INFRASTRUCTURE EVIDENCE BASE 2015 Refresh

Urban Water

March 2015

NATIONAL INFRASTRUCTURE UNIT

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EVIDENCE BASE

Urban Water

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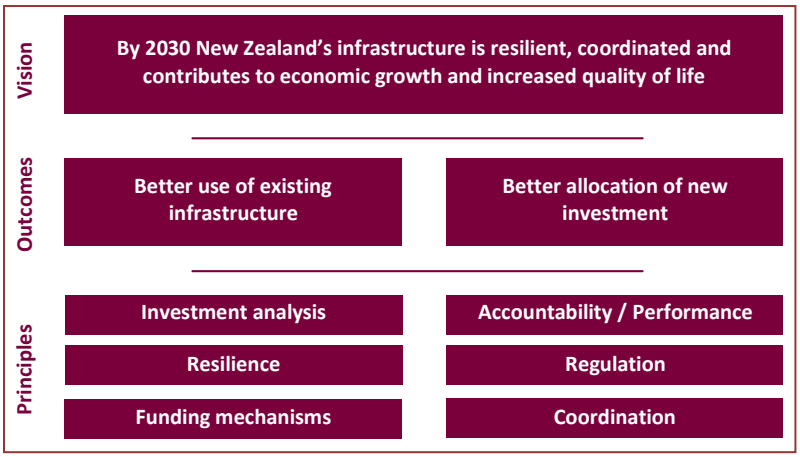
Introduction

Infrastructure is a crucial part of the New Zealand economy. It supports the day to day activities of New Zealanders, helps to improve living standards for all, and can be a driver for economic growth. As such, it is vital it is managed as well as possible. The National Infrastructure Plan 2011 sets out a long term vision for New Zealand's infrastructure and seeks to provide a common direction for how we plan, fund, build and use all economic and social infrastructure.



To support this, in 2014, the National Infrastructure Unit published the first New Zealand Infrastructure Evidence Base, working with owners and providers across all sectors to provide quantitative data where possible, and good quality qualitative analysis where the data is not yet available.

This document provides an update to the 2014 Evidence Base, providing the latest in time series data where appropriate, and reiterating and evolving key messages where required. It draws together work on performance indicators (the current state of the infrastructure), scenario and trend analysis (the future pressures or drivers of demand), the national resilience picture, and the second 10-year Capital Intentions Plan (what is known about indicative future spend). As before it has been compiled in collaboration with sector representatives and we believe is an accurate representation of the current state of New Zealand's infrastructure.

The timing of this iteration of the Evidence Base is aligned to provide a common understanding of the issues faced by New Zealand's infrastructure, to act as a strong platform for the New Zealand Infrastructure Plan, due to be released later in 2015.

This document forms the substantive component of the Evidence Base for the Urban Water (or 3 Waters) sector, covering drinking or potable water, waste water and storm water. It follows from the overview document, which can be found on the NIU's website. The new or updated data sets incorporated in this chapter are listed over the page.

Where data has been provided, this is publicly available information, and has been provided with permission of the information owner.

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Overview messages

The infrastructure for urban water (the 3 waters) is a key social and economic enabler: a precursor for any significant residential, industrial or commercial development and a significant input for any agricultural, processing or manufacturing enterprise. Urban water is a vast and diverse sector, characterised by a large number of providers, managing a large number of network assets with a wide geographic spread, heavily influenced by topography and natural features (drinking water sources and discharge options).

The 3 waters has a large asset base, with approximately 66 percent of costs fixed[1] and significant levels of expenditure are planned over the next 10 years, including 1,167 projects (excluding those under $1 million) totaling over $15 billion. Expenditure is driven by growth, renewals and requirements to meet standards (Levels of Service).

Last year saw a dramatic improvement in the quantity of information available, including the first stage of the LGNZ-led 3 Waters project, the National Information Framework, and a significant increase in the number of local authorities participating in the Water New Zealand National Performance Review.

This information has enabled a more informed conversation to occur on the quality of service provision and provided insight on some long-standing questions. Acknowledging this as a very significant first step (and recognising the leadership of LGNZ in getting to this point), **it has it has also exposed the need for a common set of data standards to underpin the sector**. These would facilitate capability building initiatives (especially focused on strengthened asset management maturity and data analytics) that have real potential to lift performance across the sector, strengthen decision making and deliver better outcomes for end users.

The variability of data is reflected in the differing levels of asset management maturity across the sector with a number of local authorities lacking foundational practices such as documented risk profiles of critical assets (fundamental from a resilience perspective) and renewal profiles or, where renewals profiles have been prepared, they are not fully funded. This carries through into forward planning with significant numbers of local authorities not having up-to-date hydraulic models and not using scenarios for growth based on statistics (recognising not all are in a growth situation).

Compliance with regulatory standards is revealed as an issue of significant scale, in many cases, well under 50 percent of local authorities are always complying with resource consent conditions for waste and storm water. The caveat on this is that the seriousness of these breaches is not detailed and some will be minor or technical in nature. Regardless, with the wider public focus on environmental issues and increasing standards, this is likely to become an increasingly significant issue.

Over 55 percent of water assets are graded 3 or worse and about 45 percent of both the potable and waste water network lengths is categorised as “ungraded” (52 percent for stormwater). While there is no expectation that 100 percent of assets will be graded, it has been the scale of the unknown and the age profile and asset condition of the known that has driven the **concern around the size of the future affordability challenge. The new data has validated this concern but is not yet at the stage of quantifying the levels of investment required and therefore the extent and scale of the problem.** In particular, the Office of the Auditor General’s analysis shows that planned renewals expenditure on physical assets is below depreciation from 2013 to 2022 with a downward trend during that period. This is a key issue identified in the LGNZ 3 Waters project.

