Controller and Auditor-General
Tumuaki o te Mana Arotake

Performance audit report

Local authorities: Planning to meet the forecast demand for drinking water

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Local authorities: Planning to meet the forecast demand for drinking water

This is the report of a performance audit carried out under section 16 of the Public Audit Act 2001.

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Auditor-General's overview

Access to good quality water for drinking, bathing, clothes washing, and cooking is essential to our health and well-being. In a country that as a whole has reliable annual rainfall, numerous lakes, rivers, and streams, and a small population, the public expects supplies of drinking water to be secure for years to come.

Local authorities are responsible for supplying drinking water to about 87% of the country's population and they manage water supply infrastructure estimated in 2009 to be worth $11 billion. Each year from 2009 to 2019, local authorities collectively have budgeted for about $605 million on operational expenditure and $390 million on capital expenditure to maintain and manage water supplies.

There are many challenges involved in supplying good quality drinking water now and forecasting demand in the future, and concern has been raised publicly that some local authorities may not be well equipped for the task. Some local authorities face more challenges than others, depending on a variety of environmental, economic, and social factors.

My staff carried out a performance audit of local authorities to help us form a view about how well prepared the country is to meet the likely future demand for drinking water. The local government sector is large and diverse, so my staff selected a representative sample of eight local authorities. Three of the eight local authorities were managing their drinking water supplies effectively to meet forecast demand for drinking water, three could be doing better, and two were managing poorly.

Feedback from the local government sector indicates that the variable performance we found in our sample fairly reflects what is happening within other local authorities. Therefore, I consider that local communities cannot be complacent about the security of their drinking water supply. It is important that we all play our part to ensure the sensible use of water in our local community, and that we take an interest in the way our local authority is managing water supplies now and how it plans to meet future demand.

I am encouraged that there was a good level of awareness about what is needed, and that each local authority we audited not only acknowledged its challenges in ensuring consistent delivery of good quality drinking water but was also actively working on solutions to meet future demand. The local authorities that were well placed to meet the forecast demand for drinking water have consistently used a wide range of strategies to influence demand and supply patterns. They also had an ongoing focus on water supply efficiency, such as minimising water leaks.

Scope of our audit

The eight local authorities that we selected for our performance audit were Tauranga City Council, Opotiki District Council, South Taranaki District Council, Kapiti Coast District Council, Nelson City Council, Tasman District Council, Christchurch City Council, and Central Otago District Council.

We did not audit any local authorities in the Auckland region because we plan to do a separate performance audit when the transition to one local authority for Auckland is complete.

Demand forecasting

My staff looked at the forecasts the eight selected local authorities used to estimate the likely future demand for drinking water, and the strategies they were using to make sure they could meet that demand.

Demand forecasting involves predicting how much drinking water will be needed in the future and where it will be needed. A reliable forecast can help to ensure that the local authority supplies enough drinking water for domestic and industrial use, while allowing for future growth and development. It can also contribute to a more efficient use of ratepayers' funds, because the infrastructure is the right size to meet the need, including an appropriate level of surplus capacity.

Local authorities can use a wide range of strategies to meet the forecast demand for drinking water. The choice of strategies will depend on the circumstances of each local authority.

Overall results

All eight local authorities are able to ensure the security of drinking water supply in their districts at present. However, providing security of supply into the future depends on, in some instances, significant improvements in forecasting, planning, and upgrading infrastructure. Some of the challenges, such as increasing competition for access to water, the need to reduce consumption, and the costs associated with upgrading infrastructure are only likely to increase in difficulty.

Only three of the eight local authorities in our sample were managing their drinking water supplies effectively to meet future demand for drinking water. Nelson City Council, Tasman District Council, and Tauranga City Council had forecasting techniques that were reasonably detailed and likely to be sufficiently accurate. They had good planning behind their strategies to meet the forecast demand, and were consistently implementing those strategies. As a result of this effective management, they were well placed to meet the forecast demand for their drinking water.

Christchurch City Council, Opotiki District Council, and Kapiti Coast District Council were adequately managing their drinking water supplies, and were adequately placed to meet the forecast demand for drinking water. They had more to do to improve the accuracy of their forecasts and implement their strategies to meet future demand.

South Taranaki District Council and Central Otago District Council were poorly placed to meet the forecast demand for drinking water. They had a significant amount of work to do to improve forecasts and upgrade drinking water supply infrastructure.

It is important to note that those local authorities currently in an adequate or poor position to meet the forecast demand have started to improve how they manage their drinking water supplies. They know what they need to do and are making progress to implement improvements. I am also aware that it is likely that these local authorities have made improvements since the fieldwork for this audit was carried out in late 2008. Provided those improvements continue, within the next 10 years these local authorities should be better placed to meet the forecast demand for drinking water.

Strengths in managing drinking water supplies

My staff identified a number of strengths in how local authorities managed their drinking water supplies.

As part of their planning, all eight local authorities had identified their main challenges for meeting the forecast demand for drinking water. Common challenges included the need to upgrade infrastructure to meet the drinking water standards for water quality, managing demand to reduce consumption, and improving information available for forecasting, planning, and asset management.

All eight local authorities integrated drinking water supply planning into their 2009-19 long-term council community plans. They had all budgeted capital expenditure that aligned with their main drinking water supply challenges. Comparatively, South Taranaki District Council and Central Otago District Council were planning to spend more, but this was consistent with the scale of infrastructure upgrades that they need to manage their particular water supply challenges.

All eight local authorities had prepared risk management plans for drinking water as part of their water supply asset management plans. They were also preparing

public health risk management plans, and some of those plans were already approved. It was too early for us to assess implementation of the public health risk management plans.

All eight local authorities had assessed what they need to do to meet the country's drinking water standards. Their assessments were behind the changes they were making and their increased capital expenditure for supplying drinking water. Five of the smaller local authorities need to upgrade their infrastructure, especially those that have previously received poor water-quality grades.

Weaknesses in managing drinking water supplies

Five local authorities used a demand forecasting method that would be considered the minimum in terms of industry standards. This is unsatisfactory, because it could result in infrastructure that is not the right size for their needs and therefore wastes public funds. It could also place unnecessary demands on scarce water resources.

The ability of some of the local authorities to prepare reliable forecasts for drinking water demand was limited by the quality of information they had, particularly about water use. Few of the eight local authorities explicitly addressed uncertainty in their forecasts. There were few examples of forecast verification or peer review.

All eight local authorities could improve how they choose their water management strategies. Their evaluation of the costs and benefits of strategy options was variable and generally limited. The types, quality, and quantity of information used varied widely.

Five of the local authorities had incomplete asset management information. Two had better information, but it was still not complete. The eighth had a lot of information, but did not make the best use of it.

Some of the local authorities could do more to improve the efficiency of their water supply systems through, among other things, active leakage and pressure control programmes. This should result in more efficient and sustainable use of water. It should also result in savings on expenditure on new infrastructure, because it will be sized and timed more accurately to meet actual demand.

Levels of service, performance measures, and targets varied among the eight local authorities. This variation may well be appropriate given the different circumstances of each local authority. However, in some instances, targets were poorly defined, which makes it difficult to measure progress. This is generally

consistent with findings this Office reported in 2008 (see *The Auditor-General's observations on the quality of performance reporting*).

While most of the eight local authorities were clearly taking sustainable development into account, the actions they had chosen were not comprehensive. None of the local authorities had a fully integrated approach to dealing with sustainable development and supplying drinking water.

Improving how supplies of drinking water are managed

Opportunities for local authorities to improve how they manage their drinking water supplies include:

- improving the information available for demand forecasting;
- using more tools to assess and verify the reliability of their demand forecasting;
- preparing comprehensive demand management plans; and
- putting more emphasis on improving the efficiency of their drinking water supply systems.

I encourage all local authorities to assess themselves against the eight recommendations in this report and to implement any that are relevant to them.

I thank the eight local authorities we audited for providing my staff with considerable help and co-operation. The information from this audit will be of benefit to the whole local government sector.

Lyn Provost
Controller and Auditor-General

15 February 2010

Our recommendations

We encourage all local authorities to consider the applicability of each of these recommendations, and implement them where appropriate.

We recommend that local authorities:

1. use accurate and up-to-date information to prepare drinking water demand forecasts to reduce the risk of under- or over-investing in water supply infrastructure. In particular, this needs to include accurate and up-to-date information on water consumption;
2. verify the reliability of drinking water demand forecasts to reduce the risk of under- or over-investing in water supply infrastructure.
3. improve the efficiency of drinking water supplies by minimising water that is unaccounted for, to reduce the demand on existing water sources and the risk of over-investing in drinking water supply infrastructure;
4. participate in an independent benchmarking programme to measure their progress in improving the efficiency with which they supply drinking water;
5. prepare comprehensive demand management plans that integrate a broad range of supply and demand strategies, to reduce the demand on existing water sources and the risk of over-investing in drinking water supply infrastructure, and to benefit from cost savings;
6. carry out rigorous evaluations of the costs and benefits of supply and demand strategy options, to choose the most cost-effective and sustainable options;
7. define targets for performance measures and demonstrate progress towards the targets to improve decision-making on investments in drinking water supply; and
8. integrate sustainable development strategies into drinking water supply management as part of preparing comprehensive demand management plans.

Part 1
Introduction

1.1 In this Part, we discuss:

- why we did our audit;
- the focus of our audit;
- how we carried out our audit;
- what we did not audit; and
- the structure of our report.

Why we did our audit

1.2 Access to good quality water for drinking, cooking, and hygiene (that is, bathing and clothes washing) is essential to our health and well-being.

1.3 About 87% of our population receives drinking water from local authorities. A large amount of public money is invested in supplying drinking water. In 2009, the country's infrastructure for drinking water was valued at about $11 billion. For the years 2009 to 2019, local authorities' operational expenditure for supplying drinking water was estimated at an average of $605 million each year. The average annual capital expenditure for 2009 to 2019 was estimated at $390 million.

1.4 The public has high expectations that the services supplying us with drinking water will continue for years to come, despite the challenges some local authorities are facing in ensuring that they do.

1.5 Many parts of the country are experiencing increasing demand for water, which puts pressure on water sources and the capacity of the infrastructure (that is, the pipes and water treatment plants). Augmenting or replacing drinking water supply infrastructure can be challenging for local authorities because it is expensive. It is important that local authorities ensure that they have considered and planned for the forecast demand for drinking water, so that they can have adequate infrastructure and strategies in place to meet the needs of their community.

The focus of our audit

1.6 We carried out a performance audit to see whether eight local authorities were managing their drinking water supplies effectively enough that they could meet the likely future demand for drinking water. We expected the local authorities to be looking ahead at least 10 years, which is the period they have to cover in their long-term council community plans (LTCCPs).

1.7 In our view, effectively managing their drinking water supplies means:

- having and using good quality data (for example, about water supplies and water consumption, existing population patterns and expected changes, and existing land use patterns and expected changes);
- using a reliable technique to forecast what the future demand might be, and verifying that forecast;
- thoroughly assessing a wide range of supply and demand management strategies; and
- using the above information to build or upgrade infrastructure at the right time and to the right scale.

1.8 We focused on the demand for drinking water that is supplied by local authorities for domestic or commercial purposes and treated to drinking-water standard (potable water).

How we carried out our audit

1.9 We audited eight local authorities. We chose them by analysing information from LTCCPs, taking advice from experts, and considering factors such as:

- the size and scale of the local authority (we wanted a mix of large, medium, and small local authorities);
- North and South Island differences;
- matters that increase demand for water, such as population growth, commercial development, and seasonal tourism;
- water supply shortages caused by environmental factors, such as drought or competition from other users; and
- examples of good practice in managing drinking water.

1.10 The eight local authorities we chose were:

- Tauranga City Council;
- Opotiki District Council;
- South Taranaki District Council;
- Kapiti Coast District Council;
- Nelson City Council;
- Tasman District Council;
- Christchurch City Council; and
- Central Otago District Council.

1.11 Appendix 1 sets out some background technical information about these local authorities and how they supply drinking water.

1.12 We reviewed documents and interviewed staff and councillors at each local authority to understand each local authority's:

- approach to forecasting the likely demand for drinking water;
- approach to developing strategies for managing its drinking water;
- levels of service and how they affect its forecasting and choice of strategies;
- approach to risk management and contingency planning;
- plans to implement the strategies through commitments in LTCCPs, annual plans, and other local authority planning documents;
- governance arrangements for the delivery of drinking water;
- asset information used to forecast the likely demand for drinking water and to choose strategies;
- response to the requirements of the Health (Drinking Water) Amendment Act 2007;
- approach to complying with relevant national policies and regional plans under the Resource Management Act 1991;
- views on limitations, problems, or barriers to its forecasting and to its strategies to meet the forecast demand for water; and
- approach to integrating its strategies for managing drinking water across its planning documents, including the links between water services assessments, LTCCPs, and District Plan growth indicators.

1.13 We visited drinking water treatment plants, and sought advice from an expert to help us understand how drinking water supply is managed.

What we did not audit

1.14 We did not audit:

- how local authorities manage wastewater services or storm water;
- the provision of water for non-domestic purposes, such as irrigation for farming;
- compliance with the drinking water standards, although we took account of how the drinking water standards were affecting what local authorities were doing to meet the forecast demand for drinking water; and
- the allocation and management of freshwater[1] resources, although we took this into account to the extent that it affected access to drinking water supply.

1 Freshwater is water without significant amounts of dissolved sodium chloride (salt). It usually includes rain, rivers, ponds, and most lakes. We published a report on freshwater management in 2005, called *Horizons and Otago Regional Councils: Management of freshwater resources*. This report is available on our website, www.oag.govt.nz.

1.15 The Ministry of Health sets, publishes, and monitors compliance with New Zealand's drinking water standards. The drinking water standards were last updated in 2008. The standards are published as *Drinking-water Standards for New Zealand 2005 (Revised 2008)*.

1.16 We did not audit any local authorities in the Auckland region because we plan to do that as a separate performance audit after the transition to one local authority for Auckland is completed.

Structure of our report

1.17 We have structured the rest of our report as follows:

- Part 2 describes, briefly, how drinking water is supplied, why demand forecasting is important, and what sorts of strategies can be used to meet the forecast demand for drinking water.
- Part 3 summarises our conclusions about the ability of each of the eight local authorities to effectively manage the supply of their drinking water to meet the forecast demand for it.
- Part 4 sets out our conclusions about the local authorities' forecasting. There are two recommendations in Part 4.
- Part 5 sets out our conclusions about local authorities' progress in implementing relevant legislation and national and regional policies.
- Part 6 sets out our conclusions about the strategies that local authorities have chosen to ensure that they will have enough drinking water to meet the forecast demand. There are five recommendations in Part 6.
- Part 7 sets out our conclusions about local authorities' progress with implementing their strategies. There is one recommendation in Part 7.
- The appendices provide background technical information about supplying drinking water and about the eight local authorities' work in supplying drinking water.

Part 2
Background

2.1 In this Part, we briefly discuss:

- how drinking water is supplied;
- why demand forecasting is important;
- the types of strategies that local authorities can use to meet the forecast demand for drinking water; and
- what we consider necessary for local authorities to effectively manage drinking water supply.

How drinking water is supplied

2.2 Many local authorities directly manage how drinking water is supplied, but others have contracted out the operational and maintenance services. Some local authorities have established council-controlled organisations to manage how drinking water is supplied.

2.3 There are usually three parts to the system for supplying drinking water: a source, a treatment plant, and a distribution system. Figure 1 shows these three parts.

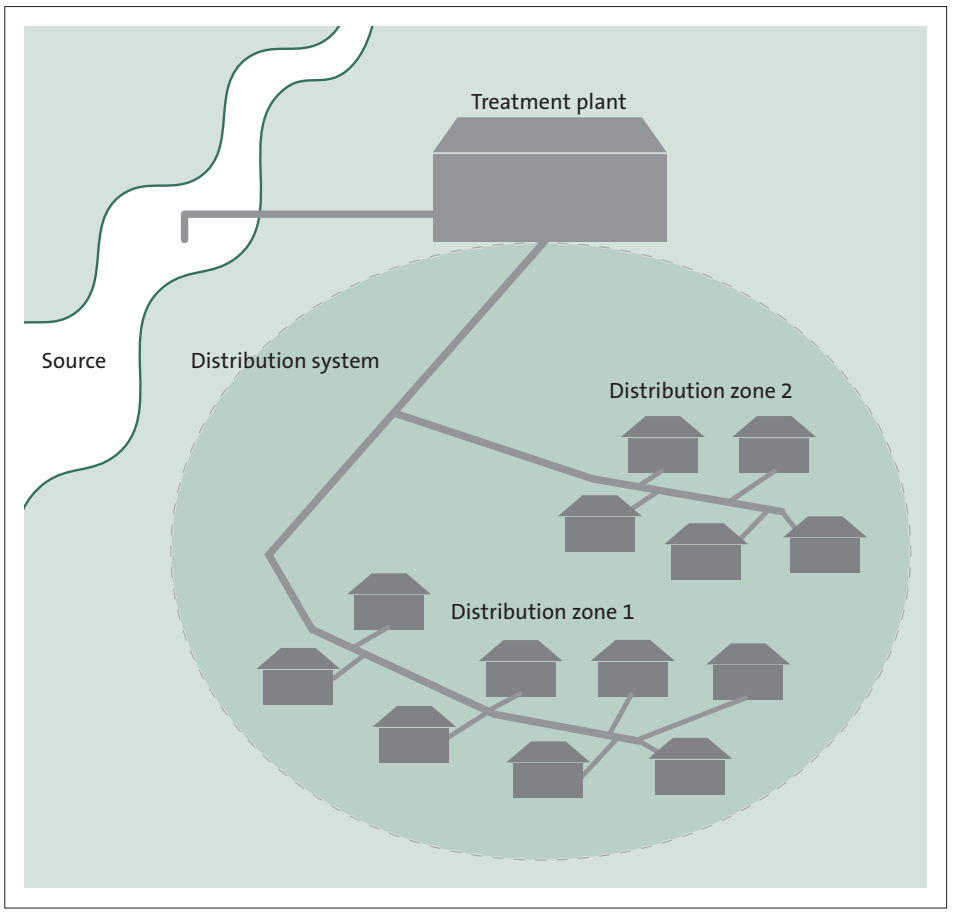
2.4 The three main sources for drinking water are:

- surface water (streams, rivers, and lakes);
- groundwater (water drawn from bores or wells); and
- roof catchment (rainwater collected on roofs and stored for later use).

