pushes greater funding requirements onto the early users of long-lived infrastructure.



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