As identified last year, the sector has a number of distinct groupings, including those needing to optimise their water networks to cater for growth, and a second group of local authorities facing a static or reducing rate payer base and the challenge of meeting future renewals and levels of service from this funding base.

There is a wide variation in the unit cost of delivery, reflecting the individual circumstances of each water network.

There is very little variation in the type of governance model used by water providers and the majority of services are provided ‘in-house’, especially for rural and provincial local authorities. Prima facie, **this suggests significant untapped opportunities in the water sector for local authorities to realize benefits from alternative governance and service provision arrangements**.

Networks continue to operate without widespread service failures but relying on this may give an overly optimistic picture. It does however, suggest that there is time for the sector and key stakeholders to grasp the opportunity that exists to work together to make the step change required to meet the future challenges.

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[1] This is based on a 2009 estimate of 3 Waters asset base. While the overall value may have changed the proportion is likely to have remained similar.

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New information and reports

Over the past 12 months new sources have developed or been updated that together provide a much more comprehensive picture of the Urban Water sector:

- LGNZ 3 Waters National Information Framework. Intended as a first step towards better information and more transparent sector performance. LGNZ collected data through a national survey with data collected from a total of 70 councils between 21 February 2014 and 29 July 2014. The responses for potable and wastewater cover approximately 95 percent of the population, while stormwater coverage is around 75 percent. Two reports were produced, NZIER prepared an analysis of the data and Castalia Strategic Advisers were commissioned by LGNZ to prepare an Issues paper.
- OAG report, *Water and Roads: Funding and Management Challenges*. This analysed the financial results and forecasts of all local authorities that are relevant to the management of their roading and three waters assets. It also collected and analysed specific information about how 31 local authorities manage their assets. These 31 local authorities own property, plant, and equipment worth $77.5 billion (which was 74 percent of all local authorities' property, plant, and equipment assets at 30 June 2013).
- Water New Zealand, National Performance Review 2012-13. Carried out annually over the past six years, the NPR is another initiative aimed at encouraging improvement in the management of water utilities through benchmarking of financial and non-financial performance measures. The 2012/13 Review surveyed 29 organisations, up from 16 in 2011-12.
- Department of Internal Affairs (DIA) analysis of National Balance Sheet from local authority 2014 annual reports.
- National Infrastructure Unit Capital Intentions Plan 2015 – 25. Capturing all local government infrastructure projects as recorded in the 2012 – 15 Long Term Plans with data updated from subsequent Annual Plans, the latest update being 2014-15.

The broadest and most comprehensive of these is the LGNZ 3 Waters National Information framework which has added depth to our understanding of the overall picture.

Context

As originally explained in the 2010 *National Infrastructure Plan*, early settlers relied on wells, springs, streams and rainfall to supply their water needs. As towns grew, the local councils (or boards) and other entities initially assumed responsibility for providing a continuous supply, followed by a reticulated water supply direct to households and businesses. Over time, this has meant that local government now has the responsibility for supplying reticulated water to approximately 85 percent of people who are on such water systems.

Like drinking water, the disposal of wastewater in urban and built-up areas is primarily the responsibility of local authorities. Councils assumed this responsibility for similar public health, environmental and service delivery reasons. Management and asset planning considerations are also similar between the two types of networks, as are issues related to access to consistent information about the assets.

Water and water disposal systems represent key urban amenities that contribute to the health and wellbeing of the population in both rural and urban settings. In New Zealand, the regional variation in topography and water resources means that these systems are best managed at a local or regional level rather than centrally. Wastewater and many water systems are generally not interconnected across the country, although some areas may share treatment facilities. Each reticulated system has assets to collect untreated wastewater from customers and transport it to facilities for the treatment and disposal of wastewater effluent, which includes liquid, solids and gas.

Similarly, councils have responsibility for stormwater, drainage and flood protection systems, many of which started as individual systems under the control of separate boards or committees.

A significant driver of investment over recent times has been the requirement for water supplies, where practicable, to meet the requirements of the Drinking-water Standards for New Zealand and the requirements of the Health Act 1956 (as amended in 2007) and have approved Public Health Management Plans.

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As part of the 2014 OAG report on *Water and Roads: Funding and Management Challenges*, NZIER were commissioned to prepare a report on a historical perspective of local government finances. This is included as part 3 of the OAG report.

Data confidence and quality

As communities face fiscal constraints, then priorities have to be set; however, this is difficult to do with variable data confidence in assets. In addition to more accurate investment analysis and the ability to plan and manage future renewals, shared data standards also allows infrastructure providers to benchmark best practice, share their analytics function (rather than having analysts dispersed across different entities), and engage in joint procurement initiatives and shared service arrangements. The implications for good financial management are very important; holding good quality data on capital assets means being able to accurately understand future financial obligations, which has positive knock-on effects for balance sheet management.

As Water New Zealand noted in their 2012/13 report, "for some participants the level of confidence regarding the condition and performance of some aspects of the water infrastructure in different parts of their district is variable. Some have well developed systems, while for others it will not be until their asset management and customer feedback systems are further developed and coverage extended, that the level of confidence regarding data on water utilities will reach similar levels. Also there is limited commonality in how data is collected and stored which makes uniformity more difficult and institutional memory important."

Similar comments are made in the OAG 2014 report and also noted by workshop participants during the LGNZ National information Framework data collection process.[2]

What do we have?

The total replacement value of water, wastewater and stormwater assets under local government control is estimated to be approximately $45.2 billion.

Estimated replacement costs		
Water	**Wastewater**	**Stormwater**
$16.2 billion	$17.8 billion	$11.2 billion

Source: DIA Analysis of 2014 Local Authority Annual reports

Is it where it needs to be?