2.5 Treatment plants can be large or small operations. They can be a series of automated treatment processes, or plants that use a manually controlled single treatment process, or a single pump drawing water from a source (usually groundwater) with or without any treatment.

2.6 Distribution systems carry drinking water from the treatment plant to the consumers. The distribution system is made up of the pipes, water storage facilities (tanks or reservoirs), and any other components situated between the treatment plant and the boundary of the consumer's property. The pipes used to distribute drinking water are also referred to as "reticulation".

Figure 1
The three parts of a typical supply system to provide a community with drinking water



Source: Chris Nokes, Institute of Environmental Science and Research Limited (2008), *A Guide to the Ministry of Health Drinking-water Standards for New Zealand*, Ministry for the Environment, Wellington.

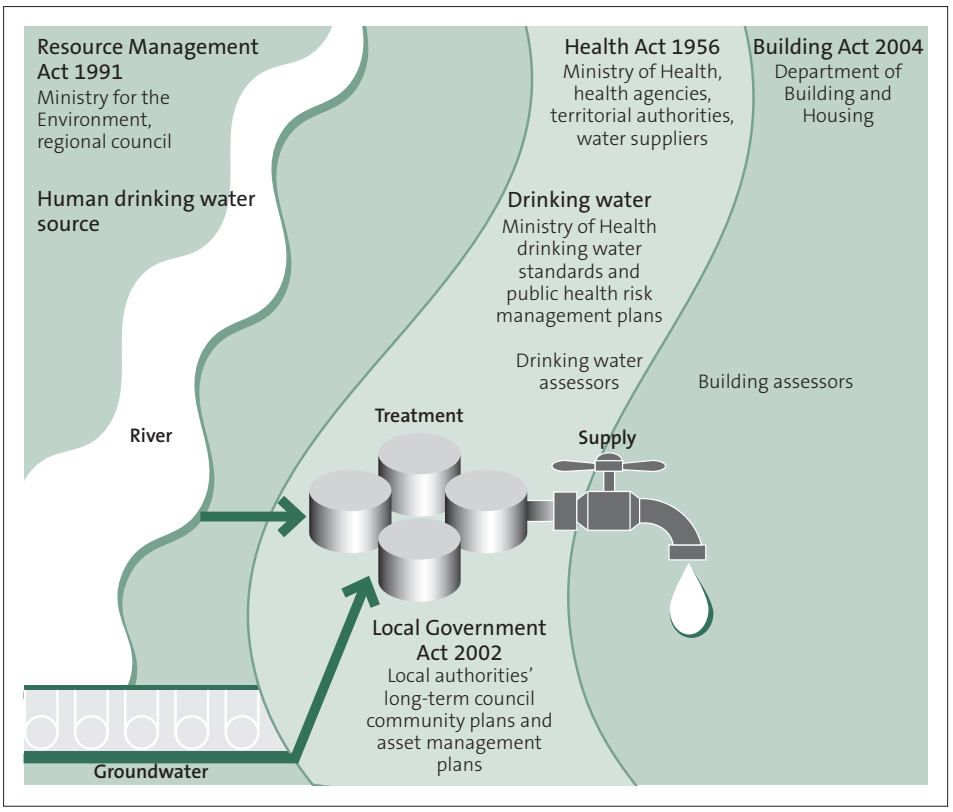
Legislative framework

2.7 Four main Acts set the legislative framework for drinking water supply. They are the:

- Health Act 1956;
- Local Government Act 2002;
- Building Act 2004; and
- Resource Management Act 1991.

2.8 Figure 2 shows the boundaries and links between these Acts, as they apply to a typical system for supplying people with drinking water.

Figure 2
How legislation applies to the parts of a typical system for supplying people with drinking water



Source: Adapted from Ministry for the Environment (2009), *Draft Users' Guide: National Environmental Standard for Sources of Human Drinking Water*, Wellington.

2.9 The Health Act covers the quality of the drinking water that is provided to consumers.

2.10 The Health (Drinking Water) Amendment Act was passed in October 2007 and took effect from 1 July 2008. Before this, local authorities had more discretion in the quality of the water they supplied to their communities. This Act does not require compliance with the drinking water standards but it does require the suppliers of drinking water to take "all practicable steps" to comply. The Ministry of Health considers that taking steps to implement an approved public health risk management plan is enough to comply with "all practicable steps". A public health risk management plan is a quality assurance programme for providing drinking water.

2.11 In relation to supplying water, the Local Government Act requires each local authority to carry out demand forecasting, evaluate options to meet current and forecast demand, and identify how the authority will meet this demand. Section 130 of the Act also requires local authorities to continue to provide water services and prevents them from selling the assets used to supply such services.

2.12 More generally, the Local Government Act requires local authorities to assess and plan for the future needs of their communities, taking a sustainable development approach and using a decision-making framework that covers consultation, planning, and accountability. LTCCPs outline how local authorities intend to contribute to community outcomes and provide an opportunity for the community to participate in local decision-making.

2.13 The Building Act applies to water delivery systems inside buildings that are connected to a water supply system provided by a local authority or community, and also applies to the water supplies of buildings that have an individual water supply (such as a rainwater tank). In our audit, we did not examine the Building Act aspects of supplying drinking water.

2.14 The main piece of legislation for managing freshwater is the Resource Management Act. Again, this was not a focus of our audit.

Why forecasting the likely demand is important

2.15 Demand forecasting involves predicting how much drinking water will be needed in the future and where it will be needed. Local authorities need to identify the main factors and trends that influence the demand for drinking water and prepare projections for that demand over time. Forecasts provide a basis for designing and budgeting for drinking water supplies. They also provide a basis for preparing a strategy to secure sources of water. Forecasting water demand is a critical part of the asset management and planning process.

2.16 It is important that local authorities take all practicable steps to use a reliable forecasting technique because it can be difficult to accurately forecast future trends. A reliable forecast can help ensure that the local authority supplies enough drinking water for domestic and industrial use, while allowing for future growth and development. It can also contribute to a more efficient use of ratepayers' funds, because the infrastructure is the right size to meet the need. See Appendix 2 for more information on how councils forecast demand.

Strategies for meeting the forecast demand

2.17 Local authorities can use a wide range of strategies to meet the forecast demand for drinking water. The choice of strategies will depend on the circumstances of each local authority.

2.18 These strategies generally fall into two broad groups – supply strategies and demand strategies.

2.19 Supply strategies deal with how drinking water is produced and delivered to consumers. Generally, they are asset management solutions to meet growing and changing demand. Supply strategies can include, for example, ongoing maintenance and renewals, controlling leaks or other system efficiency[2] changes, and proposals for new or replacement infrastructure.

2.20 Demand strategies deal with how consumers use drinking water. Demand strategies generally attempt to change the pattern of demand to minimise or eliminate the need to upgrade the infrastructure that supplies the water. Demand strategies can include: metering and charging for drinking water, water restrictions, and public education programmes about conserving water. Taking these actions can reduce the need to upgrade the infrastructure and reduce the demand placed on water sources.

Meeting the forecast demand by effectively managing how drinking water is supplied

2.21 In our view, for local authorities to effectively manage their drinking water supply means:

- having and using good quality data (for example, about water supplies and water consumption, existing population patterns and expected changes, and existing land use patterns and expected changes);
- using a reliable technique to forecast what the future demand might be, and verifying that forecast;
- thoroughly assessing a wide range of supply and demand management strategies; and
- using the above information to build or upgrade infrastructure at the right time and to the right scale.

2 A water supply system increases in efficiency when there are fewer system losses without any change in how consumers are using water. Systems can be made more efficient by detecting and repairing leaks, reducing water pressure, changing how the mains are flushed and reservoirs are cleaned, and installing mechanisms for balancing peak demands.

Part 3
Summary of our conclusions

3.1 In this Part, we discuss our conclusions about whether the eight local authorities were effectively managing their drinking water to meet forecast demand.

3.2 Our conclusions are based on the forecasting techniques the local authorities used, the strategies they had chosen, and how they were implementing those strategies. We discuss forecasting in more detail in Part 4. In Part 5, we discuss how the local authorities implement legislation and national (and regional) policies and plans. In Parts 6 and 7, we discuss the strategies that the local authorities used.

Our overall findings

3.3 Three of the eight local authorities (Nelson City Council, Tasman District Council, and Tauranga City Council) were effectively managing their drinking water supplies. They were well placed to meet the forecast demand for drinking water.

3.4 Three of the eight local authorities (Christchurch City Council, Opotiki District Council, and Kapiti Coast District Council) were adequately managing their drinking water supplies, and were adequately placed to meet the forecast demand. They had more to do to improve the accuracy of forecasts and implement strategies.

3.5 Two of the eight local authorities (South Taranaki District Council and Central Otago District Council) were poorly managing their drinking water supplies, and were poorly placed to meet the forecast demand. They had a significant amount of work to do to improve forecasts and upgrade drinking water supply infrastructure.

3.6 It is important to note that those local authorities in an adequate or poor position to meet the forecast demand for drinking water had identified how they would improve the effectiveness of their management and were implementing those improvements. Provided they continue, within the next 10 years they should be in a position to effectively manage the supply of drinking water to meet the forecast demand.

3.7 Each local authority's capacity to meet the forecast demand for drinking water was, broadly, related to their size. Generally, the smaller the local authority, the more limited the forecasting, the bigger the challenges faced, and the more expenditure (per connection to the water supply) planned to address the risks and challenges. The exception to this was Opotiki District Council, which was in a unique position for reasons we discuss in paragraph 3.16.

3.8 The particular context of each local authority was also a strong influence. For example, although Christchurch City Council is the largest of the eight local authorities, its forecasting was not as developed as some of the other local authorities. The incentives to improve forecasting have been weak because Christchurch City Council has access to a groundwater source in a quantity that exceeds current and anticipated demand until 2051.

3.9 We discuss our conclusions about each local authority in more detail in the rest of this Part. Figure 3 summarises the factors we considered in reaching our conclusions.

Figure 3
Summary of factors considered in assessing how the eight local authorities were managing their drinking water

Local authority	Tauranga City Council	Nelson City Council	Tasman District Council	Kapiti Coast District Council	Opotiki District Council	Christchurch City Council	Central Otago District Council	South Taranaki District Council
Location								
Current ability to manage supply to meet demand	Effective	Effective	Effective	Adequate	Adequate	Adequate	Poor	Poor
Forecasting demand	Forecasting is reasonably detailed and likely to be accurate	Forecasting is reasonably detailed and likely to be accurate	Forecasting is reasonably detailed and likely to be accurate	Forecasting is adequate but data could be improved	Forecasting is limited	Forecasting is currently limited by incomplete data, but developing a demand forecasting model	Forecasting is limited by incomplete data; particularly needs accurate water consumption data	Forecasting is limited by incomplete data; particularly needs accurate water consumption data
	Existing supply is insufficient to meet projected demand Has identified an additional source of supply and has applied for necessary resource consents	Existing supply is sufficient	Existing supply is insufficient to meet projected demand Investing in dams to provide an additional source of supply	Existing supply is generally sufficient to meet projected demand now; but, in some parts of the district, by 2015/16, summer demand is projected to exceed the amount that can be legally taken under resource consents Has decided to increase supply	Existing supply is sufficient to meet projected demand	Existing water supply is sufficient to meet projected demand until about 2051	Existing supply is sufficient to meet projected demand though Council anticipated future restrictions Possible pressure when resource consents for taking surface water are due for renewal because consumption is very high	Existing supply is insufficient to meet projected demand Additional sources of supply difficult because of pressure on supply from drought, few groundwater resources, and surface water in some catchments being at or near full allocation
Planning to meet future demand	Planning is good and implementation is consistent	Planning is good and implementation is consistent	Planning is satisfactory and improving, early stages of commitment to implementation Strategy to meet demand is based on supply augmentation	Planning is satisfactory but implementation is sometimes limited by changes in policy Strategy to meet demand is based on supply augmentation and demand management	Planning is limited	Planning is satisfactory and improving Adopted a water supply strategy for 2009-2039 that includes more demand management tools	Planning is improving but early stages of commitment to implementation Has adopted the Central Otago Drinking Water Strategy 2007 which, if implemented, should improve the situation	Planning is improving but early stages of commitment to implementation Has adopted a District Water Supply Strategy (2007) which, if implemented, should improve the situation
	Uses universal water metering and charging plus a number of other initiatives to manage demand	Uses universal water metering and charging to reduce demand	Uses universal water metering and charging in all urban supplies to reduce demand. This affects about 90% of the total number of water users. Also developing other conservation measures	Uses voluntary conservation to reduce demand. New homes will be required to install rainwater tanks and/or greywater* systems Also developing other demand management measures	Has universal metering and charging and developing other conservation measures	Few tools currently used for reducing demand. Metering but only commercial and industrial consumers are charged	Currently using some tools for reducing demand but progressively implementing metering and charging	Currently using some tools for reducing demand, including working with farmers, education, and progressively implementing metering
	Ongoing investment in infrastructure renewals and upgrades Significant investment in new supply to meet forecast future demand	Ongoing investment in infrastructure renewals and upgrades	Significant investment in infrastructure renewals and upgrades required	Some investment in infrastructure renewals and upgrades required	Little investment in infrastructure renewals and upgrades	Ongoing investment in infrastructure renewals and upgrades	Significant investment in infrastructure renewals and upgrades required	Significant investment in infrastructure renewals and upgrades required
Quality of drinking water **(Capacity to comply with the drinking water standards)**	Graded Aa for drinking water standards in 2005 but requires minor upgrades to comply with the current drinking water standards	Currently graded Ab Planning to improve distribution grading	Currently ungraded and requires upgraded infrastructure (additional filtration and disinfection) to comply	Currently ungraded and requires upgraded infrastructure (UV treatment) to comply	Currently ungraded and requires upgraded infrastructure (UV treatment) to comply	Currently graded Ba and Da for Christchurch City and Ee for Banks Peninsula supplies Requires upgraded infrastructure to comply in Banks Peninsula	Currently ungraded and requires upgraded infrastructure (treatment plants) to comply	Currently ungraded and requires upgraded infrastructure (treatment plants) to comply

* Greywater is wastewater that we generate in our homes (for example, dishwashing water, laundry water, and bathwater).

Conclusions about each of the eight local authorities

3.10 We have grouped the eight local authorities according to how well they were managing their drinking water supplies. Three local authorities were effectively managing, three were adequately managing, and two were poorly managing their drinking water supplies.

Local authorities effectively managing their drinking water

3.11 **Tauranga City Council** is effectively managing its drinking water supply, and is well placed to meet the forecast demand for it. The Council has detailed forecasting and up-to-date data about its asset management systems. It has identified water supply challenges and it uses a full range of strategies for managing for demand. It has consistently implemented the strategies and is constantly assessing, revising, and improving its strategies.

3.12 **Nelson City Council** is effectively managing its drinking water supply, and it too is well placed to meet the forecast demand for it. The Council has identified water supply challenges and has strategies in place to upgrade its systems for reticulation, asset management, backflow prevention, and managing water loss. The Council has enough water sources and a modern treatment plant. It is dealing with the risks it has identified with its main pipeline between water sources and the treatment plant. It has sound forecasting techniques and is putting in place a range of strategies to meet the forecast demand.

3.13 **Tasman District Council** is also effectively managing its drinking water supply, and it too is well placed to meet the forecast demand for drinking water. It has sound forecasting techniques and is putting in place a range of strategies to meet the forecast demand. Although both the quantity and quality of its drinking water supply are problematic, it understands the challenges and is using both supply and demand strategies to address those challenges. The Council has a strong focus on demand management and water conservation. It has also identified the upgrades it needs to make to its existing water supply systems and has started to implement them. It has implemented a water augmentation project and is planning more (for example, dams to increase storage) to resolve the supply issues.

Local authorities adequately managing their drinking water

3.14 **Kapiti Coast District Council** is, currently, adequately managing its drinking water supply to meet future demand. It is able to adequately forecast future demand for drinking water. However, the accuracy of its forecasts would be increased by improving some of the data used. Under the umbrella of the 2003 Sustainable Water Management Strategy, the Council is using a range of supply and demand strategies to address its drinking water supply challenges.

3.15 However, by about 2015/16, in Waikanae, Paraparaumu, and Raumati, the Council expects demand during summer to exceed the amount of water it can legally take on a regular basis under its resource consents. It has decided to increase supply and expects to make a decision in June 2010 on what option to implement. The Council is also committed to reducing consumption and uses a number of demand management tools, some of which are innovative (for example, a regulatory tool requiring the use of greywater systems in new homes). It has also set a standard to limit the amount of water supplied. However, progress towards that standard is slow and the overall impact of demand management strategies seems to be limited. The current council and previous councils have had difficulty achieving a clear consensus in the community about how to reduce consumption and resolve the supply issues.

3.16 **Opotiki District Council** is able to meet the forecast demand for drinking water even though its forecasting and planning is relatively limited. The Council upgraded its main drinking water supply system within the past 15 years. The new water supply was built with additional capacity to provide for future growth. It can treat more than two times the current average daily demand. The Council also has access to enough water sources. The investment in a relatively large water supply system has helped to ensure that the Council has enough supply to meet demand now and in the future. There are few immediate financial incentives for the Council to prepare detailed forecasts or manage water consumption more conservatively.

3.17 **Christchurch City Council** is able to meet the forecast demand for drinking water because it uses less water than it has available. The Council has resource consents that allow it to take up to 40% more water than it is currently using. Because of this, and because much of its water supply is inexpensive to provide, there are few immediate financial incentives for the Council to prepare detailed forecasts or manage water consumption more conservatively. However, the Council has prepared a 30-year water supply strategy and began implementing the strategy toward the end of 2009.

Local authorities poorly managing their drinking water

3.18 **Central Otago District Council** is poorly placed to meet the forecast demand for its drinking water. Both the quantity and quality of drinking water supply are problematic. The Council's water supply infrastructure needs upgrading, partly to comply with the drinking water standards and partly to improve the efficiency of its water supply systems. The Council needs to reduce the excessive water consumption patterns in its district to reduce how much it will need to spend on upgrading its water supply infrastructure. Its asset management information is

also incomplete. The Council has identified the improvements needed to upgrade its water supply systems. It has also started to implement those projects. Provided this progress continues, the Council should be in a position to manage demand effectively in the future (from about 2015).

3.19 **South Taranaki District Council** is also poorly placed to meet the forecast demand for its drinking water. In our view, meeting demand in South Taranaki is more about providing an appropriate quality of drinking water and matching demand to supply in the future than providing for new growth. The Council's water supply infrastructure needs upgrading, partly to comply with the drinking water standards and partly to improve the efficiency of its water supply systems. Its asset management information is also incomplete though improving. However, the Council has identified the improvements needed to upgrade its water supply systems, starting with projects to improve its asset management information and to understand the extent of the problems it faces. It has also started to implement those projects. Provided this progress continues, the Council should be in a position to manage demand effectively in the future (from about 2015).

Part 4
Forecasting the demand for drinking water

4.1 In this Part, we discuss:

- the information local authorities were using to forecast demand for drinking water;
- the risks and assumptions in the forecasts;
- the methods local authorities were using to calculate their forecasts; and
- the effectiveness of the local authorities' forecasting for drinking water.

4.2 We expected the eight local authorities to have effective methods for forecasting the demand for drinking water that:

- used relevant information and showed an understanding of the main factors that influence demand;
- stated assumptions about factors that might affect future water demand;
- identified and documented risks associated with the forecasts; and
- were appropriate to the size of the community being supplied.[3]

Our overall findings

4.3 Five local authorities used a forecasting method that would be considered the minimum in terms of industry standards. This may be enough for local authorities with very little growth, or those operating well within the capacity of their water supplies. However, it is problematic for local authorities needing to build or upgrade infrastructure, or facing restrictions on access to water. The forecasting method could result in infrastructure that is not the right size for the community's needs. Local authorities risk under-spending or over-spending, and could put more pressure on water sources than is necessary.

4.4 The ability of some of the local authorities to prepare reliable forecasts was limited by the quality of information they had on factors that influence the demand for water, particularly information about water use.

4.5 Few of the local authorities dealt explicitly with uncertainty in their forecasts. We did not see many instances of forecast verification or peer review.

Information used to forecast demand

The ability of five of the local authorities to prepare reliable forecasts was limited by the quality of information they had, particularly information about water use.

4.6 The main factors that can influence future demand for drinking water are set out in Figure 4. To forecast demand, a local authority needs information about

3 We used the *International Infrastructure Management Manual* (2006) for guidance when we set these expectations. (National Asset Management Steering (NAMS) Group, Association of Local Government Engineering NZ Inc (INGENIUM) (2006) 3rd edition (Version 3.0), Wellington.

these factors relevant to its particular district. The extent to which these factors are relevant to an individual local authority depends on the nature of its water consumers. For example, some local authorities do not have a large industrial sector, while others supply rural water schemes.

Figure 4
Main factors influencing the future demand for drinking water

Changes (increases or decreases) in water use as a result of:

- weather patterns (for example, seasonal drought);
- water supply performance efficiency (for example, reducing leakage);
- usage efficiency;
- charging and tariffs;
- expansion of water supplies to unserviced areas;
- population and dwelling growth;
- industrial development; and
- rural development.

Changes (increases or decreases) to levels of service as a result of:

- community expectations and consumer preferences (for example, wanting higher or lower water quality or water pressure);
- drinking water standards and other relevant legislation; and
- public and environmental health requirements.

4.7 Our analysis showed that the main sources of information the local authorities used to understand the factors affecting demand were:

- historical water use data;
- population growth estimates provided by Statistics New Zealand;
- household dwelling growth derived from building and resource consent numbers;
- research into growth expectations in the industrial and commercial sectors; and
- research into growth expectations in the rural sector (only two of the local authorities supply large rural drinking water systems).

4.8 Three of the local authorities had detailed information (Tauranga City Council, Tasman District Council, and Nelson City Council) that enabled more reliable demand forecasting. That is, they had detailed sets of data on all of the relevant matters covered in paragraph 4.2 and in Figure 4. For example, Tauranga City Council had analysed its water use data sufficiently to confirm that the main factor influencing an increase in water use was a lack of rain on preceding days, particularly during summer.

4.9 Five of the selected local authorities had incomplete data sets (Central Otago District Council, Christchurch City Council, Kapiti Coast District Council, South Taranaki District Council, and Opotiki District Council). In our view, this creates doubt about the reliability of the forecasting. A common limitation was incomplete asset management information (for example, incomplete asset registers and incomplete information about the condition of assets).

4.10 Another limitation was the use of water production data as a proxy for water use (Central Otago District Council, Christchurch City Council, Kapiti Coast District Council, and South Taranaki District Council). The likely outcome of this is an over-estimation of demand, mainly because leaks are not accounted for. All four local authorities were taking steps to improve their data.

4.11 Our finding about data limitations is generally consistent with other research on this matter. An industry-led initiative, the Ingenium Water Information Management Steering Group, has been set up to improve water data.

4.12 The types of information that the local authorities used are discussed further in the next sections.

Measuring how much drinking water is used

4.13 The eight local authorities used different methods for measuring how much drinking water was used. Four measured water use at the point of production (the volume of treated water produced) and used this as a proxy for water use. The other four measured drinking water use at the point of consumption (that is, on individual properties using data from water meters). This provided more accurate data on actual water use.

4.14 All eight local authorities had information on peak and average daily demand for drinking water (see Figure 5). This information is important because it indicates the size of the water supply infrastructure required and the amount of water needed. Peak per person water use varied among the local authorities but reached as high as 4000 litres per person per day in one Central Otago water supply. Central Otago District Council attributed this to high demand for irrigating gardens during summer in an area with very low summer rainfall. Average daily demand also varied widely among the eight local authorities.

Figure 5
Average and peak drinking water consumption per person per day for the eight local authorities

Local authority	Household water meters?	Average drinking water consumption (litres per person per day)	Peak drinking water consumption (litres per person per day)
South Taranaki District Council	No	408 (excluding farms) 888 (including farms)	426 (excluding farms) 1016 (including farms)
Kapiti Coast District Council	No	404-763, depending on the supply	662-1478, depending on the supply
Central Otago District Council	Some*	228-1169, depending on the supply	Up to 4000
Nelson City Council	Yes	180 (residential only) 500 (all users)	775 (all users)
Christchurch City Council	Yes	435	**
Tasman District Council	Yes	250-375 for larger supplies*** 125-250 for smaller supplies***	**
Opotiki District Council	Yes	300	**
Tauranga City Council	Yes	198 (residential only) 270 (all users)	500 (all users)

Note: Each local authority collects water use data in different ways, so comparisons need to be made with caution.
* Some supplies are partially metered.
** Data not included here because it was not calculated in litres per person per day and therefore was not comparable.
*** Excludes system leakage.

Growth expectations

4.15 All of the eight local authorities had population forecasts based on population growth estimates provided by Statistics New Zealand. Statistics New Zealand provides high, medium, and low population growth scenarios at five-year intervals up to 2031. Generally, the local authorities based their forecasting on a scenario of medium growth. We consider this reasonable. The exception was Opotiki District Council, which based its forecasting on the high-growth scenario despite a recent decline in population growth.

4.16 Some of the eight local authorities commissioned research to better understand the likely population growth in their districts, such as where growth was likely to occur and the potential implications for infrastructure (see Figure 6). We support this approach, especially for those local authorities facing relatively high rates of population growth, because it enables the local authorities to test the appropriateness of the scenarios from Statistics New Zealand.

Figure 6
Tasman District Council's growth demand and supply model 2008

During 2008, Tasman District Council prepared a growth model to support its 2009-19 LTCCP. The Council divided the district into 17 settlement areas, because the district has a number of dispersed communities that are quite distinct from each other.

Using geographic information systems software, existing land use in the 17 areas was mapped and land available for development was identified. This established the "supply" of land available. Data on settlement form, existing infrastructure and services, productivity of land, hazards, and the sensitivity of the environment were added.

Estimates of residential population growth were added to establish "demand". The Council adopted population projections consistent with the medium-growth scenarios provided by Statistics New Zealand for all areas except Motueka and Richmond, where a high-growth scenario was used. The Council used consultants to research estimated growth in industrial, commercial, and retail activities, and therefore the likely demand for business land.

This information was used to model and map the supply and demand of land available for development, and where it could or should occur.

For drinking water, the 17 settlement areas were further divided into 258 development areas. Combined with existing water use data, the growth model was used to forecast water demand in the district for the next 10 years.

4.17 Five of the eight local authorities also incorporated information on predicted growth in household numbers (Kapiti Coast District Council, Nelson City Council, South Taranaki District Council, Tauranga City Council, and Tasman District Council). This information can be important because new connections to the water supply affect the level of demand.

4.18 Those local authorities with large commercial or industrial sectors had prepared growth predictions for those sectors (Tauranga City Council and Nelson City Council).

4.19 Of the eight local authorities, only South Taranaki District Council and Tasman District Council had rural water schemes of a significant size. South Taranaki District Council has carried out some useful research to help it form predictions about increased water demand and growth in the rural sector.

Demand forecast risks and assumptions

We found little documented evidence that forecasts were verified or checked using historical data to confirm their reliability. The eight local authorities had outlined the assumptions associated with their forecasts.

4.20 The eight local authorities had outlined the assumptions associated with their forecasts for drinking water. Some used a limited set of assumptions. For example, they used only estimated population growth and projected water use. Others used a more detailed set of assumptions.

4.21 We saw very little evidence that the eight local authorities verified their forecasts or checked their forecasts using historical data (that is, put historical data through the forecasting model to see whether the resulting forecast is close to actual current water use). We also saw little evidence that forecasts were peer reviewed.

4.22 Only Tauranga City Council provided evidence of some verification of its forecasts. The Smart Growth programme[4] provides for regular and timely monitoring and review to ensure that actual growth circumstances are evaluated, and that the strategy is modified when necessary. It aims to ensure that planning decisions are based on the best information.

Methods used to calculate demand forecasts

Three of the eight local authorities relied on forecasts based solely on a linear relationship between population growth and historical water use. Two used forecasts that used additional information on factors influencing demand. Three had forecasts using yet more detailed analysis of demand factors and more accurate data about actual water consumption.

4.23 Demand forecasts can vary from simple linear trends (for example, assuming a direct linear relationship between water use and population growth) to regression models based on historical trends in a number of factors that may influence demand. Given the different circumstances of local authorities, a range of forecast methods is acceptable. For example, a linear trend method would be acceptable for a small local authority with an abundant water source. However, a large local authority or one with supply issues would need to use a more sophisticated approach.

4.24 Three of the eight local authorities (Central Otago District Council, Christchurch City Council, and Opotiki District Council) used demand forecasts based on an assumed linear relationship between predicted population growth and historical water production. However, Christchurch City Council has a strategy for improving

4 The Smart Growth programme (led by Environment Bay of Plenty, Tauranga City Council, Western Bay of Plenty District Council, and tāngata whenua) facilitates integration between district planning and infrastructure provision to manage growth in the Western Bay of Plenty district.

the sophistication of its forecasting. It has prepared a demand forecasting model that it will use in future.

4.25 Two of the eight local authorities (Kapiti Coast District Council and South Taranaki District Council) used a linear model but showed a more complex understanding of demand factors. For example, they had identified more demand factors, analysed water consumption patterns for different sectors, and improved the quality of their data as a result of research. These local authorities were not yet able to model the potential effect of any strategies on future demand.

4.26 Three of the eight local authorities (Nelson City Council, Tasman District Council, and Tauranga City Council) had prepared forecasts that used more detailed analysis of demand factors and more accurate data about water use (because all households have water meters). Nelson City Council and Tauranga City Council have a modelling capacity that enables them to examine the potential effect of any strategies on future demand.

4.27 Figure 7 summarises the results of the forecasts prepared by the eight local authorities. It shows the forecast increased demand in terms of the additional amount of water likely to be needed (expressed as a percentage increase on current consumption).

Figure 7
Increased demand for drinking water forecast by the eight local authorities

Local authority	Current water production (base = 0)	2015 forecast	2020 forecast	2025 forecast	2050 forecast
		Additional water needed (%)	Additional water needed (%)	Additional water needed (%)	Additional water needed (%)
Central Otago District Council		30	45	Not forecast	Not forecast
Kapiti Coast District Council		10	35	50	Not forecast
Tauranga City Council		20	30	45	Not forecast
Tasman District Council		15	25	35	Not forecast
Christchurch City Council		10	15	20	40
Opotiki District Council		5	10	Not forecast	Not forecast
Nelson City Council		Not forecast	5	10	(5)
South Taranaki District Council		(10)*	0	5	Not forecast

Note: Figures are based on our approximation of the forecast demand and rounded to the nearest 5%.

* This figure is based on an assumption that demand management strategies will be effective.

Effectiveness of forecasting

Five of the eight local authorities used demand forecasting that would be considered the minimum in terms of industry standards. This is problematic for local authorities needing to build new infrastructure or facing restrictions on their access to water. They could spend money on infrastructure that is not the right size for their needs, and could put more pressure on water sources than they need to.

4.28 Five of the eight local authorities used demand forecasting that does not fully meet the core asset management planning criteria in the *International Infrastructure Management Manual* (2006) (see Figure 8). This would be considered the minimum in terms of industry standards. In our view, the other three local authorities are at an intermediate level because they have met the core criteria but not all of the advanced criteria.

Figure 8
Comparing the asset management planning of the eight local authorities with the criteria set out in the *International Infrastructure Management Manual* (2006)

Local authority	Size*	Core asset management planning criteria		Advanced asset management planning criteria	
		10-year demand forecasts using latest growth forecasts	Demand management strategies and demand drivers are understood and documented	Demand forecasts include analysis of different factors comprising demand	Sensitivity of asset development (capital works) programmes to demand changes are understood
Opotiki District Council	1	Yes	**	No	No
Central Otago District Council	2	Yes	Partly	No	No
Christchurch City Council	6	Yes	Partly	No	No
South Taranaki District Council	3	Yes	Partly	Partly	No
Kapiti Coast District Council	4	Yes	Partly	Partly	No
Tasman District Council	4	Yes	Partly	Yes	No
Nelson City Council	4	Yes	Yes	Yes	Partly
Tauranga City Council	5	Yes	Yes	Yes	Partly

*We devised these size groups to help with the 2006 LTCCP audit process. We used six variables. Three relate to external constraints (population, rates to median income, and population to area) and three relate to internal constraints (full-time equivalent staff, debt to equity, and other council income). Broadly, 1 indicates a small local authority and 6 indicates a large local authority.

** There was not enough data available for us to form a view.

4.29 There was some correlation between the size of the local authority and how detailed its forecasting was. With the exception of Christchurch City Council, the larger local authorities had more sophisticated forecasts.

4.30 However, the context in which the eight local authorities operated also seemed to be a strong influence on how detailed their forecasting was.

4.31 Unsurprisingly, those local authorities that have experienced population growth for some time and/or were operating near the capacity of their drinking water supplies (for example, Tauranga City Council and Tasman District Council) have prepared a more complex analysis of the variables they need to consider.

4.32 Those local authorities with low rates of population growth and/or operating well within the capacity of their drinking water supplies (for example, with access to abundant water), such as Opotiki District Council and Christchurch City Council, did not have highly detailed forecasts. They had taken into account only predicted population growth and historical water consumption and assumed a linear relationship between the two. These local authorities estimated that they had enough supply capacity and water sources to accommodate more future growth than was predicted, by a large margin.

4.33 Four of the local authorities used water production data as a proxy for water use (South Taranaki District Council, Central Otago District Council, Kapiti Coast District Council, and Christchurch City Council). Estimating water use in this way is likely to produce water demand forecasts that are higher than actual demand, because the forecasts include water lost to leaks before reaching consumers as well as the water that is actually used. These local authorities did not take into account any possible water savings (through leak detection and repair, system efficiencies, or conservation).

4.34 This approach may be acceptable for local authorities that have very little growth or are operating well within the capacity of their supply systems (for example, Opotiki District Council or Christchurch City Council). The underlying assumption is that current water use will continue and there is little risk of running out of water in the circumstances outlined above.

4.35 However, relying on a high estimate may result in infrastructure that is larger than it needs to be. This places an additional and unnecessary financial burden on ratepayers. It may also mean that more pressure is put on water sources than there needs to be. This approach is more problematic for local authorities needing to upgrade existing infrastructure or build new infrastructure, or facing restrictions on their access to water (such as South Taranaki District Council, Central Otago District Council, and Kapiti Coast District Council).