Water infrastructure is a precursor to residential, industrial or commercial development. The infrastructure is typically laid or built in the early stages of development. There are exceptions with some residential communities operating without reticulated networks, typically smaller and/or isolated communities, relying on rain tanks and/or on-site sewerage systems such as septic tanks.

The more notable issues with location are:

- Where populations have grown beyond the levels able to be supplied by the existing drinking water sources. In these cases further development may be restricted, there may be water restrictions regularly applied, or significant costs may be needed to increase supply.
- Where wider externalities and factors have changed over time and the current location or type of infrastructure provided is no longer suitable. In particular, for wastewater and changed discharge requirements.
- A number of economic pressures in regards to demands on potable water, particularly in rural communities. Potable water supplies are coming under increasing pressure to meet the demands of other economic uses / users (e.g. farming, horticulture etc).

[2] Refer paragraphs 2.38 and 2.58 in OAG 2014.

In areas that have experienced significant growth in this time, especially Auckland, Waikato and the Bay of Plenty, discussions with local authorities in these regions signal that provision of water infrastructure to enable the continued development of land is creating fiscal pressures and in some cases, is not affordable in the medium term under current financial policy settings.

Categorisations that have been used by NZIER that may be helpful in further discussions are:

- Prosperous and growing places, which will need increasing capital;
- Prosperous or growing places, which might need more capital; and
- Poor and/or declining places, which might need to plan for a lower requirement for capital

The essence of this report focuses on the sector finding a suite of solutions which 'right sizes' the infrastructure frameworks and investment outcomes to support the wide variety of circumstances found within the urban water sector.

What quality is it?

Three measures of quality that we have looked at are compliance against standards, asset condition and whether local authorities are generally meeting their KPIs.

Compliance against Drinking Water Standards

The Ministry of Health 2014 Annual Report on Drinking-water Quality 2013-2014 reports on drinking-water quality for all registered community drinking-water supplies that served populations of more than 100 people from 1 July 2013 to 30 June 2014. This reports that 79 percent of the reticulated population achieved full compliance with bacteriological, protozoal and chemical standards (a two percentage point increase over the 2012-13 reporting period), although some non-compliance is technical in nature rather than having to do with water quality.

Drinking-water achieving the bacteriological standards was received by 97.2 percent of New Zealanders (compared with 96.7 percent the previous year), protozoal achievement was at 80.8 percent (up from 79.2 percent the previous year) and chemical achievement was at 97.4 percent (up from 95.3 percent the previous year).

As expected, achievement against the Standards was generally highest in the large supplies and lowest in the small supplies. The exception to this was the rate of chemical achievement. While highest in large supplies, small supplies achieved better than medium or minor supplies because they are not required to be assessed for chemical contamination and so achieved by default.

	POPULATION COUNTS (000'S)					PERCENTAGE OF POPULATION				
	Large	**Medium**	**Minor**	**Small**	**Total**	**Large**	**Medium**	**Minor**	**Small**	**Total**
Total Population	3002	270	477	79.7	3829	78	7	12	2	
Bacteriological achievement	2977	264	424	57.2	3723	99.2	98	88.8	71.8	97.2
Protozoal achievement	2692	155	228	18.8	3093	89.7	57.4	47.7	23.5	80.8
Chemical achievement	2976	237	437	77.5	3728	99.1	87.9	91.6	97.2	97.4
Overall achievement	2667	143	197	16.5	3023	88.9	52.9	41.2	20.7	79.0

NB: Population figures are rounded (except for small supplies) to the nearest thousand. As a result of rounding, figures may not add up to totals shown.

Compliance with resource consent conditions

The LGNZ National Information Framework data is the start of the process towards greater transparency and understanding of what is a complex and multifaceted system. LGNZ note, "the responses in 2014 suggest that less than half of provincial and rural councils always meet resource consent conditions. This is also a serious issue. Non-compliance with resource consents for wastewater discharges risk contaminating natural environments and damaging people's health when these areas are used by the public". (LGNZ/Castalia 2014 Issues paper, p18)

	Percentage of councils that answered 'yes' or 'always'	
	Wastewater: Resource consent compliance for receiving areas	Storm water: Resource consent compliance for receiving areas
Metro	50	80
Provincial	19	52
Unitary/Regional	0 (Unitary)	25 (Regional)
Rural	20	52

Source: LGNZ/NZIER 2014

Consent compliance is not necessarily evidence of a health risk, or detrimental environmental effects. Some of the non-compliance may be for technical reasons, for example, failing to meet reporting requirements, while other discharges (especially stormwater), do not require consent.

Information in this area will only improve over the coming years, including with the first non-financial reporting measures in the middle of this year, but prima facie, this is an area of significant concern.

Asset condition

As the OAG noted, "condition and performance information should be used to make good decisions about risk management to avoid asset failures, assess the useful lives of assets, and inform asset management renewal and retirement strategies." OAG 2014, 2.42 p25

In terms of asset condition, a significant portion of assets included in the available case studies and reports are assessed as "poor asset condition".

Water New Zealand reports 62 percent (13 of 21) Local Authorities had at least 30 percent of water mains rated as condition grade 3 (moderate) or worse. The same report shows a more negative story for wastewater mains (76 percent or 16 of 21) and a slightly better story for stormwater (57 percent or 12 of 21).

The LGNZ National Information Framework also collected information on the age, materials used and condition of the network (by length), providing physical indicators of the remaining usable life of the infrastructure. The data showing the numbers and proportion graded 1 (Very Good) or 2 (Good) is shown below.