Recommendation 1

We recommend that local authorities use accurate and up-to-date information to prepare drinking water demand forecasts to reduce the risk of under- or over-investing in water supply infrastructure. In particular, this needs to include accurate and up-to-date information on water consumption.

Recommendation 2

We recommend that local authorities verify the reliability of drinking water demand forecasts to reduce the risk of under- or over-investing in water supply infrastructure.

Part 5
Implementing relevant legislation and national and regional policies

5.1 In this Part, we discuss the eight local authorities' progress with implementing:

- the Health (Drinking Water) Amendment Act 2007;
- the drinking water standards;
- the Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007; and
- the *Proposed National Policy Statement for Freshwater Management*.

We also discuss the local authorities' compliance with national and regional policies and plans.

5.2 We expected the eight local authorities to be aware of, and be taking steps to implement, legislation and national policies affecting the supply of drinking water. We also expected them to be complying with regional plans under the Resource Management Act 1991.

Our overall findings

5.3 All eight local authorities had met national and regional planning requirements for supplying drinking water.

5.4 All eight local authorities were making steady progress in preparing the public health risk management plans required by the Health (Drinking Water) Amendment Act 2007. A recent extension of deadlines has given them more time to fully comply with the Act's requirements.

5.5 All eight local authorities had assessed what they need to do to comply with the drinking water standards. They were making changes and spending more on supplying drinking water because of those assessments. Five of the local authorities need to upgrade their infrastructure, especially the local authorities that had previously had poor water quality gradings.

5.6 All of the eight local authorities held the relevant resource consents for their drinking water supplies.

Health (Drinking Water) Amendment Act 2007

All eight local authorities were aware of, and taking steps to implement, the requirements of the Health (Drinking Water) Amendment Act 2007. The eight local authorities were making steady progress in preparing the required public health risk management plans and, after a recent extension of deadlines, should be able to meet the statutory deadline for the plans.

5.7 Under the Health (Drinking Water) Amendment Act 2007, all suppliers that provide drinking water to communities of more than 500 people must prepare and start to implement a public health risk management plan to guide the safe management of their drinking water supply. These plans will affect how drinking water is supplied to meet future demand because they relate to the quality of the water that is supplied. Implementing the plans might mean an investment in upgraded infrastructure.

5.8 Suppliers have staggered deadlines for compliance, spread over several years and based on the size of the population served by the drinking water supply. In June 2009, the Government extended the original deadlines by three years, effective from 1 July 2009, to ease the financial burden on local authorities.

5.9 Figure 9 provides a summary of the progress that the eight local authorities have made in preparing public health risk management plans. It also shows the deadlines for having those plans prepared and approved.

5.10 Five of the eight local authorities have water supply systems that supply drinking water to communities with more than 10,000 people (see Appendix 1 for more information). Of the five, three have made excellent progress (Christchurch City Council, Kapiti Coast District Council, and Tauranga City Council) because they have plans for those systems approved by drinking water assessors from the Ministry of Health. Nelson City Council has yet to prepare a plan. Tasman District Council has yet to get the plan for its large supply approved.

5.11 Six of the eight local authorities have water supply systems that supply drinking water to smaller communities (less than 10,000 people). Of the six, Central Otago District Council and Christchurch City Council have made excellent progress and have plans approved for all of their supplies. South Taranaki District Council has draft plans prepared for almost all of its supplies. Opotiki District Council and Tasman District Council have prepared draft plans for some but not all of their systems. Kapiti Coast District Council has yet to prepare plans for its smaller supply systems. Because the deadlines have been extended, the local authorities now have time to comply.

Figure 9
Progress of the eight local authorities in preparing public health risk management plans for drinking water supply systems

Local authority	Size of water supply system	Deadline for plans	Status of public health risk management plans, as at June 2009
Tauranga City Council	1 large	2012	Approved plan
Nelson City Council	1 large	2012	Plan being prepared
Kapiti Coast District Council	1 large 2 medium 1 minor	2012 2013 2014	Approved plan for the large supply No plans prepared for the other three supplies
Tasman District Council	1 large 8 minor 5 small 2 neighbourhood	2012 2014 2015 2016	Approved plans for two (Tapawera and Upper Takaka) of 16 supplies
Opotiki District Council	1 minor 2 small 1 neighbourhood	2014 2015 2016	Approved plan for one small supply (Te Kaha) No plans prepared for the other three supplies
Christchurch City Council	1 large 2 minor 5 small 1 neighbourhood	2012 2014 2015 2016	Approved plans for all supplies
Central Otago District Council	5 minor 2 small 2 neighbourhood	2014 2015 2016	Approved plans for all supplies
South Taranaki District Council	1 medium 3 minor 4 small 5 rural agricultural	2013 2014 2015 2016	Draft plans for 11 of 13 supplies

5.12 The approved plans demonstrate a detailed approach to identifying and managing the risks to supplying drinking water. However, it is too soon for us to form a view about the effectiveness of the local authorities' efforts to implement those plans.

5.13 Opotiki District Council and Central Otago District Council have been encouraged to prepare public health risk management plans by the opportunity to apply for financial assistance from the Ministry of Health to upgrade their drinking water supplies. Drinking water supplies that serve communities of fewer than 5000 people and are owned by local authorities are eligible for capital assistance, if they meet certain criteria. The criteria include having approved public health risk management plans.

Drinking water standards

All eight local authorities have assessed what they need to do to comply with the drinking water standards. Those assessments had contributed to the changes the local authorities were making and their increased expenditure on supplying drinking water. Five of the local authorities need to upgrade their infrastructure, especially those that have previously received poor grades for their water quality.

5.14 The drinking water standards govern the quality of the drinking water provided to consumers. They prescribe the maximum allowable concentrations of potentially harmful contaminants in the water. Drinking water suppliers have a duty to take all practicable steps to provide water of a quality consistent with the drinking water standards. Figure 10 summarises the drinking water grades for the eight local authorities. (Appendix 3 includes full definitions of these grades.)

5.15 Local authorities are not required to achieve a particular grade, but five local authorities have chosen to aim for specific grades as part of their approach to service delivery. This decision will affect their strategies to meet the forecast demand for drinking water, because the strategies need to include how the desired water quality will be achieved.

Figure 10
Current and previous drinking water standard grades for the eight local authorities

Local authority	Grade under the current drinking water standards	Grade currently aiming for	Grade under earlier drinking water standards (year of grading)
Tauranga City Council	Ungraded and requires minor improvements to monitoring equipment to comply with the standards	Aa	Aa (2005)
Nelson City Council	Ab	Aa	Ed (up to 2005)
Tasman District Council	Ungraded and requires upgraded infrastructure to comply with the standards	Bb (Richmond) Cc (rest of the district)	Ungraded
Kapiti Coast District Council	Ungraded and requires upgraded infrastructure to comply with the standards	Not specified	Aa, Ca, Db, and Ba (1995)
Opotiki District Council	Ungraded and requires upgraded infrastructure to comply with the standards	Not specified	De, Ec, and Dc (2000)
Christchurch City Council	Da (northwest of Christchurch City)	Ba (northwest of Christchurch City)	Ungraded
	Ba (rest of Christchurch City)	Ba (rest of Christchurch City)	
	Ee (Banks Peninsula)	Cc (Banks Peninsula)	
Central Otago District Council	Ungraded and requires upgraded infrastructure to comply with the standards	Bb (for larger supplies) Cc (for smaller supplies)	Eb (2003)
South Taranaki District Council	Ungraded and requires upgraded infrastructure to comply with the standards	Not specified	Ungraded

Note: Under the drinking water standards, "A" grades are considered completely satisfactory, "B" grades are satisfactory, "C" grades are marginally satisfactory, "D" grades are unsatisfactory, and "E" grades are unacceptable.

5.16 Of the eight local authorities, one (Nelson City Council) already complies with the drinking water standards. Tauranga City Council is complying with the standards at one of its water treatment plants, and needs only minor improvements to its monitoring equipment at the second water treatment plant. Some water supplies provided by Christchurch City Council comply with the standards, but the Banks Peninsula supplies do not and need upgraded infrastructure to do so.

5.17 The other five local authorities all need to upgrade their infrastructure, especially those local authorities that have previously had their water graded as "C" or lower. A common reason for low grades is that water sources are not secure, so the water needs more treatment to remove the risk of a wider range of contaminants.

5.18 The planning that local authorities are doing to comply with the drinking water standards is driving change and investment in how they supply their drinking water. The local authorities have identified the need for infrastructure upgrades to comply with drinking water standards. We further discuss the strategies that these local authorities have planned for complying with the drinking water standards in Part 6.

Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007

All eight local authorities are aware of the National Environmental Standard. However, because they are not primarily responsible for implementing it, it has not yet started to influence how they manage the supply of drinking water.

5.19 Regional councils are primarily responsible for implementing the Resource Management (National Environmental Standards for Sources of Human Drinking Water) Regulations 2007 (the National Environmental Standard).[5]

5.20 The National Environmental Standard aims to reduce the risk of contamination of drinking water supplies by requiring regional councils to consider the effects of certain activities on drinking water sources. It does this by requiring regional councils to decline applications for discharge and water permits that could result in drinking water becoming unsafe for human consumption, and by preventing the inclusion of permitted activity rules in regional plans, if they will cause drinking water to still be unsafe to drink after the existing treatment processes. It should provide opportunities for drinking water suppliers to influence catchment management in areas they take water from, to reduce the potential for contamination and subsequent treatment requirements.

5.21 Seven of the eight local authorities were paying some attention to water catchment management, but it was limited. Only Tauranga City Council had made a commitment to preparing a water catchment management plan.

5 Statutory regulation 2007/396.

The *Proposed National Policy Statement for Freshwater Management*

5.22 Under the Resource Management Act 1991, the Ministry for the Environment has proposed a national policy statement for freshwater management. The purpose of the *Proposed National Policy Statement for Freshwater Management* is to set out some national objectives and policies for managing freshwater resources. At the time of our audit, it was moving through a submission and hearing process and was not yet operative.

5.23 The *Proposed National Policy Statement for Freshwater Management* includes a draft policy that is aimed at giving "priority for reasonably foreseeable domestic water supply, over other competing demands, provided that appropriate demand strategies are established for such supply".[6] This will be of benefit to drinking water suppliers in areas where there is strong competition for access to water, because it should help to ensure that their access to water is protected when need be.

Complying with relevant national and regional policies and plans

All of the eight local authorities held the relevant resource consents required under the Resource Management Act 1991.

5.24 Under the Resource Management Act 1991, regional councils are responsible for managing freshwater. That responsibility includes allocating water, and responsibility for the quality of the freshwater. Regional policy statements and regional plans set out the framework for this.

5.25 Resource consents are usually required for taking water for drinking water supply, but the specific requirements vary from region to region according to the provisions of regional plans.

5.26 All eight local authorities held the relevant resource consents for their drinking water supply activities. There were some instances of non-compliance with consent conditions in one local authority (South Taranaki District Council).

6 Policy 1(i)(ii). Ministry for the Environment (2008), *Proposed National Policy Statement for Freshwater Management*, Ministry for the Environment, Wellington, page 5.

Part 6
Deciding on strategies for meeting the forecast demand

6.1 In this Part, we discuss:

- the main challenges to meeting the forecast demand for drinking water;
- the strategies chosen by the eight local authorities to meet the forecast demand;
- how local authorities assessed the strategy options for meeting the forecast demand;
- the information they had used for strategy development;
- their levels of service and performance reporting; and
- areas for improvement.

Our overall findings

6.2 All of the eight local authorities had identified their main challenges to meeting the forecast demand for drinking water.

6.3 Those local authorities effectively managing their drinking water supply to meet the forecast demand had consistently used a wide range of supply and demand strategies. They were also more likely to have an ongoing focus on water supply efficiency.

6.4 Those local authorities adequately or poorly managing their drinking water supply were using a more limited range of supply and demand strategies or had been less consistent in the implementation of chosen strategies.

6.5 The local authorities had two approaches to assessing the strategy options for meeting forecast demand. Four had recently completed a major strategic review to identify options for meeting the forecast demand. The other four assessed options for meeting demand as an ongoing part of asset management.

6.6 However, the evaluation of the costs and benefits of options was variable and limited. The types, quality, and quantity of information used varied widely. Five of the eight local authorities had incomplete asset management information and two had better information. The eighth had a lot of information but its systems did not allow it to make best use of that information.

6.7 The performance measures and levels of service varied widely and, in some cases, were poorly defined. This is generally consistent with findings we reported in 2008 (see *The Auditor-General's observations on the quality of performance reporting*).[7]

7 Available on our website, www.oag.govt.nz.

Main challenges to meeting the forecast demand for drinking water

All of the eight local authorities had identified their main challenges to meeting the forecast demand for drinking water.

6.8 The most common challenges in meeting the forecast demand for drinking water were:

- upgrading infrastructure to comply with the drinking water standards (this was a challenge for six of the eight local authorities);
- improving the efficiency of water supply systems (four local authorities);
- managing demand for drinking water in order to reduce consumption (four local authorities);
- accessing new sources of water to increase the quantity of water available (four local authorities);
- improving information available for forecasting, planning, and asset management (four local authorities); and
- funding infrastructure upgrades (three local authorities).

6.9 Six of the eight local authorities need upgraded infrastructure to comply with the drinking water standards. The other two may need some upgraded infrastructure to improve their water grades (discussed in Part 5). The upgrades mostly involve improved water treatment plants that are able to remove a wider range of potential contaminants.

6.10 Four of the eight local authorities (Central Otago District Council, South Taranaki District Council, Kapiti Coast District Council, and Tasman District Council) had identified problems with the efficiency of their drinking water supplies. An indicator of this is how much water is unaccounted for or lost (that is, not apparently used by a consumer). The efficiency of water supplies matters when it comes to meeting the forecast demand. For example, the demand for water may appear to be more than it actually is if supplies are leaking, resulting in infrastructure and expenditure that is larger than it needs to be. The suppliers of drinking water need to give priority to minimising "unaccounted for" water, fixing leaks within the distribution network, and assessing water pressure reduction possibilities (because high pressure increases the potential for leaks).

6.11 These four local authorities have also identified managing demand to reduce consumption as a challenge.

6.12 Four of the eight local authorities needed to find new sources of water to meet the forecast demand. In three districts, this was a particular challenge because the

potential supply was limited (South Taranaki District Council, Kapiti Coast District Council, and Tasman District Council). Access to water was becoming more problematic as water resources in some catchments approached full allocation (for example, some surface water resources in South Taranaki were nearly fully allocated). The South Taranaki, Kapiti Coast, and Tasman districts also experience drought, which further reduces the availability of water at times.

6.13 Some regional councils, such as Taranaki Regional Council and Environment Canterbury, are starting to link access to water with demand management. This means that drinking water suppliers will need to show they are managing demand and reducing consumption as part of their planning. This approach is expected to contribute to the overall sustainability of water resources.

6.14 Three of the eight local authorities (Central Otago District Council, Kapiti Coast District Council, and South Taranaki District Council) faced most, if not all, of the challenges identified in paragraph 6.8. Cumulatively, this is more challenging because it results in a requirement to upgrade much of a drinking water supply system rather than parts of it.

Strategies chosen by the eight local authorities

The local authorities that were well placed to meet the forecast demand for drinking water focused on water supply efficiency, and consistently used a wide range of supply and demand strategies. Local authorities that were less well placed were using a more limited range of options.

Supply strategies

6.15 Figure 11 summarises the range of strategies that the eight local authorities chose to manage their drinking water.

6.16 All eight were planning for maintenance and renewals, and had proposals for new or replacement infrastructure (as evidenced by asset management plans and LTCCPs).

6.17 Four of the eight local authorities (Central Otago District Council, Kapiti Coast District Council, Opotiki District Council, and South Taranaki District Council) had only recently started to focus on making their drinking water supplies more efficient. They have more work to do.

6.18 Two of the local authorities (Tauranga City Council and Christchurch City Council) reported water losses within the industry standard of 10-20%. The other six could not accurately estimate water losses. Of the six, five (Central Otago District Council, Nelson City Council, Tasman District Council, Kapiti Coast District Council, and South Taranaki District Council) were actively carrying out research to identify the extent of water loss.

6.19 Only Tauranga City Council reported an active leak control programme that included measuring performance using the Water New Zealand[8] Infrastructure Leakage Index. It achieves good to excellent ratings on that Index. Christchurch City Council will begin an active leak detection programme in 2009/10 by inspecting at least 12.5% of its water supply network each year, with an emphasis on repairing the larger leaks first.

Figure 11
Strategies used by the eight local authorities to meet the forecast demand for drinking water

	Tauranga City Council	Nelson City Council	Tasman District Council	Kapiti Coast District Council	Opotiki District Council	Christchurch City Council	Central Otago District Council	South Taranaki District Council
Supply strategies								
Ongoing capital upgrades and renewals programme	√	√	√	√	√	√	√	√
Significant upgrades to existing infrastructure		√				√	√	√
Building new drinking water supply infrastructure	√		√					
Looking for new sources of water	√	√	√	√			√	√
Assessing non-potable sources of supply, such as greywater	√	√	√	√				
Ongoing leak detection and water loss programme	√		√	√		√		
Ongoing pressure management programme	√	√	√					
Investigating and improving management of water losses and other system efficiencies	√	√		√			√	√
Using a supply standard to reduce the quantity of water supplied	√			√		√		
Taking development contributions	√	√	√	√		√	√	
Water Supply Bylaw 2008	√ (Adopted in 2007)	√	√		√	√	√	

8 Water New Zealand is a national not-for-profit sector organisation comprising more than 1500 corporate and individual members in New Zealand and overseas. It represents the water sector, focusing on sustainable management and promoting the water environment. It encompasses fresh, waste, and storm waters.