Local authorities water network – percentage up to 40 years old and percentage graded 1 or 2						
	Potable		Waste water		Stormwater	
Council Type	Share of network up to 40 years old	Share of network graded 1 or 2	Share of network up to 40 years old	Share of network graded 1 or 2	Share of network up to 40 years old	Share of network graded 1 or 2
Metro	63	41	48	50	60	51
Provincial	65	46	63	28	45	33
Unitary	68	19	67	1	71	0
Rural	66	60	58	62	52	57
All Councils	64	45	54	43	55	45

Source: LGNZ/NZIER 2014

Over 55 percent of water assets that have been graded are Graded 3 (Moderate – described as adequately performing now but likely to require replacement within 5 – 15 years) or lower. 45 percent of both the potable and waste water network lengths was categorised

as "ungraded" with 52 percent for stormwater. There are valid reasons why large portions of networks can be categorised as ungraded, particularly if substantive parts of the network are relatively new.

If this is an accurate reflection of condition and the remaining life of the assets, then this creates a significant challenge as renewals at this scale are likely to create affordability issues. However, this data needs to be treated with caution, especially as not all local authorities responded. As we noted in the 2014 Evidence Base, what is not clear from the above condition data is the link to asset criticality and therefore how important the prima facie concern is.

Achievement against KPIs

From the new LGNZ National Information Framework, four relevant KPIs have been extracted and shown below – the percentage of local authorities with KPIs and in brackets, the percentage of those with KPIs that generally meet them. Overall, they show significant room for improvement. However, what is not clear and would require more detailed and individual investigation is the criticality of each.

Local Authorities selected water KPIs – percentage with KPIs and percentage that generally meet them					
	Potable	Waste water		Stormwater	
Council Type	Disruption to water supply: *With (generally meet)*	Management of overflow: *With (generally meet)*	Disruption to water supply: *With (generally meet)*	Response to storm events: *With (generally meet)*	Number of floodable properties: *With (generally meet)*
Metro	80 (60)	80 (60)	80 (80)	80 (100)	90 (60)
Provincial	74 (74)	85 (78)	59 (59)	74 (70)	63 (59)
Unitary	100 (100)	100 (100)	50 (50)		
Rural	68 (72)	84 (80)	64 (64)	72 (72)	56 (60)
Regional				75 (75)	50 (50)

Source: LGNZ/NZIER 2014

What capacity is it at?

There is a lack of robust evidence with regards to capacity. A 2004 study estimated capacity of the surveyed water supply systems at 668 million cubic metres per annum[3]. Little data has been found to update this figure or provide a more detailed breakdown. This is now 11 years old and is of limited usefulness. In areas that have experienced significant growth in this time, especially Auckland, Waikato and the Bay of Plenty, this is likely to have changed considerably. Discussions with local authorities in these regions signal that provision of water infrastructure is a constraint on the continued development of land in the medium term.

The Water New Zealand report includes data on the days of supply for water, based on reservoir storage, and for wastewater treatment plant capacity.

- Days of water supply, 27 responses were recorded with a range of 0.2 to 5 days, a mean of 1.8 days and a median of 1.7days.
- Water treatment plant capacity currently utilised indicates sufficient headroom for the majority but 10 of 25 (40 percent) are at 80 percent capacity or over. Noting that plant capacity is only one part of the network and pipe capacity for example, is also a key determinant of overall capacity.

Both of these are relevant to resilience. There is some concern in the average days of water supply evidenced by these historical statistics by a number of practitioners.

[3] 2004 Ministry of Economic Development Stocktake. Available at: http://www.med.govt.nz/templates/MultipageDocumentPage9031.aspx?&MSHiC=65001&L=0&W=water+infrastructure&Pre=%3cb%3e&Post=%3c%2fb%3e

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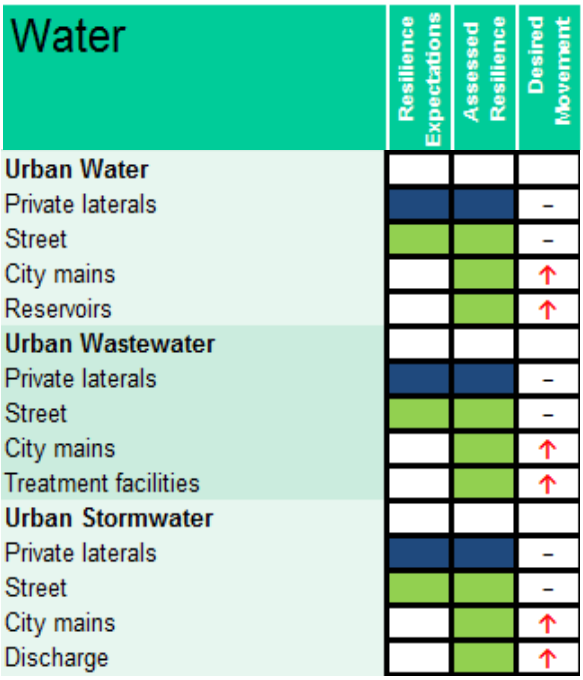
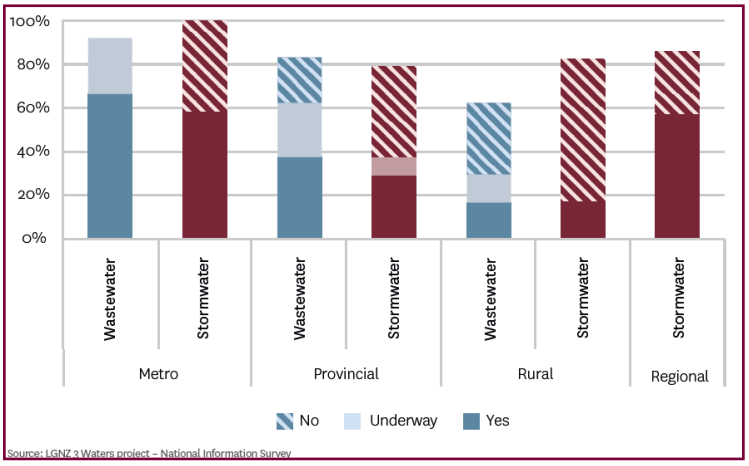
Resilience

A key point when considering resilience is the importance of overlaying the objective data with subjective intelligence due to the interdependencies with other infrastructure sectors and the particular geographic features of each locality or region e.g. Christchurch with 160 wells is in a very different situation than Wellington City with one main pipeline into the City that crosses a major fault in several places.