	Tauranga City Council	Nelson City Council	Tasman District Council	Kapiti Coast District Council	Opotiki District Council	Christchurch City Council	Central Otago District Council	South Taranaki District Council
Complying with the drinking water standards	√ (1 plant)	√				√ City		
Planning to upgrade existing infrastructure to comply with the drinking water standards	√ (1 plant)		√	√	√	√ Banks Peninsula	√	√
Preparing integrated catchment management plan for water supply catchment	√							
Proposing District Plan changes to require all new homes to install rainwater tanks and/or greywater systems for toilets and lawn irrigation				√				
Demand strategies								
Using some metering and/or charging (volumetric pricing)						√	√	
Using universal metering and charging (volumetric pricing)	√	√	√ urban supplies		√			
Investigating universal water metering and charging				√			√	√
Running a public conservation education programme (information and free services to ratepayers)	√			√				
Running a public conservation education programme (information)		√	√		√	√	√	√
Running a schools education programme	√							
Preparing a general water conservation policy or demand management policy					√	√		
Using water restrictions when required	√	√	√	√			√	√
Using policy on use of compulsory dual-flush toilets, low-flow showerheads, and rainwater tanks			√					

Demand strategies

6.20 All eight local authorities had public conservation education programmes aimed at reducing consumption. The programmes generally included providing consumers with information about the need for conserving water (through mailouts, websites, and local media sources). The information might be supported by water restrictions, depending on pressure on the water resource. These sorts of programmes can be useful, but there is little evidence that they significantly reduce consumption.

6.21 Two of the eight local authorities (Tauranga City Council and Kapiti Coast District Council) had extended this approach to offering free advice to consumers on water conservation and efficient water use through home visits and workshops (see Figure 12).

Figure 12
Kapiti Coast District Council's conservation and water efficiency programmes

The Council offers free advice through two initiatives – *Green Gardener* and *Green Plumber*.

Green Gardener publishes articles and offers workshops and home visits to provide tips for improving the health of a garden and reducing water needs. *Green Gardener* encourages residents to reduce reliance on town water by using water efficiently and installing a rainwater tank, or installing a bore or greywater system to irrigate lawns.

Green Plumber replaces washers on leaking toilets, taps, and showers for free. *Green Plumber* will also help homeowners locate major leaks and offers workshops on simple plumbing maintenance. *Green Plumber* will also visit homes and offer advice on rainwater tanks, bores, and greywater.

6.22 Nelson City Council, Opotiki District Council, and Tauranga City Council used universal water metering and charging to manage demand (as well as for funding purposes). Tasman District Council used water metering and charging for all of its urban water supplies. However, as at September 2009, only 11 of the 73 territorial authorities in New Zealand had universal water metering and charging in place.

6.23 Christchurch City Council had universal water metering but charged only its commercial and industrial consumers. Central Otago District Council is progressively installing water meters and had budgeted $3 million in its 2009-19 LTCCP for this purpose. South Taranaki District Council was actively investigating the use of water metering and charging.

6.24 Water metering and volumetric charging can be used in several ways to improve the efficiency of water supplies and reduce the investment required from ratepayers. It reduces demand and can be used to identify leaks.

6.25 The four local authorities that used metering and charging recorded lower residential water consumption rates than those local authorities not using water metering and charging (see Figure 13).

Figure 13
Drinking water consumption in the eight local authorities

Local authority	Household water meters?	Charge for water used?	Average drinking water consumption (litres per person per day)
Tauranga City Council	Yes	Yes	198 (residential only) 270 (all users)
Opotiki District Council	Yes	Yes	300
Nelson City Council	Yes	Yes	180 (residential only) 500 (all users)
Tasman District Council	Yes	Yes (for urban supplies)	250-375 for larger supplies 125-250 for smaller supplies
Christchurch City Council	Yes	No	435
Central Otago District Council	Some	No	228-1169, depending on the supply
Kapiti Coast District Council	No	No	404-763, depending on the supply
South Taranaki District Council	No	No	408 (excluding farms) 888 (including farms)

6.26 Tauranga City Council estimated that the 2002 introduction of water metering and charging on a volumetric basis had reduced average daily water demand by about 25%. It also estimated that metering and other demand management initiatives had enabled it to defer investment in a new water source by 10 years. It meant that existing water resources would be able to provide for 50,000 additional people in future years.

6.27 Charging for water use is based on recovering the costs of supplying drinking water. We found no evidence that the local authorities were pricing with the intent of reducing demand to a specified level.

6.28 However, two of the local authorities have introduced targets for reducing demand to a specified level. Christchurch City Council's 2009-19 LTCCP includes performance standards for reducing the drinking water delivery from 369m^3

per property each year to 325m^3 (plus or minus 10%) per property each year by 2019/20. Tauranga City Council had set a performance measure related to average consumption of drinking water, with a target of decreasing it each year over the 10 years from a baseline set at the actual level in 2008/09.

Combining a range of strategies

6.29 Those local authorities effectively managing their drinking water to meet the forecast demand had consistently combined a strong emphasis on both supply and demand strategies (Tauranga City Council and Nelson City Council). Figure 14 sets out Tauranga City Council's supply and demand strategies.

Figure 14
Tauranga City Council's range of strategies to meet the forecast demand for drinking water

Supply strategies	Demand strategies
Developing a new source of water supply Ongoing investment in capital upgrades and renewals programme Leak control programme and monitoring of real water losses Pressure management programme Distribution and passive leakage control Taking development contributions Preparing integrated catchment management plan Investigating alternative water sources and emerging technologies, such as greywater use and rainwater harvesting	Universal metering and charging introduced in 2002 Waterline programme – free service promoting efficient water use (new money for a third education person) Schools education programme

6.30 Those local authorities adequately or poorly managing their drinking water supplies were using a more limited range of options or had been less consistent in the implementation of chosen strategies. For example, Kapiti Coast District Council appeared to be largely implementing supply strategies, despite previous commitments to demand management strategies. There was more it could be doing to reduce demand, compared with some of the other local authorities in our sample.

6.31 Others of the eight local authorities were using a more limited range of strategies but were planning to use more in the future. For example, Figure 15 sets out the demand management improvements Tasman District Council proposed to implement.

Figure 15
Tasman District Council's planned demand management improvements

Task	Description of task	Cost estimate	Year
Bulk meter installation and night flow monitoring	Bulk meter assessment Installation of bulk meters (10 assumed) Night flow monitoring	$10,000 $60,000 $25,000	2009-2019 2009-2019 2009-2019
Further demand analysis	Collate, process, and assess demand data	$25,000	2010/11
Assess level of water loss	Undertake water balance in each scheme and assess economic level of leakage to prioritise leak reduction	$20,000	2012/13
Proactive leak reduction in pilot community	Develop a leakage reduction programme in a pilot community to prioritise high leakage areas	$40,000	2012/13
Hydraulic modelling upgrades	Recalibrate Waimea and Richmond supply system Recalibrate Mapua supply system Recalibrate Brightwater supply system Recalibrate Wakefield supply system	$45,000 $25,000 $25,000 $25,000	2009/10 2010/11 2015/16 2015/16
Meter replacement programme	Develop a database of bulk and customer meters and develop a proactive meter replacement programme	$20,000	2010/11
Cost-benefit analysis	Assess relevancy of demand management measures to each scheme and undertake a high-level cost-benefit analysis for the short-listed options	$20,000	2011/12
Demand management plans	Develop a water demand management implementation plan for each scheme	$25,000	2012/13
Pressure management	Assessment of potential pressure-managed areas and implementation of pilot study area (assumed 2 valves and 2 pressure-reducing valves)	$30,000	2012/13
	Total	**$395,000**	

Source: Tasman District Council (2009), Tasman District Council Water supply activity management plan 2009-2019, Tasman District Council, Richmond.

6.32 An ongoing focus on water supply efficiency also distinguished those local authorities well placed to meet future demand from those less well placed to do so. As mentioned in paragraph 6.18, two of the selected local authorities reported water losses within the industry standard of 10-20% (Tauranga City Council and Christchurch City Council). The other six were not able to accurately estimate their water losses. Initial calculations by Central Otago District Council indicate potential water losses during winter ranging from 40% to 80%, depending on the water supply system. This range is significantly above the industry standard.

Other potential strategies

6.33 Some potential strategies were little used by the eight local authorities, including:

- re-using wastewater and storm water;
- carrying out proactive catchment management;
- promoting water-efficient technologies; and
- preparing comprehensive demand management plans.

Assessing the strategy options for meeting forecast demand

The local authorities had taken two approaches to assessing the strategy options – either carrying out a major strategic review or as an ongoing part of asset management. The types, quality, and quantity of information, and cost/benefit evaluation, were variable and limited. Five had incomplete asset management information, two had detailed information, and one had a lot of information but its systems did not allow it to make best use of that information.

6.34 We expected the eight local authorities to have identified a range of possible options for meeting the forecast demand for drinking water before choosing strategies. We also expected them to have assessed the suitability of the options for their district and for communities within their district.

6.35 The local authorities took two approaches to this. Two (Tauranga City Council and Nelson City Council) used an ongoing process of assessing whether current water supply systems were capable of meeting the forecast demand and, if not, identifying those matters that needed to be addressed. This was generally an ongoing part of asset management planning. Tauranga City Council supplemented its approach with specialist reports when required (for example, on building a new water supply system).

6.36 Four of the eight local authorities had recently carried out a major strategic review, including public consultation, to establish what the challenges were and identify options for meeting the forecast demand (Central Otago District Council, Christchurch City Council, Tasman District Council, and South Taranaki District Council). Figure 16 sets out an example of this.

Figure 16
South Taranaki District Council's non-statutory drinking water supply strategy

The District Water Supply Strategy (September 2007) sets out a framework for upgrading water supply in South Taranaki. It is focused on:

- reliability of supply – increasing reservoir capacity;
- connecting the schemes to provide more resilience and to reduce vulnerability to loss of supply;
- new sources of supply (bore water);
- demand management (leak detection and conservation); and
- complying with the drinking water standards.

Specific capital works to implement the strategy will be identified in LTCCPs. This strategy also includes expanding water supply into new areas of the district.

Water supply activity since 2006 includes:

- between 2006 and 2008: district water supply strategy, public health risk management plans, mains renewals, water resources investigations, a focus on demand management, pressure control, backflow prevention, unaccounted for water, new Kapuni water treatment plant under construction, other water treatment improvements, and new reservoirs for supply security;
- between 2009 and 2010: more planned maintenance, planning for future development, new water supply bylaw, ongoing renewals and replacements, unaccounted for water work continues, two more new water treatment plants under construction, and various upgrades to comply with the drinking water standards; and
- between 2011 and 2015: consolidation of strategies already started, securing new water resources to meet future demand, and further water quality treatment improvements.

The Council plans to fund the infrastructure development programme through loans, with uniform annual charges and metered water rates (where properties are metered) covering the interest and principal over time.

6.37 In our view, the ongoing approach and the major strategic review approach are both acceptable, provided they lead to improved planning and greater integration.

Evaluating the costs and benefits of options

6.38 Six of the eight local authorities were unable to model or assess accurately the effects of demand management strategies because they did not have sufficiently accurate data or the modelling capabilities. Therefore, their ability to quantify the costs and benefits of, for example, increasing water supply versus demand management, was limited. Local authorities in this situation had generally relied on the professional judgement of qualified staff or consultants to identify and prioritise options.

6.39 Further approaches used to evaluate costs and benefits were:

- commissioning studies to evaluate project options;
- identifying and ranking costs and benefits during the preparation of a water supply strategy (see the example about Christchurch City Council in Figure 17);

- commissioning research – for example, a Kapiti Coast District Council domestic water use study that found that leak detection can be very cost-effective (more so than rainwater tanks and greywater use); and
- assessing benefits of demand management by quantifying the savings from deferred expenditure on infrastructure (Tauranga City Council).

Figure 17

Method used by Christchurch City Council to identify and evaluate strategy options

In 2006, Christchurch City Council started preparing a 30-year water supply strategy. It used an internal Council working group in consultation with stakeholders (through surveys and meetings) to identify a variety of options. These options were then roughly priced.

The draft was released in early 2009 for public consultation. Further public consultation occurred as part of the 2009-19 LTCCP process. The extract from the draft strategy below shows some of the options prioritised and priced after that consultation was complete.

Option #	Ranking	Option	Rough order cost (-20% to +50%)	Preferred time frame
1a	M	**N** Benchmarking exercise to determine target economic level of loss	$50,000 – $100,000	2009-10
1b	M	**N** Enhanced water loss reduction programme (if benchmarked economic level of loss less than current level of loss)	$ Unknown (depends on benchmarked level of loss – Option 1a)	2011-12, if needed
2a	H	**L** Pressure zone modelling to optimise equalised pressure management zones	$150,000	2009-10
2b	H	**N** Infrastructure upgrades for new pressure management zones – feasibility study/cost benefit analysis	$130,000	2011-12 to 2012-13
2c	H	**N** Infrastructure upgrades for new pressure management zones – capital programme	$ to be determined (TBD); depends on results of Options 2a and 2b	2013-14 onwards
3	H	**C** North West Zone – installation of UV disinfection systems (some locations in NW zone) and replacement of shallow wells with deeper wells (other locations in NW zone)	$8,600,000 (Capital expenditure) $80,000 (Operating expenditure, per annum)	2012-15

M – medium, H – high, L – included in draft LTCCP for 2009-19, N – not included in draft LTCCP for 2009-19, C – considered as part of the capital programme budget

6.40 We found one example (at Tauranga City Council) of an in-depth analysis of alternatives that included a quadruple bottom-line assessment[9] of various options.

Information used for strategy development

6.41 We expected the eight local authorities to be using accurate water asset management information to help identify and evaluate options. We expected this to include information on the water supply assets, asset age and condition, performance utilisation, capacity, and financial value. We also expected this to include an assessment of the reliability of the information held.

6.42 Five of the eight local authorities had incomplete asset management information (Opotiki District Council, Central Otago District Council, South Taranaki District Council, Kapiti Coast District Council, and Tasman District Council). For example, Central Otago District Council and South Taranaki District Council had recently completed an asset register but had yet to include condition assessment information in it. South Taranaki District Council had limited data about water usage but was progressively upgrading and installing new water meters, which will provide accurate data and assist with improving the efficiency of its water supply.

6.43 Nelson City Council had developed a detailed water asset management information system. It included information about the asset age, size, material, condition (of pipes encountered in maintenance and other operations), performance, capacity, and financial value.

6.44 Tauranga City Council also had detailed and current water asset management information that included asset age and condition, performance utilisation, capacity, and financial value. It had invested in developing and maintaining a detailed computer model of the drinking water supply system, which contained water asset information and formed the basis for integrated planning of the water supply network – from maintenance to asset renewals, to forecasting the implications of future growth on the network.

6.45 Christchurch City Council had a lot of asset management information. However, the information was fragmented, and its asset management system was characterised by several stand-alone systems that were not integrated with its financial systems. The Council had identified the business need to integrate these systems. We were told that progress had been made in the past two years on standardising all its asset management functions, tools, and reporting.

9 A quadruple bottom-line assessment evaluates and measures the return on capital along with financial, social, environmental, and cultural dimensions.

Levels of service and performance reporting

The local authorities' levels of service and performance measures varied widely and, in some cases, the performance targets were poorly defined. This is consistent with previous observations we have made about performance reporting.

6.46 As part of assessing strategy options, we expected the eight local authorities to have performance measures in place, and take into account levels of service for drinking water supply. We expected the performance measures to be:

- specific, measurable, achievable, relevant, and time-bound;
- consistent with industry benchmarks and legal obligations;
- meaningful to consumers; and
- useful as a management tool.

6.47 All of the eight local authorities had performance measures in their LTCCPs related to complying with the drinking water standards and the reliability of supply. We expected this, because it is a legal requirement that they do so. However, the level of detail of these measures and each local authority's target (intention to improve) varied significantly. Variation is not necessarily a problem because these measures should relate to the individual circumstances of each local authority.

6.48 Service levels and performance measures were generally well defined. However, some local authorities had not set specific performance targets in their LTCCP, which makes it hard to track progress. For example, Central Otago District Council stated only that the quality of supply would comply with the drinking water standards. In contrast, Tasman District Council plans to achieve Bb and Cc water quality grades (see Appendix 3 for the definition of grades), while Christchurch City Council is aiming for a gradual improvement of water grades for Banks Peninsula and some city supplies.

6.49 Some of the eight local authorities had measures for the amount of time residents were without drinking water. Some also had a measure for being on site to fix water issues within a certain period. For example, Nelson City Council had a performance measure that residents would have access to a supply of drinking water 99.6% of the time, with a maximum outage time of 24 hours.

6.50 Three of the eight local authorities had a measure to assess consumers' approval of the water supply from an aesthetic perspective (unpleasant taste, odour, or lack of clarity). This is an indicator of the health of the water supply.

6.51 One of the eight local authorities had a performance measure that tracked progress on carrying out capital expenditure projects. We consider this good

practice. Capital expenditure can involve significant amounts of ratepayer funding, so the measure allows for greater transparency for ratepayers. It allows them to see how the different parts of the water supply connect (for example, water quality cannot improve until a new treatment plant is built). We expect that, where there is significant expenditure on capital items, there would also be an increase in the levels of service able to be provided through that expenditure.

6.52 All of the local authorities had integrated their water supply strategies with specific community and regional outcomes in their LTCCPs. This is important because it enables a local authority to demonstrate how the activity will contribute to the overall outcomes it is trying to achieve for the community. However, only two of the local authorities (South Taranaki District Council and Kapiti Coast District Council) clearly reported how specific performance aspects contribute to achieving those outcomes. We consider this good practice.

6.53 Only Christchurch City Council's performance targets increased meaningfully throughout the 10-year planning cycle in the LTCCP.