In the table to the right, right resilience expectations from a national perspective are identified as low medium or high. When making these judgements a wide range of aspects require consideration. To demonstrate; under Urban Water "City mains" generally have a very high economic and social value associated with them. A high level of resilience expectation is therefore attributed to them. An assessed resilience of medium reflects the significant vulnerabilities of some of these routes both from limited alternative options and ability to withstand hazards such as earthquakes. In contrast "Private laterals" have a low resilience expectation in part due to the relatively low economic value associated with them and also the relative ease of remediation. "Private laterals" are also a good example of level of resilience being dependent on your perspective; if your residence or building is dependent on a particular lateral you are likely to expect a high level of resilience and in many cases this probably exists.

In addition to the NIU assessment, the LGNZ National Information Framework provides new information on local authorities understanding of their critical assets and whether they have documented risk profiles and undertaken a Lifelines analysis.



Considering that the focus is specifically on critical assets, ie. those most important to the network, the relatively low numbers of local authorities that answered yes is a concern, with just over 60 percent of Metro Councils answering yes for waste water being the highest and some local authority groups being lower than 20 percent. It is recognised that a number of local authorities have answered that these are underway.

Undertaken a lifelines analysis - percentage of councils that answered 'yes' or 'always'						
Council group	**Wastewater**			**Storm water**		
	Yes	**Underway**	**No (No response)**	**Yes**	**Underway**	**No (No response)**
Metro	8	2	0	9	0	1
Provincial	17	4	5 (1)	15	0	11 (2)
Unitary	3	0	2			
Regional				4		2
Rural	12	3	5 (5)	11		12 (3)

Source: LGNZ/NZIER 2014

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As PWC/GHD (2012) identified in six metrics to assess for resilience, shown in the table below. Overall for the Resilience principle, two of the nine providers rated green with the other seven rated amber. Vulnerability assessments rated the lowest – two green, five amber and two red (recognising that high vulnerability in itself does not mean low resilience).

Table 7. Scores against each metric for the Resilience principle, for pilot study operators

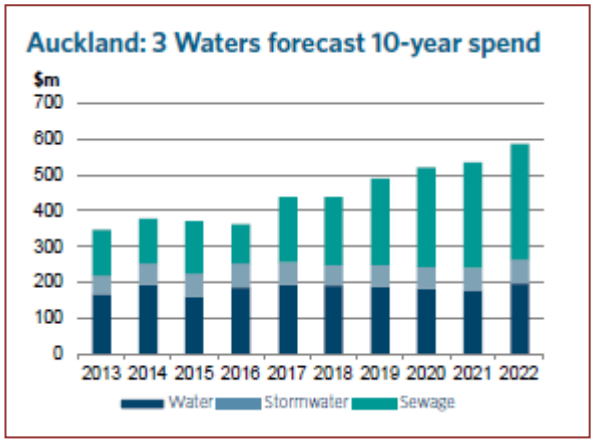
Metrics for Resilience	Waikato	Hamilton	Waipa	Taupo	Watercare	New Plymouth	Hutt	Wellington	Dunedin
Overall score for principle									
Design & construction standards									
Natural hazard risk assessments									
Vulnerability assessments									
Key risks: understand & mitigation									
Network resilience consideration *									
Power outage contingency plan									

Note: (*) The score for this metric was derived from scores for sub-metrics. The scores for each sub-metric are shown in Appendix C.

What are we spending?

Water

Capital expenditure on water in Auckland is uneven with most capital being spent on increased demand (40 percent) followed by renewals (35 percent). The amount spent on renewals increases from $41 million forecast in 2013 to $77 million forecast in 2022.

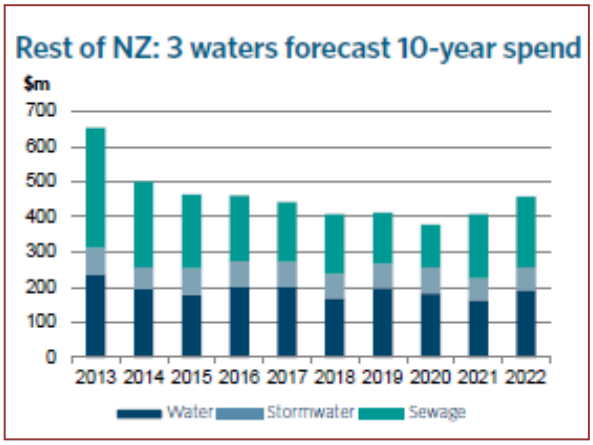


Real capital expenditure on water for councils in the rest of New Zealand is forecast to decrease over time. Renewals makes up 50 percent of projected spend, gradually increasing over time. Most change is due to decreasing expenditure on improvements to levels of service from 28 percent of forecast annual expenditure in 2013, to 17 percent forecast in 2022.

Wastewater

In Auckland, capital expenditure on sewage will increase steadily and significantly over the next ten years, from $127 million forecast in 2013 to $322 million forecast in 2022. Increased demand makes up 43 percent of the total forecast spend with renewals next at 31 percent.