Areas for improvement

6.54 We have identified some areas where local authorities could improve how they choose strategies for managing their drinking water. Our recommendations are likely to have broad applicability throughout the local government sector. Although they will not be all relevant to every local authority, we encourage local authorities to implement them where appropriate.

Improving the efficiency of existing water supply systems

6.55 In our view, local authorities need to put more emphasis on the efficiency of their water supply systems. That emphasis should include, among other things, active leakage and pressure control programmes. This should result in more efficient and sustainable use of water. It should also result in savings on expenditure on new infrastructure, because it will be sized and timed more accurately to actual demand.

6.56 One way to transparently measure progress would be to use an industry benchmarking tool to assess performance and encourage continuous improvement. An example is the *Water New Zealand Pilot National Performance Review 2007/08*,[10] which involved eight water supply authorities. Another example is the *Auckland water industry annual performance review 2006/07*.[11]

10 Available from Water New Zealand (www.waternz.org.nz).

11 Available from Auckland City Council (www.aucklandcity.govt.nz/council/documents/awireview/default.asp).

Recommendation 3

We recommend that local authorities improve the efficiency of drinking water supplies by minimising water that is unaccounted for, to reduce the demand on existing water sources and the risk of over-investing in drinking water supply infrastructure.

Recommendation 4

We recommend that local authorities participate in an independent benchmarking programme to measure their progress in improving the efficiency with which they supply drinking water.

Improving demand management

6.57 Although all of the eight local authorities were using some demand management tools, we consider that the next step is to prepare demand management plans that integrate supply and demand strategies and are tailored to local circumstances. This will enable local authorities to get more benefits from demand management.

6.58 The benefits of more comprehensive and integrated demand management plans include:

- saving capital costs through delaying or eliminating infrastructure development;
- achieving cost savings in wastewater management through reducing the water that goes through the system;
- saving operating costs associated with energy and maintenance, in both the treatment of water to a potable standard and its reticulation;
- delivering consumer benefits from lower water- and energy-related costs; and
- promoting the resilience of the overall water system, by reducing competing demand for water in areas where water resources are constrained.

Recommendation 5

We recommend that local authorities prepare comprehensive demand management plans that integrate a broad range of supply and demand strategies, to reduce the demand on existing water sources and the risk of over-investing in drinking water supply infrastructure, and to benefit from cost savings.

Evaluating costs and benefits of strategy options

6.59 The evaluation by the eight local authorities of the costs and benefits of options was limited. Therefore, we have identified this as an area for improvement.

Recommendation 6

We recommend that local authorities carry out rigorous evaluations of the costs and benefits of supply and demand strategy options, to choose the most cost-effective and sustainable options.

Levels of service and performance reporting

6.60 Given our conclusion that performance measures and levels of service varied widely and, in some cases, targets were poorly defined, we recommend improvements in this area.

Recommendation 7

We recommend that local authorities define targets for performance measures and demonstrate progress towards the targets to improve decision-making on investments in drinking water supply.

Part 7
Implementing strategies for meeting the forecast demand

7.1 In this Part, we discuss whether the eight local authorities were:

- preparing the relevant planning documents;
- making the necessary financial commitments;
- managing risk;
- integrating their planning processes;
- working with neighbouring local authorities; and
- taking a sustainable development approach to meeting the forecast demand for drinking water.

7.2 We expected to see evidence that the eight local authorities were implementing the strategies they had chosen for meeting the forecast demand for drinking water.

Our overall findings

7.3 Of the eight local authorities, most had prepared, or were preparing, the planning documents that we expected to see.

7.4 All of the eight local authorities have budgeted capital expenditure in their 2009-19 LTCCPs that aligns with the main drinking water supply challenges they previously identified. Comparatively, South Taranaki District Council and Central Otago District Council are planning to spend more on drinking water supply, but this is consistent with the scale of upgraded infrastructure they need to address their particular water supply challenges.

7.5 All of the eight local authorities integrated drinking water supply planning into their 2009-19 LTCCPs. In two cases, regional planning initiatives also provided an important integrating mechanism.

7.6 All of the eight local authorities had taken a risk-based approach to managing their drinking water. They had prepared risk management plans for drinking water supply as part of their asset management plans. They were also preparing public health risk management plans.

7.7 Some of the local authorities were working with neighbouring local authorities to supply drinking water. This was largely driven by geographic circumstance – for example, adjacent urban areas for Nelson City Council and Tasman District Council, and for Tauranga City Council and Western Bay of Plenty District Council.

7.8 Although most of the eight local authorities were clearly taking sustainable development into account, the actions chosen tended to be partial rather than comprehensive. None of the eight had a fully integrated approach to dealing with sustainable development and the supply of drinking water.

Preparing relevant planning documents

Most of the eight local authorities had prepared, or were preparing, the planning documents we expected to see.

7.9 We expected the strategies, and commitments to implementing those strategies, to be set out in the following documents:

- a water supply asset management plan, which conforms to an appropriate level of asset management as set out in the 2006 *International Infrastructure Management Manual*;
- an assessment of water and sanitary services in compliance with section 126 of the Local Government Act 2002;
- the LTCCP for 2009-19, in compliance with the requirements of clauses 2 and 3 of Schedule 10 of the Local Government Act 2002 with respect to water supply as an activity (possibly in the form of a water activity plan);
- a public health risk management plan or plans; and
- other non-statutory water management strategies, varying according to local authority.

7.10 In this section, we comment on water supply asset management plans and the assessments of water and sanitary services. We discussed public health risk management plans in Part 5 and other non-statutory water management strategies in Part 6. We discuss LTCCPs in paragraphs 7.18-7.30. Appendix 4 provides more information about the eight local authorities' water supply strategies.

Water supply asset management plans

7.11 Five of the eight local authorities had updated their water supply asset management plans as part of preparing their 2009-19 LTCCP.

7.12 Two local authorities (Opotiki District Council and Tasman District Council) had prepared an activity management plan as part of preparing their 2009-19 LTCCP, which was, in effect, a water supply asset management plan. An activity management plan would commonly be a brief summary of an asset management plan. However, these plans had similar levels of detail and content to the other water supply asset management plans.

7.13 South Taranaki District Council advised us that it was preparing an electronic asset management system. This system was not available at the time of our audit fieldwork in September/October 2008.

Assessments of water and sanitary services

7.14 All eight local authorities had completed assessments of water and sanitary services related to the supply of drinking water (see Appendix 4 for more information). Six had done this in 2005 and two in 2006. These assessments covered the matters required by the Local Government Act 2002 (see Appendix 3 for more information about these requirements).

7.15 Six of the local authorities (Opotiki District Council, Central Otago District Council, Kapiti Coast District Council, South Taranaki District Council, Nelson City Council, and Tasman District Council) had published updated summaries as part of their 2009-19 LTCCPs. The other two local authorities had updated the matters covered by section 126 of the Local Government Act 2002 in the asset management plans and drinking water supply sections of their LTCCPs.

7.16 The eight local authorities had taken different approaches to the requirements to assess the risks associated with the drinking water supplies that they did not provide. Some considered that they did not have the resources to assess the risks associated with private supplies. For example, Central Otago District Council had determined that it did not have the resources to visit and assess the risk of all private water supplies. Opotiki District Council had made a similar decision. Of its residents, 47% were on private water supplies and it planned to maintain an advisory and educational role only in relation to these supplies.

7.17 One of the eight local authorities had assessed the risks and was committed to building council-owned water supplies for some of its communities. Tasman District Council had identified a number of communities that were not connected to council-owned water supplies. These communities were made a priority for investment in improved water supplies. Motueka was the highest priority because most residents currently get water from shallow wells that do not have contamination barriers, thus creating a public health risk. Some money had been budgeted in the 2009-19 LTCCP for this purpose.

Making the necessary financial commitments

All of the eight local authorities had budgeted capital expenditure in their 2009-19 LTCCPs that aligned with their drinking water supply challenges. South Taranaki District Council and Central Otago District Council were planning to spend relatively more, consistent with the scale of upgraded infrastructure needed to address their challenges.

7.18 All of the eight local authorities had prepared and adopted LTCCPs for 2009-19, as required by the Local Government Act 2002. The audit reports on seven of the eight local authorities concluded that those plans provided a reasonable basis for long-term integrated decision-making. The audit report for the eighth (Central

Otago District Council) concluded that the plan did not provide a reasonable basis for long-term, integrated decision-making. This was because the forecast information and proposed performance measures and targets did not provide an appropriate framework for assessing the actual levels of service, and because future asset valuations had not been included in financial forecasts.

7.19 The level of expenditure committed by any local authority depended greatly on the specific context it operated within. Consequently, we considered expenditure on supplying drinking water in the context of the water supply challenges faced by each local authority.

Planned capital expenditure on drinking water for 2009-19

7.20 The total amount budgeted by each local authority for 2009-19 on capital expenditure for drinking water is set out in Figure 18. We focused on proposed capital expenditure because it is most closely related to meeting future demand. More information on proposed capital expenditure for each of the eight local authorities is set out in Appendix 5, including which projects the expenditure was allocated to. Appendix 5 also shows that proposed capital expenditure is aligned with the drinking water supply challenges identified for each local authority.

Figure 18
Total capital expenditure budgeted for supplying drinking water in the 2009-19 long-term council community plans for the next 10 years

Local authority	Total amount budgeted $m*	Average cost per connection to the water supply for the next 10 years $
South Taranaki District Council	81.1	9,294
Tasman District Council	77.0	6,758
Central Otago District Council	51.3	6,013
Tauranga City Council	227.7	4,578
Kapiti Coast District Council	60.2	3,429
Nelson City Council	46.7	2,424
Christchurch City Council	157.6	1,274
Opotiki District Council	1.1	458
TOTAL	702.6	2,911**

* Figures are rounded to one decimal place.

** Combined average cost per connection.

7.21 The average cost per connection ranged from $458 to $9,294. The pattern of planned capital expenditure was consistent with each of the eight local authorities' need to build or replace water supply infrastructure. The higher figures reflect planned investment in significant amounts of replacement and new infrastructure.

7.22 Figure 18 shows that South Taranaki District Council, Tasman District Council, and Central Otago District Council planned to spend more per connection to the water supply during the period 2009-19 than the other local authorities. This was consistent with all three local authorities having identified that their drinking water supplies required infrastructure upgrades. For example, Central Otago District Council required infrastructure upgrades for nine separate water supplies (see Figure 19 for more information). Tasman District Council was planning to build drinking water supplies for two communities on private supplies.

Figure 19
Case study on Central Otago District Council's challenges to its drinking water supplies, and planned capital expenditure

Central Otago District Council faces several interrelated challenges with its water supplies:

- Reducing demand, because consumption is currently very high. High consumption is problematic for two reasons. The Council expects the Otago Regional Council to reduce the amount of water the Council can take when some consents are renewed. The size of new infrastructure required is affected by consumption (that is, the more water required, the larger the infrastructural requirements).
- Complying with the drinking water standards. New infrastructure is required to do this.
- Affordability and funding of infrastructure upgrades required to comply with the drinking water standards and upgrade its infrastructure.

Other challenges include:

- Energy-intensive water supplies – distribution requires pumping, and therefore electricity, which increases the operating costs. The water supplies were originally designed to pump water in an environment with low operating costs.
- Pressure management – the distribution system for pumping water from source to reservoir produces very high pressure in some properties, which leads to breaks and leaks.
- Improving operational staff training levels – through its new asset management plan, the Council has identified a lack of staff training as a key risk for water supply services.

In its 2009-19 LTCCP, the Council has budgeted $51.3 million for the period 2009-19 on a large number of projects on its nine separate water supply systems, including new water treatment plants, telemetry, reservoirs, valves and hydrants, tobies, backflow prevention, water meters, investigations, asset management plans, bore redevelopment, and reticulation. For example, it has budgeted expenditure on water meters of $3 million.

7.23 Opotiki District Council was planning to spend a minimal amount on capital expenditure. The Council invested in a new water treatment plant and reticulation for its main drinking water supply to Opotiki within the last 15 years.

Comparing budgeted capital expenditure on drinking water supply between the 2006-16 and the 2009-19 LTCCPs

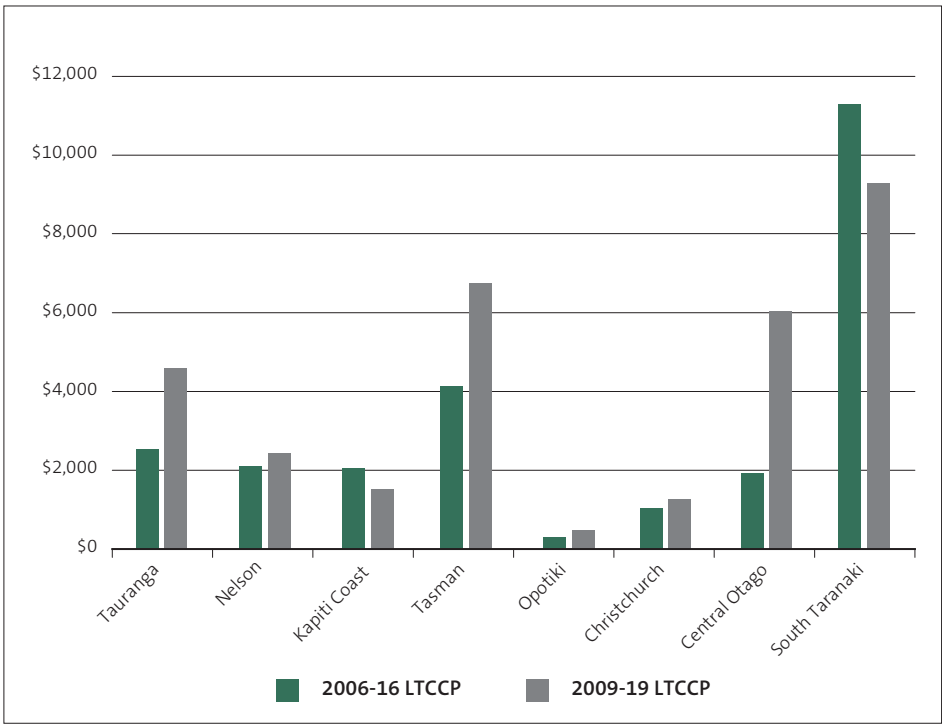
7.24 For most of the eight local authorities, planned capital expenditure per water supply connection had increased between the 2006-16 LTCCPs and the 2009-19 LTCCPs (see Figure 20).

7.25 Christchurch City Council, Opotiki District Council, and Nelson City Council showed moderate increases. However, planned capital expenditure on drinking water supply by Opotiki District Council was very low in both LTCCPs.

7.26 Central Otago District Council had increased its budgeted capital expenditure on supplying drinking water significantly – by 213%. This was consistent with the preparation of a district water supply strategy in 2007 that identified the need for upgraded infrastructure. Tauranga City Council's capital expenditure had also increased because it planned to build a new water supply within the next 10 years.

7.27 South Taranaki District Council had decreased its capital expenditure for supplying drinking water by $17 million as a result of more detailed planning. Kapiti Coast District Council's budgeted capital expenditure was also decreasing.

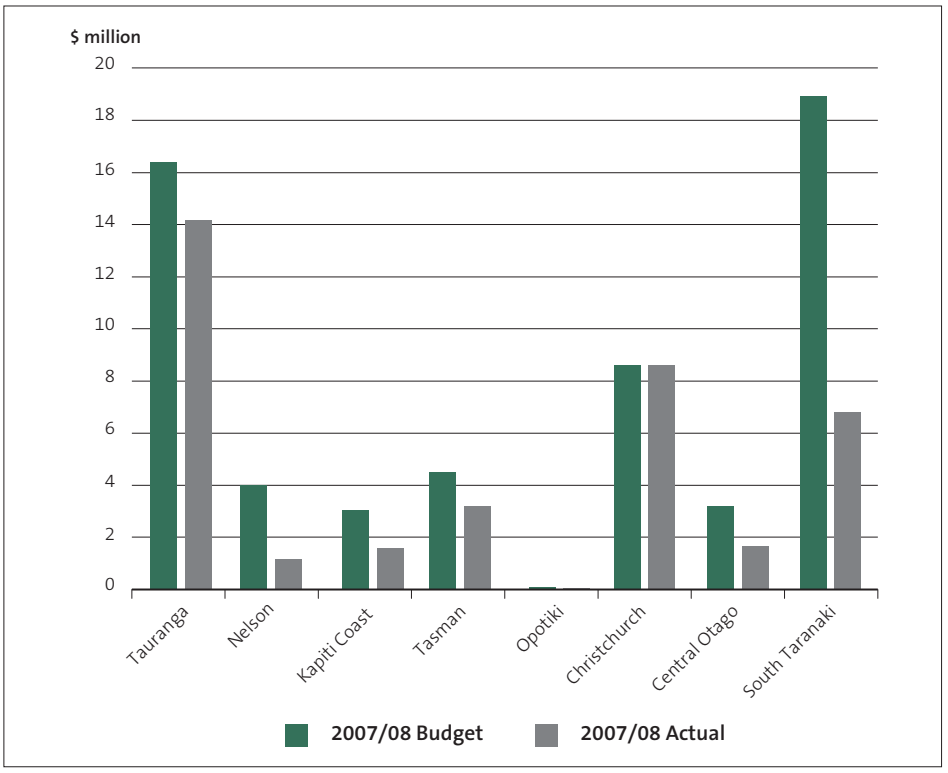
Figure 20
The eight local authorities' budgeted capital expenditure on water supply, with 2006-16 LTCCPs compared to 2009-19 LTCCPs (total dollars per water supply connection)



7.28 A comparison of budgeted capital expenditure and actual capital expenditure for 2007/08 (see Figure 21) shows that, for six of the eight local authorities, budgets were higher than expenditure.