For councils in the rest of New Zealand, there is a period of significant expenditure on sewage in the early years of the LTP, gradually decreasing before increasing again in 2021. As renewals remain stable (44 percent of the forecast total), the increased forecast expenditure in the early years is being driven by both improvements to levels of service, and to cater for increased demand.



Stormwater

Spend on stormwater assets comprises 4 percent of total capital expenditure for Auckland, and 5 percent for councils in the rest of New Zealand.

Capital expenditure on stormwater in Auckland is forecast to peak in 2015 and 2016, and again in 2022. Over time the proportion of expenditure on improved levels of service is forecast to increase from 36 percent in 2013, to 44 percent in 2022.

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Councils in the rest of New Zealand are forecast to gradually reduce their capital expenditure on stormwater. Most expenditure will be for improvements to levels of service (49 percent), suggesting councils may be addressing capacity issues with their existing stormwater systems. Sector feedback suggests that as stormwater networks tend to be younger the longer term picture will be for increasing capex as renewals are due.

Overall

LGNZ/NZIER data suggests that most councils are providing for the replacement of assets at between 1 and 2 percent per year - depreciation divided by replacement value. (LGNZ/NZIER 2014, para 3.1.5, p29)

	Number of projects over $1m	Sum of total cost ($billion)
Water supply	469	$6.5
Waste water	484	$7.8
Stormwater	214	$1.3
Total	1,167	$15.6

Source: NIU, Capital Intentions Plan Analysis, 2015

From the NIU analysis for the Ten-year Capital Intentions Plan, Local Authorities have listed 1,162 projects (excluding those under $1 million) totaling over $16 billion

How productive is it?

The data to determine productivity is not immediately obvious or available. Some insight can be gleaned from looking at the costs of provision, water loss and governance/service provision.

Costs of provision

LGNZ/NZIER noted the variability, "annual average running costs (measured in $ per 000 m3 of water processed) vary widely across council groups for both potable and waste water with no obvious explanation from either scale effects or differences in council service standards. …There are also wide variations in costs within council groups. (LGNZ/NZIER, para 2.1.1, p3)

This comes with a warning that the data for running costs plus asset renewals needs to be interpreted with caution as asset renewal spending is lumpy and the survey responses may not reflect 'average' levels for all councils. (LGNZ/NZIER 2014, p3)

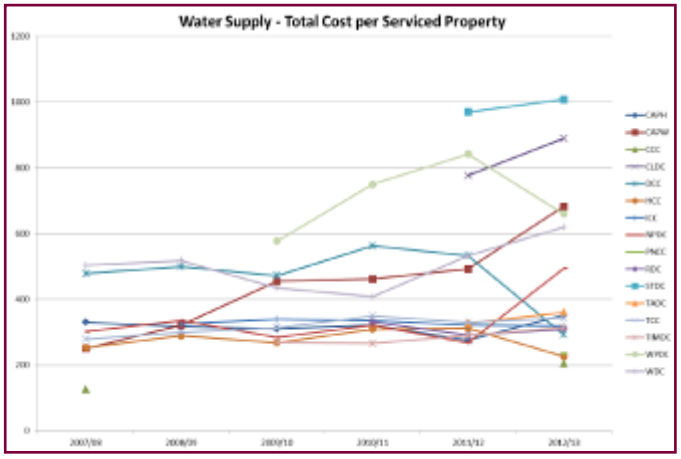
ANNUAL AVERAGE RUNNING COST – POTABLE AND WASTE WATER (costs measured in $ per meter cubed)				
Council group	**Potable**		**Waste water**	
	Running Costs	Running Costs and Asset renewals	Running Costs	Running Costs and Asset renewals
Metro	$0.83	$1.19	$0.88	$0.97
Provincial	$0.38	$0.71	$0.87	$1.47
Unitary	$0.64	$1.18	$2.18	$2.83
Rural	$0.53	$1.44	$0.99	$1.37
Note: 'Asset renewal' includes replacing end of life assets and capital spend to improve the quality or capacity of the network.				
Source: LGNZ/NZIER 2014				

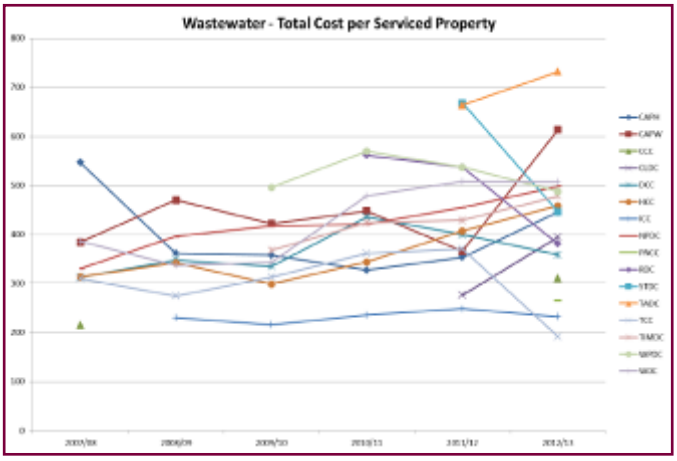
The Water New Zealand report identifies a wide variation of unit cost of water delivery – ranging from $0.50 to $2.00 with a mean of $1.10 per cubic metre.

This variation in costs is not surprising, as SPM noted, a number of communities in New Zealand have aquifers that deliver high quality water into the supply networks without the need for treatment. Others require extensive headwork structures and treatment to meet demand and the Drinking Water standards.

Perhaps more significantly, the trend data over the past five years in the Water New Zealand data shows little movement in price.

For wastewater, Water New Zealand reports an even wider variation of unit cost – a range from $0.50 to $2.80 with a mean of $1.65 per cubic metre. Trend data over the past five years shows increasing unit cost.





Source: Water New Zealand, 2012/2013 National performance Review Report, available at http://www.waternz.org.nz/Category?Action=View&Category_id=232 with larger versions of charts available on pages 32 and 36.

Water loss

33 percent of the applicable providers (5 of 15) meet the suggested international benchmark[4]. Prima facie, this suggests significant wastage and loss of productivity.

Governance and service provision

As noted in the LGNZ/Castalia issues paper, there may also be a link between a water provider's operational and management capabilities and its governance model. The governance model for water providers is typically an internal committee or external (using council controlled organizations) or a mix of both internal and external. The table below shows there is very little variation in the type of governance model used by water providers in New Zealand.

Council Type	Which governance model do you use? (per cent answering 'yes')								
	Potable			Wastewater			Stormwater		
	Internal	External	Both	Internal	External	Both	Internal	External	Both
Metro	40	40	10	40	20	30	50	30	10
Provincial	81	0	4	85	0	0	81	0	4
Rural	72	0	4	68	0	4	68	0	4
Regional							100	0	0

Source: LGNZ 3 Waters project – National Information Framework

Competitive tendering typically brings savings and promotes innovation. This has been seen in roading, a similar local authority provided core infrastructure, leading to benefits from economies of scale. The table below shows that the majority of services are provided 'in-house', especially for rural and provincial local authorities. Prima facie, this suggests significant untapped opportunities in the water sector for local authorities to realise benefits from alternative service provision arrangements.

[4] Infrastructure Leakage Index (ILI). Industry standard for water loss assessment is Benchloss, evaluating Current Annual Real Loss and comparing this with Unavoidable Annual Real Loss to provide ILI. Water New Zealand suggest international experience is that network losses are being effectively managed if ILI <2.

EVIDENCE BASE 2015: URBAN WATER

Council Type	Service providers (percent of Local Authorities that answered 'yes')											
	Potable				Wastewater				Stormwater			
	In house	CCO	Other Council	Comm. Partner	In house	CCO	Other Council	Comm. Partner	In house	CCO	Other Council	Comm. Partner
Metro	70	50	20	20	60	10	0	10	70	10	0	10
Provincial	96	4	0	0	89	4	7	4	96	7	11	7
Unitary	100	0	0	0	50	50	0	25				
Rural	88	0	4	8	92	0	0	0	92	0	0	4
Regional									25	50	0	0

Source: LGNZ/NZIER 2014

How well are we managing it?

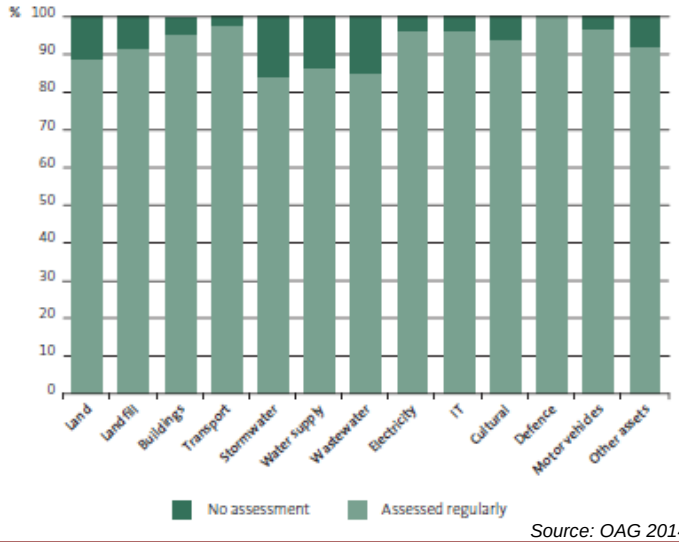
Fundamental to managing long-life infrastructure assets is having mature asset management practices that reflect the scale and scope of each service provider. As already outlined, data quality and confidence is the key enabler.

The 2013 OAG report identified that stormwater, water supply and waste water assets were all assessed less than the overall average across public sector assets. This is shown in the graph to the right.

Adding to this picture, OAG reports that "Based on the information we collected, maintenance and renewal plans are being followed for about 40% of assets, and those plans influenced the work carried out to some extent for a further 53%" (OAG 2013 4.5)

Further, there was a lack of regular reporting to governing bodies with less than 60 of local government decision makers receiving regular asset condition information (OAG 2013 5.10).

% of Assets with Regular Condition Assessments, by Type of Asset



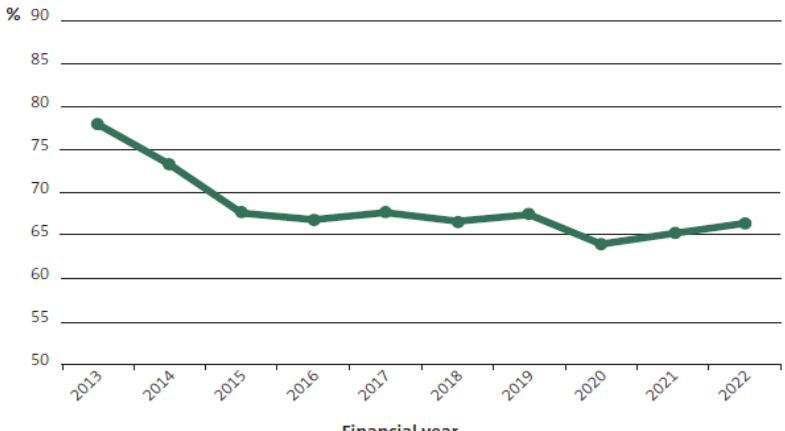
Source: OAG 2014

This was reinforced by the Better Local Government Infrastructure Efficiency Expert Advisory Group (IEEAG) in their 2013 report with the IEEAG saying "On the part of councils, business case decisions need to be improved to ensure that appropriately scaled and targeted solutions are delivered. Better asset management can also help achieve efficiencies and therefore contain costs."