7.29 South Taranaki District Council had spent significantly less than its budget. Its annual reports for 2006/07 and 2007/08 noted delays in beginning some major infrastructure works. In addition, some projects were related to accessing new sources of water. Exploratory drilling failed to find useful new groundwater supplies, so these projects did not continue. Most surface water resources were close to full allocation, so the lack of viable new sources of water meant more pressure to reduce consumption.

Figure 21
The eight local authorities' budgeted capital expenditure on water supply compared to actual capital expenditure, 2007/08

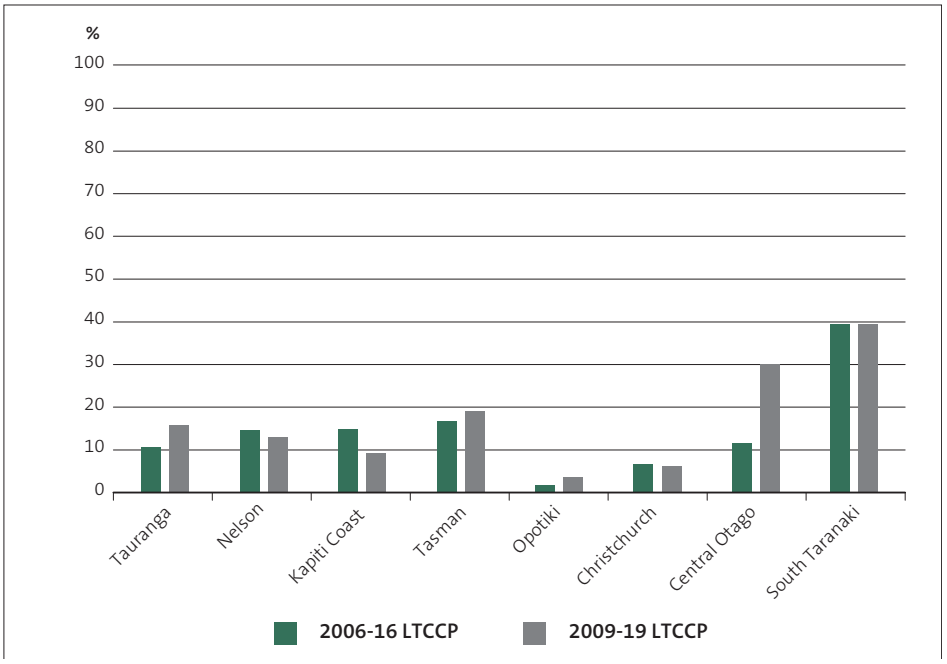


Note: Budgeted data was taken from the 2006-16 LTCCPs and actual data from the relevant annual reports.

Planned capital expenditure on supplying drinking water, as a proportion of total capital expenditure

7.30 Figure 22 shows the capital expenditure planned for supplying drinking water, as a percentage of total capital expenditure for the periods 2006-16 and 2009-19. The graph also shows the greater proportion of expenditure planned by Central Otago District Council (about 30%) and South Taranaki District Council (about 40%).

Figure 22
The eight local authorities' capital expenditure planned for supplying drinking water, as a percentage of total capital expenditure for the periods 2006-16 and 2009-19



Managing risk

All eight local authorities had prepared risk management plans as part of their water supply asset management plans. They were also preparing public health risk management plans.

7.31 We expected the eight local authorities to have taken a risk-based approach in managing their drinking water. This would include identifying critical water supply assets and associated risks, and preparing risk management plans (including public health risk management plans) for their drinking water.

7.32 All eight local authorities had developed risk management plans. Their water supply asset management plans generally included risk management frameworks. In addition, the preparation of public health risk management plans for drinking water supplies (see the discussion in Part 5) was further improving the risk management framework. Nelson City Council used a framework consistent with the Australian/New Zealand Standard 4360:1999. Christchurch City Council had intentions to manage its risk in keeping with the same standard.

Integrating supply planning for drinking water with other planning processes

All of the eight local authorities integrated their supply planning for drinking water into their 2009-19 LTCCPs. In two cases, regional planning also provided an important integrating mechanism between water supply planning and other local authority planning processes.

7.33 All of the eight local authorities had integrated their supply planning for drinking water with preparing their 2009-19 LTCCPs. Most had revised their water supply asset management plans in parallel to preparing the LTCCP, ensuring that proposed operating expenditure and capital expenditure was consistent. With the exception of Opotiki District Council, the water supply asset management plans usually described how that integration was managed.

7.34 In two cases, regional planning processes also provided an important integrating mechanism – Smart Growth in Tauranga City, and the Canterbury Water Management Strategy and Greater Christchurch Urban Development Strategy in Christchurch City. Integrating water supply planning within the wider regional planning framework is a way of ensuring that the new or replacement infrastructure is appropriately sized and provided where the growth is expected to occur.

7.35 The Canterbury Water Management Strategy provides an overarching regional strategy for freshwater in Canterbury. It was initiated by central government (the Ministry of Agriculture and Forestry and the Ministry for the Environment) and Environment Canterbury in response to concerns about whether the Canterbury region may run out of freshwater in the future. As a user of the freshwater, Christchurch City needs to be involved to avoid potential threats, such as loss of access to water sources because others are using it.

7.36 Christchurch City Council developed the Greater Christchurch Urban Development Strategy in collaboration with the Selwyn and Waimakariri District Councils and Environment Canterbury. Christchurch City Council used the Strategy forecast data as the basis of financial planning and capital expenditure programmes, enabling future water supply infrastructure to be matched to where development was expected.

Working with neighbouring local authorities to supply drinking water

Some of the eight local authorities were working with neighbouring local authorities to supply drinking water.

7.37 Tasman District Council and Nelson City Council had particularly close links because they had a range of overlapping interests and responsibilities. Both recognised the scope for efficiencies and economies of scale through co-operation on a number of joint projects. The two councils had formal links for water planning, supply, and management. This included agreements to supply consumers in each other's districts (Tasman District Council provided water to some industrial consumers in Nelson City Council's area, and Tasman District Council had rights to access a certain amount of water from Nelson if need be).

7.38 Tauranga City Council had a 2008 Memorandum of Understanding with Western Bay of Plenty District Council for joint actions to develop a drinking water supply in the Western Bay of Plenty district. This will initially focus on drinking water for Papamoa East and adjacent parts of Western Bay of Plenty – known as the third water supply scheme (Waiari).

7.39 Some of the local authorities had informal arrangements with neighbours that involved sharing expertise and advice on an as-needed basis (for example, Opotiki District Council and Whakatane District Council, and New Plymouth District Council and and South Taranaki District Council).

Taking a sustainable development approach

Although most of the eight local authorities were taking sustainable development into account, the actions chosen tended to be partial rather than comprehensive. None of the eight local authorities had a fully integrated approach to dealing with sustainable development and the supply of drinking water.

7.40 We expected the eight local authorities to be taking a sustainable development approach to supplying drinking water, consistent with section 14(1)(h) of the Local Government Act 2002 and encompassing:

- the social, economic, and cultural well-being of people and communities;
- the need to maintain and enhance the quality of the environment; and
- the reasonably foreseeable needs of future generations.

7.41 The eight local authorities showed a range of ways of dealing with sustainable development for the supply of drinking water supply. These included:

- trying to reduce demand for, and consumption of, water, as discussed in paragraphs 6.20-6.28 (all eight were doing this, but most used a limited range of the possible options);
- explicitly prioritising economic development ahead of other aspects of sustainable development (three of the local authorities were doing this);
- defining sustainable development as being equivalent to environmental sustainability (one local authority did this);
- improving water supply efficiency (for example, fixing leaks and reducing water loss); and
- investigating opportunities for integrating urban water management to include drinking water supply, storm water, and wastewater management[12] (one local authority was doing this).

7.42 Appendix 6 sets out more detailed information on what each local authority was doing to address sustainable development.

7.43 The one aspect of sustainable development that was not considered by any of the eight local authorities was cultural well-being.

7.44 Climate change was another important sustainable development issue. It is expected to produce great variability in the amount of rainfall. This means that, for any given level of demand, there may be an increased risk in future of not being able to meet it. Greater water storage capacity is likely to be required to manage this risk. The eight local authorities considered climate change in the context of their risk management framework as one of a number of potential risks to supply. We did not see evidence of detailed strategies dealing solely with climate change.

7.45 There are a number of tools or strategies that local authorities could use to enhance the sustainability of their supply of drinking water, including:

- integrating urban water management to include drinking water supply, storm water, and wastewater management;
- active management of the water supply catchment to reduce risks to the quality and quantity of water. The National Environmental Standard (see Part 5) will provide impetus to this but drinking water suppliers could be more active in this area;
- reducing demand through metering and charging for drinking water (for those local authorities not already doing so);
- developing sustainability reporting to improve transparency and encourage continuous improvement; and

12 This is sometimes called the "three waters" approach.

- developing and using a framework for assessing the sustainability of alternative options for drinking water supplies (for example, the Sustainability Framework developed by Water Services Association of Australia).[13]

Recommendation 8

We recommend that local authorities integrate sustainable development strategies into drinking water supply management as part of preparing comprehensive demand management plans.

13 Water Services Association of Australia is an Australian urban water industry representative body. It has 35 members and 30 associate members that provide water and wastewater services to about 15 million Australians and many of Australia's largest industrial and commercial enterprises.

Appendix 1
Technical information about drinking water supply in the eight local authorities

The information in this Appendix is for those readers interested in technical detail about the supply of drinking water in the eight local authorities. It includes:

- factors that drive demand, such as population growth;
- a summary of our conclusions about aspects of each local authority's water supply systems that may affect their capacity to manage their drinking water, for example, whether they have access to enough source water and whether they are able to forecast demand accurately; and
- technical data, such as the number of water supply systems and populations served, the amount of water produced and consumed, and costs of supplying drinking water.

Local authority	Tauranga City Council	Nelson City Council	Tasman District Council	Kapiti Coast District Council	Opotiki District Council	Christchurch City Council	Central Otago District Council	South Taranaki District Council
Location								
Population (2006)	103,632	42,888	44,625	46,200	8973	348,435	16,647	26,487
Population growth rate (2001-06)	+14.4%	+4.2%	+7.6%	+9.2%	–1.5%	+8.6%	+16.4%	– 4.4%
Number of water supply systems	1	1	16	4	3	9	9	13
Access to water sources (security and quantity of water available)	Existing supply secure but needs more to provide for future growth Uses surface water for supply	Uses surface water for supply	Uses a mix of groundwater and surface water sources for supplies	Uses surface water and groundwater for supplies	Uses surface water for supplies	Groundwater used for Christchurch City supply, and a mix of groundwater and surface water used for Banks Peninsula supplies	Uses mix of surface water and groundwater for supplies Possible pressure when resource consents for surface water takes are due for renewal because consumption is very high	Uses surface water for supplies Pressure on supply from drought, and surface water in some catchments is at or near full allocation
Quality of drinking water (ability to comply with the drinking water standards)	Currently ungraded Previously graded Aa but requires minor upgrades to comply with the latest drinking water standards	Currently graded Ab Planning to improve distribution grading	Currently ungraded and requires upgraded infrastructure (additional filtration and disinfection) to comply	Currently ungraded and requires upgraded infrastructure (installation of UV treatment) to comply	Currently ungraded and requires upgraded infrastructure (UV treatment) to comply	Currently graded Ba and Da for Christchurch City and Ee for Banks Peninsula supplies Requires upgraded infrastructure to comply in Banks Peninsula and may invest in new infrastructure to improve grades for Christchurch City Managing risk of contamination is critical because supply is untreated	Currently ungraded and requires upgraded infrastructure (treatment plants) to comply	Currently ungraded and requires upgraded infrastructure (treatment plants) to comply
State of the distribution network	No specific reticulation or efficiency issues Has an active leakage management programme	The pipeline between source and treatment facility is ageing and at risk of failure Trunk watermains and reservoirs need extensions and additions to meet growth demand Reticulation condition requires continuous monitoring and maintenance/ replacement	Possible high leakage in some supplies No current leak detection programme but planning to develop	Consumption levels tend to be high Possible high leakage in Otaki Ongoing leak detection programme but still to accurately quantify extent of leakage	Possible high leakage, does not have an active leak detection programme but is planning to develop one	No specific reticulation or efficiency issues Has an active leakage management programme	Consumption tends to be high High leakage possible in all supplies, started a leak detection programme but still to accurately quantify extent of leakage Current water supply systems are energy intensive Reticulation system for pumping water from source to reservoir produces very high pressure in some properties	Consumption tends to be high Possible high leakage in all supplies, started a leak detection programme but still to accurately quantify extent of leakage Infrastructure upgrades are required to manage risk, increase resilience, and improve the efficiency of the systems

Local authority	Tauranga City Council	Nelson City Council	Tasman District Council	Kapiti Coast District Council	Opotiki District Council	Christchurch City Council	Central Otago District Council	South Taranaki District Council
Capacity to forecast demand	Forecasting reasonably detailed and likely to be accurate	Forecasting reasonably detailed and likely to be accurate	Forecasting reasonably detailed and likely to be accurate	Forecasting adequate but data could be improved	Forecasting limited	Forecasting currently limited by incomplete data, but developing a demand-forecasting model	Forecasting limited by incomplete data Particularly needs accurate water consumption data	Forecasting limited by incomplete data Particularly needs accurate water consumption data
Planning for future demand	Future demand cannot be met with existing water supply Investing in new supply to meet forecast future demand Uses universal water metering and charging plus a number of other initiatives to manage demand	Future demand can be met with existing supply Uses universal water metering and charging to reduce demand	Future demand cannot be met with existing supply Strategy to meet demand is based on supply augmentation Uses universal water metering and charging to reduce demand in all urban supplies, which is about 90% of the total number of water users	Existing supply is generally sufficient to meet future demand now; but, in some parts of the district, by 2015/16, summer demand is projected to exceed the amount that can be legally taken under resource consents Has decided to increase supply Committed to reducing consumption and uses voluntary conservation to reduce demand	Future demand in terms of quantity can be met with existing supply over the next 10 years Has universal metering and charging and developing other conservation measures	Future demand can be met with existing water supply until about 2050 Few tools currently used for reducing demand Uses universal metering but charges only commercial and industrial consumers Currently preparing a water supply strategy for 2009-39 that includes more demand management tools	Poor position to effectively manage future demand for water supply but has adopted the Central Otago Drinking Water Strategy 2007 which, if implemented, should improve the situation Currently has some tools for reducing demand and is progressively implementing metering and charging	Poor position to effectively manage future demand for water supply but has adopted District Water Supply Strategy 2007 which, if implemented, should improve the situation Currently using some tools for reducing demand including working with farmers, education, and introducing metering
Attracting and retaining skill base (capability)					Identified as a problem – hard to attract suitable staff		Identified as a problem – also making provision for training a problem	
Expenditure on drinking water supply	Water supply funded by user fees and charges LTCCP budgets $227,658,000 over the period 2009-19 on capital expenditure	Water supply funded by user fees and charges LTCCP budgets $46,653,000 over the period 2009-19 on capital expenditure	Water supply funded by targeted rates and user fees and charges LTCCP budgets $76,953,459 (inflated) over the period 2009-19 on capital expenditure	Water supply funded by targeted rates LTCCP budgets $60,193,000 over the period 2009-19 on capital expenditure	Water supply funded by a targeted rate with a fixed component and a variable component based on actual consumption May be difficult to raise more revenue through the limited rating base LTCCP budgets $1,114,000 over the period 2009-19 on capital expenditure	Water supply funded by targeted rate LTCCP budgets $157,639,000 (inflated) over the period 2009-19	Water supply funded by targeted rates Affordability and funding of upgrades, relying on approval of government subsidies LTCCP budgets $51,326,977 over the period 2009-19 on capital expenditure	Water supply to be funded by loans, with uniform annual charges and metered water rates (where properties are metered) covering the interest and principal over time LTCCP budgets $81,079,000 over the period 2009-19 on capital expenditure
Total annual drinking water supply rates and charges (2009/10)	$14,683,000	$10,109,000	$5,526,697	$6,646,000	$720,000	$22,197,000	$2,538,508	$7,836,000
Total annual drinking water supply production	13,258,278m^3	14,636,500m^3	5,525,005m^3	7,446,000m^3	602,250m^3	54,300,000m^3	5,269,631m^3	15,695,000m^3
Volumetric price of drinking water	$1.20 per m^3	$0.70 per m^3	$0.99 per m^3	$0.89 per m^3	$1.22 per m^3	$0.41 per m^3	$0.48 per m^3	$0.50 per m^3
Value of water supply assets (30 June 2009)	$175,205,000	$129,537,000	$84,028,000	$68,295,000	$9,839,000	$342,918,000	$41,502,000	$77,413,000