Sustainable network - renewals

A well managed network is sustainable. A standard measurement is the ratio of renewals expenditure to depreciation. As OAG explain "When we compare renewals expenditure to depreciation, we assume that depreciation is a reasonable estimate of the capital expenditure needed to replace the existing asset base. A result where renewals expenditure is equal to depreciation (100%) over time usually indicates that an asset (and therefore service) is sustainable." OAG 2014, 2.64 – 2.65 (p30)

Forecast annual renewals expenditure as a percentage of the depreciation expense, 2013 to 2022



Source: OAG 2014

The OAG analysis shows "local authorities' forecast renewals expenditure on physical assets is below depreciation from 2013 to 2022. It also shows a downward trend during that period." OAG 2014,2.65 p31

In and of itself, this is not conclusive evidence as there are valid concerns with this formula and all parties recognise that there will be reasons why for some local authorities, a ratio of less than 100 percent is appropriate. However, as identified in the OAG report on the 2012-15 LTPs, sweating assets and reducing planned renewal expenditure was a strategy some local authorities had adopted. Prima facie, the combination of this strategy plus the downward trend of the renewals/depreciation ratio raise a concern. OAG conclude that the forecasts indicate a "renewals/depreciation gap" – the difference between depreciation expenses and renewals expenditure – of between $6 billion and $7 billion by 2022.

A further salient points made by OAG is that if depreciation funding is being deferred or held back for spending in future years, we would expect to see an associated increase in forecast cash, reserves, or investments, and/or a forecast decrease in borrowing. However, forecast increases in assets, excluding fixed assets, are trending well below the growing renewals/depreciation gap and total debt is forecast to continue increasing.

This concern is picked up in the LGNZ/Castalia Issues paper where it states "Funding such investment programmes may be challenging as a number of councils either do not have a renewals profile or, where renewals profiles have been prepared, they are not fully funded." (LGNZ/Castalia 2014, p2).

Councils without a funded renewals profile for water and wastewater (number of councils that answered 'no')				
Council type	**Potable**		**Waste water**	
	Councils that do not have a renewals profile	**Councils without a profile that is matched and funded**	**Councils that do not have a renewals profile**	**Councils without a profile that is matched and funded**
Metro	0 out of 10 0 non-responses	2 out of 9 1 non-response	0 out of 10 0 non-responses	2 out of 9 1 non-responses
Provincial	4 out of 22 8 non-responses	2 out of 20 6 non-responses	3 out of 18 8 non-responses	3 out of 17 9 non-responses
Rural	4 out of 18 6 non-responses	5 out of 18 6 non-responses	6 out of 17 7 non-responses	6 out of 15 9 non-responses

Source: LGNZ/Castalia 2014, Issues paper

Understanding demand

Understanding demand is particularly important in light of the current condition of the networks, changing demographic trends, pressures coming from growth, and the tight fiscal environment in which the sector is managing its water assets.

In the 2014 Evidence Base we recorded that "the underlying quality of available data is also a concern with regards to forecasting, and means little meaningful insight can be drawn at a national level" and as a result, focussed on other indicators such as whether forecasting is done, the quality of this and the inclusion of both supply and demand management (DM) strategies to meet forecast demand.

The data reviewed suggests an imperative for an improvement in information supporting evidence-based decision making in the sector. While local authorities typically included population changes and may have considered demand management strategies, they generally do not quantify its potential impact. Nor are they typically verifying forecasts. Overall, forecasting has been assessed by a number of reviews as having a minimum to intermediate standard.

- OAG (2010) rated five of eight providers forecasting as minimum standard with the other three at intermediate. They also noted the lack of verification.
- MWH identified the lack of quantification of the impact of other drivers of demand and that councils have not defined what they will do to implement demand management strategies.
- PWC/GHD rated only one of the nine providers as 'green' – a 'green' rating requires detailed data, and forecasts internally consistent with assumptions.

- PWC/GHD also looked at more short term measure on the accuracy of actual versus planned capex - with only one provider meeting the 'green' criteria – a 'green' rating = actual within 10 percent budget on average or in total over three years, and within 20 percent in each year.

The new data available through the LGNZ National Information Framework included an objective on future planning and the approach local authorities used in planning for the 3 Waters.

The results around the significant number of local authorities without a renewals profile or with a renewals profile that is not matched by funding is reported above. Two other areas we have focussed on are the use of up to date hydraulic models and whether local authorities are using scenarios for growth based on statistics – recognising that not all local authorities are in a growth situation.

Forward planning (percentage of councils that answered 'Yes')						
Council group	**Potable**		**Wastewater**		**Storm water**	
	Do you have an up to date model of the whole scheme?	Are you using scenarios for growth based on statistics?	Do you have an up to date model of the whole scheme?	Are you using scenarios for growth based on statistics?	Do you have an up to date model of the whole scheme?	Are you using scenarios for growth based on statistics?
Metro	60	90	60	90	20	80
Provincial	44	81	30	81	19	67
Unitary	50	100	50	100		
Regional					25	100
Rural	24	56	12	72	20	60

Source: LGNZ/NZIER 2014

This paints a picture where parts of the sector can substantially improve asset management practices, the quality of information collected and reported to governing bodies, and the use that is made of this information. The new National Information Framework is a significant first step in providing a basis for discussions to continue and actions to be taken as part of the LGNZ 3 Waters project.

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