Local authority	Tauranga City Council	Nelson City Council	Tasman District Council	Kapiti Coast District Council	Opotiki District Council	Christchurch City Council	Central Otago District Council	South Taranaki District Council
Population served by each supply system (at March 2009)	Tauranga City (103,783)	Nelson City (43,000)	Collingwood (450) Dovedale (450) Eighty Eight Valley (200) Hamama Road (50) Hope/Brightwater (2000) Kaiteriteri (300) Motueka (1200) Murchison (680) Pohara (150) Redwood Valley (550) Richmond (10,500) Tapawera (400) Upper Takaka (50) Waimea Industrial/Mapua/ Ruby Bay (1680) Wakefield (1500) [Three of these – Redwood Valley, Eighty Eight Valley and Dovedale – are rural water supplies]	Hautere/Te Horo (700) Otaki (5700) Paekakariki (1700) Paraparaumu/ Waikanae (31,900)	Ohiwa (50) Opotiki (5100) Te Kaha (150)	Akaroa (1350) Birdlings Flat (240) Christchurch Central (311,000) Duvauchelle (440) Little River (240) Lyttelton (3720) Pigeon Bay (50) Takamatua (280) Wainui (320)	Alexandra (5000) Clyde (1000) Cromwell (3400) Lake Roxburgh Village (90) Naseby (400) Omakau/Ophir (400) Patearoa (60) Ranfurly (1000) Roxburgh (700)	Cold Creek/Pihama (470) Eltham (2200) Hawera (9771) Inaha (490) Nukumaru (< 50) Opunake (1500) Patea (1400) Pope Rural Scheme/Riverlea (50) Pungarehu (< 60) Rahotu (120) Wai-inu Beach (300) Waimate West (4500) Waverley (950) Waverley Beach (300) [Five of these are rural water supplies]
Average drinking water consumption in litres per person per day (lpd)	198 (residential only) 270 (all users)	180 (residential only) 500 (all users)	250-375 for larger supplies 125-250 for smaller supplies	Paraparaumu/Raumati – 404 Waikanae – 543 Hautere/Te Horo – (no data) Otaki – 763 Paekakariki – 450	300	435	Alexandra – 855 Cromwell – 605 Clyde – 991 Omakau/Ophir – 803 Naseby – 228 Ranfurly – 661 Patearoa – 1169 Roxburgh – 488 Lake Roxburgh Village – 875	408 (excluding farms) 888 (including farms)
Other information	The port is a significant part of Tauranga's economy, while horticulture and agriculture are the main drivers of the Western Bay of Plenty's economy	Urban district – the main drivers of the regional economy are its horticulture, pastoral production, forestry, seafood, and tourism sectors	Semi-rural – fruit growing, farming, fishing, and forestry are the main economic contributors to the district's economy Viticulture and tourism are other important industries	Rural-urban – changed from a series of holiday settlements and farming areas into a rapidly urbanised and popular district Kapiti is the fastest growing district in the Wellington region	Rural district – the economy is primarily driven by agriculture, including beef, dairy, forestry, and horticulture (kiwifruit) Economic growth is a priority area for the Council	Urban district – water supply is used primarily for residential, commercial, and industrial uses	Rural district, with rural or primary industries providing the backbone of the economy	Rural – the economy is based on dairy farming, with the oil and gas sector and engineering support industries also important

Appendix 2
Forecasting the demand for supplying drinking water

What demand forecasting involves

Demand forecasting involves identifying the main factors and trends that influence demand for an asset or service and then preparing projections for demand over time. Once the factors are understood, mathematical modelling is often used to assess the effect of these factors on future demand. Demand forecasts can vary from simple linear trends (for example, assuming a direct linear relationship with population growth) to regression models based on historical trends in a number of factors that influence demand. Demand forecasts are considered more reliable when prepared for separate classifications of use and sectors.

There are several commonly used methods of projecting water demand. These include projecting:

- from the historical (bulk) rate of increase in water consumption;
- based on historical consumption per capita data and the projected population growth rate; and
- based on historical consumption per user category (for example, domestic, industrial/commercial) and expected changes (increases or decreases) in user category over the forecasting period.

Demand forecast methodologies can include quantitative and qualitative techniques. If possible, more than one approach to demand forecasting should be used, and the different methodologies compared.

Quantitative demand forecasting techniques often require mathematical modelling, such as regression analysis. This approach establishes a relationship between various drivers of demand (for example, demographic factors such as family size, expectations of large users, and temperature or seasonal variability), and the relationship is used to project future demand. Historical data is used to verify and adjust the model.

Qualitative forecasting can include consultation with experts to reach a consensus on the forecast demand, or a market analysis of the main drivers of demand.

Demand forecasts should be treated with some caution because factors that influence demand cannot be predicted with certainty over long periods of time. Risks and sensitivity of forecasts should be considered, including considering:

- the consequence of partial or total loss of supply;
- the effect that conservation strategies may have; and
- the effect of variations in rates income.

Appendix 3
Drinking water standards and assessing water services

In this Appendix, we provide further background information about the drinking water standards, and assessing water services under the Local Government Act 2002.

Drinking water standards in New Zealand

The Health (Drinking Water) Amendment Act 2007 (the Act) was passed in October 2007 and took effect from 1 July 2008. Before this legislation took effect, local authorities had more discretion in the quality of the water they supplied to their residents and communities. The Act does not require compliance with the drinking water standards, but it does require drinking water suppliers to take all practicable steps to comply. Taking steps to implement an approved public health risk management plan is considered sufficient to comply with "all practicable steps". A public health risk management plan is a quality assurance programme for providing water.

Compliance with the Act is staggered over several years, depending on the size of population served by the drinking water supply. Originally, drinking water suppliers for large communities (more than 10,000 people) were required to prepare a public health risk management plan within a year after 1 July 2008. Drinking water suppliers for smaller communities had more time to prepare a plan (see Figure 23). However, in June 2009, the Government extended these deadlines by three years, effective from 1 July 2009 (see Figure 23).

Figure 23
Deadlines for complying with the Health (Drinking Water) Amendment Act 2007

Supply type	Population served	Original deadline	Deadline as at 1 July 2009
New or large	More than 10,000	1 July 2009	1 July 2012
Medium	5001-10,000	1 July 2010	1 July 2013
Minor	501-5000	1 July 2011	1 July 2014
Small	101-500	1 July 2012	1 July 2015
Neighbourhood	25-100	1 July 2013	1 July 2016
Rural agricultural	N/A	1 July 2013	1 July 2016

Grading the water, treatment plants, water sources, and distribution zones

The descriptions of the drinking water standards, plant and source grades, and distribution zone grades are set out in Figure 24. (A distribution zone is a part of a town or community receiving water of a similar quality. By definition, places within a district that receive a different grade of water will be in different zones.)

Plant and source grading (A1 to U) is based primarily on the likely health risks to the community arising from bacteria, protozoa (Giardia and Cryptosporidium), and chemical substances in the source water, and how effectively the treatment plant can act as a barrier to such contaminants passing through to the reticulation system. Possible grades are A1 (best), then A to E. As well as a grade being assigned to each treatment plant, each distribution zone gets the grade of the worst treatment plant providing it with water.

Distribution zone grading (a1 to e) is based on the microbiological and chemical quality of the water, along with the condition of the reticulation system and the quality of its care. A zone grade should always be considered with the accompanying plant and source grade.

Figure 24
Descriptions of public health grades for drinking water supplies

Grade	Description
Source/plant grade	
A1	Completely satisfactory, negligible level of risk, demonstrably high quality
A	Completely satisfactory, extremely low level of risk
B	Satisfactory, very low level of risk
C	Marginally satisfactory, low level of microbiological risk when water leaves the plant, but may not be satisfactory chemically
D	Unsatisfactory level of risk
E	Unacceptable level of risk
U	Ungraded
Distribution zone grade	
A1	Completely satisfactory, negligible level of risk, demonstrably high quality, meets Aesthetic Guidelines and has ISO 9001:2000 accreditation
a	Completely satisfactory, extremely low level of risk
b	Satisfactory, very low level of risk
c	Marginally satisfactory, moderately low level of risk
d	Unsatisfactory level of risk
e	Unacceptable level of risk

Assessing water services

Section 126 of the Local Government Act 2002 sets out the requirements for assessing water services. An assessment must include (for water supply only):

- a description of the means by which drinking water is obtained by residents of, and communities within, the district, including the extent to which the water supply is provided by the territorial authority and any other person;
- an assessment of any risks to the community relating to the absence in any area of a water supply;
- an assessment of the quality and adequacy of supply of drinking water available within the district for each community;
- a statement of current and estimated future demands for water services within the district and a statement of any issues relating to the quality and adequacy of supply of drinking water for each community;
- a statement of the options available to meet the current and future demands and assessment of the suitability of each option for the district and for each community within it;
- a statement of the territorial authority's intended role in meeting the current and future demands; and
- the territorial authority's proposals for meeting the current and future demands, including proposals for any new or replacement infrastructure.

Appendix 4
Water supply strategies

Local authority	Water supply asset management plan(s)*	Date of assessment of water and sanitary services	Public health risk management plan(s)	Other non-statutory water management strategy(s)
Tauranga City Council	2008/09 (draft)	2005	Approved plan – 2008	Demand management and conservation programme embedded in asset management plan
Nelson City Council	2006-08 and 2009-19	2005 Revision in 2009-19 LTCCP	Draft plan being prepared (expect to complete it by June 2010)	Water supply conservation strategy 2003 Nelson Urban Growth Strategy 2005 Water supply agreement with Tasman District Council
Tasman District Council	Water supply activity management plan 2006 Water supply activity management plan 2009	2005 Revision in 2009-19 LTCCP	Approved plans for two of 16 supplies	2003 Tasman Regional Water Study Water supply agreement with Nelson City Council
Kapiti Coast District Council	2007/08 (draft)	2006 Revision in 2009-19 LTCCP	No plans prepared	Water Matters – sustainable water use strategy 2003 Plan Change 75 – water demand management *Green Gardener* *Green Plumber*
Opotiki District Council	2009-19 activity management plan	2005 Revision in 2009-19 LTCCP	Approved plan for the Te Kaha supply No plans prepared for other two supplies	
Christchurch City Council	2006	2005	Approved plans for Christchurch City and Lyttelton Harbour – 2008 Draft plans for Banks Peninsula supplies	Water Supply Strategy 2009-2039 (draft) Greater Christchurch Urban Development Strategy 2007
Central Otago District Council	2006 and 2009 (draft)	2006 Revision in 2009-19 LTCCP	Approved plans for all supplies – 2008	Central Otago Drinking Water Strategy 2007 Alexandra and environs water options study October 2007
South Taranaki District Council	2009 (draft, not available at time of our audit)	2005 Revision in 2009-19 LTCCP	Draft plans for 11 of 13 supplies	District Water Supply Strategy September 2007 Unaccounted for water and leak detection strategy 2008 (draft)

* We reviewed documents that were available at the time of our audit and any updates provided by the local authorities up to June 2009.

Appendix 5
Budgeted capital expenditure on supplying drinking water

Local authority	Main challenges identified	Capital expenditure set out in the 2009-19 long-term council community plan
Tauranga City Council	The Council has identified the main future challenge as supplying water for growth and development along the coastal strip – Papamoa and Te Tumu. The current water supply network is not able to meet the projected growth. From an efficiency point of view, it makes more sense to have a water source and treatment plant located closer to that growth.	Budgeted **$227,658,000** for the period 2009-19 on projects including: • Waiari project – third water scheme; • reservoir construction; • new reticulation for Papamoa East; • new watermains for Papamoa; • new reticulation for Pyes Pa West; • new reticulation for the Tauriko Business estate; • new watermains for Welcome Bay/ Ohauiti/Pyes Pa; • new watermains for Te Papa Peninsula; • new watermains for Oropi Road; • new watermains for Bethlehem; • contribution to Western Bay of Plenty District Council under Sub-Regional Water Resource Agreement; and • other assets upgraded or renewals.
Nelson City Council	The Council has identified the main future challenges as: • the fair to poor condition of the Maitai pipeline, which the Council defines as its highest risk water asset because of its vulnerability to earthquakes, land slips, and rockfalls, and which is to be replaced by a new trunk watermain down the Maitai Valley; • trunk mains and reservoirs, which need extensions and additions to meet growth demand; • backflow prevention (to guard against contamination from accidental flows into the system), which is incomplete (dual check valves fitted to all residential water meters are to be replaced in 2013-16, and protection devices in commercial and industrial premises need upgrading); • reticulation condition, which involves continuous monitoring and maintenance/replacement; and • water supply grading, which is Ab: A for source and treatment, and b (below the standard suggested by the Ministry of Health) for distribution. Aa grading would depend on improvements including additional storage, water loss reduction, and backflow prevention.	Budgeted **$46,653,000** for the period 2009-19 on projects including: • Stoke high-level reservoir ($1.3 million); • Stoke trunk watermain ($0.7 million); • Maitai second pipeline ($27.6 million); • Atawhai reservoir No. 2 ($1.5 million); • Observatory Hill reservoir ($0.2 million); • Atawhai trunk watermain ($3.9 million); and • Atawhai reservoir ($0.2 million).

Local authority	Main challenges identified	Capital expenditure set out in the 2009-19 long-term council community plan
Tasman District Council	The Council has identified the main future challenges as: • water quantity – insufficient water sources in most of the water supply systems to meet current and expected future demand (for example, because of limited storage capacity in the Waimea aquifer); • water quality – all of the water supply systems will need upgrades to comply with the drinking water standards, and saltwater intrusion is a risk to the Waimea and Richmond (urban) supplies; and • asset information – the Council's understanding of the age and condition of its drinking water assets varies.	Budgeted **$76,953,459** (inflated) for the period 2009-19 on projects including: • water treatment plant upgrades to comply with the drinking water standards for Eighty Eight Valley, Brightwater, Collingwood, Kaiteriteri, Murchison, Pohara, and Redwood Valley ($5,070,751); • Watermain replacement along SH6 from Three Brothers Corner to Ranzau Road ($876,328); • Dovedale – new water supply from the Motueka River Valley, includes wells, treatment plant,and delivery pipework ($2,138,944); • CTA/Coastal Pipeline ($11,727,203); • Motueka – construction of new town supply ($19,297,937); • Richmond Major Projects ($16,471,221): – reticulation renewals or upgrades; – re-zoning; – Richmond East; – treatment plant; – new groundwater source; and – Lee Valley dam contribution; • Takaka Fire Fighting Improvement ($1,099,496); and • Wakefield – construction of new source and treatment plant ($3,855,936).
Kapiti Coast District Council	The Council has identified the main future challenge for supplying drinking water as reducing consumption to a reasonable level (targeting 400 litres peak consumption per person per day) and providing a sufficient supply of drinking water to meet that. In addition, it faces a specific challenge in some areas of its district. By approximately 2015/16, in Waikanae, Paraparaumu, and Raumati,the Council expects summer demand to exceed the amount of water it can legally take on a regular basis under its resource consents. Another challenge for the Council is covering the cost of water services and upgrading and improving the water supply systems, considering the district's limited rating base.	Budgeted **$60,193,000** for the period 2009-19 on: • water storage – investigations, preferred options, site selection; • construction of preferred option; • Waikanae treatment plant upgrade; • Riwai reservoir upgrade; • Otaki reservoir; and • Hautere – network augmentation and renewal.

Local authority	Main challenges identified	Capital expenditure set out in the 2009-19 long-term council community plan
Opotiki District Council	The Council has identified the main future challenges as: • Compliance with the drinking water standards. Water is drawn from sources that are not secure, and some of the community water supply systems are not disinfected. This poses a significant human health risk associated with waterborne diseases, including those caused by Giardia and Cryptosporidium. • Its ability to raise enough revenue to cover the costs of the infrastructure renewals and upgrades needed to comply with the drinking water standards. About 70% of the land in the district is non-rateable (most of the district land is owned by the Department of Conservation). The combination of a small rating base and a high unemployment rate in the district poses a challenge for the Council when attempting to raise enough revenue to cover infrastructure investments.	Budgeted **$1,114,000** for the period 2009-19.
Christchurch City Council	The Council has identified the main future challenges as: • upgrading its systems on Banks Peninsula to provide sufficient water quantity and adequate quality; • risk mitigation action required in the northwest section of the city, through either UV treatment or installation of deeper wells, or a combination of the two approaches (water is currently drawn from a shallow well and is therefore not a secure source, as defined by the drinking water standards); and • ensuring that there is sufficient water supply infrastructure in the southwest section of the city to encourage growth.	Budgeted **$157,639,000** (inflated) for the period 2009-19 on projects including: • drinking water standards rural upgrades ($2,302,000); • Little River (Banks Peninsula) water supply ($4,656,000); • drinking water standards compliance ($9,554,000); • backflow prevention ($68,000); • water supply growth programme ($35,899,000); • water supply renewals and replacements ($92,755,000); • water supply security ($392,000); and • water supply for Akaroa ($8,338,000).

Local authority	Main challenges identified	Capital expenditure set out in the 2009-19 long-term council community plan
Central Otago District Council	The Council has identified several interrelated challenges: • Reducing demand because consumption is currently very high. High consumption is problematic for two reasons. First, the Council expects Otago Regional Council to reduce the amount of water the Council can take when some resource consents are renewed. Secondly, the size of new infrastructure required is affected by consumption (that is, the more water required, the larger the infrastructural requirements). • Complying with the drinking water standards. Upgraded infrastructure is required before the Council can comply. • Affordability and funding of the required infrastructure upgrades. Other challenges include: • Current water supply systems are energy intensive. Reticulation requires a lot of pumping, and therefore electricity, which is increasing operating costs. The systems were originally designed to pump a lot of water in a low operating cost environment. • Pressure management – the system for pumping water from source to reservoir produces very high pressure, increasing the risk of leaks. • Improving operational staff training levels. Through its new asset management plan, the Council has identified a lack of staff training as a key risk for water supply services.	Budgeted **$51,326,977** for the period 2009-19 on a large number of projects on nine separate water supply systems, including new water treatment plants, telemetry, reservoirs, valves and hydrants, tobies, backflow prevention, water meters, investigations, asset management plans, bore redevelopment, and reticulation.
South Taranaki District Council	The Council has identified the main future challenges as: • infrastructure upgrades are required to manage risk, increase resilience, and improve the efficiency of the systems; • current water treatment systems will not comply with the drinking water standards, and investment in new infrastructure is required to comply with those standards; and • risks to security of supply from drought, and pressure from Taranaki Regional Council to minimise the amount of water taken from some sources and find additional sources of water.	Budgeted **$81,079,000** for the period 2009-19 on 50 projects covering improvements to water treatment plants, pressure management, water meters, backflow prevention, reticulation networks, and investigating new sources of water.

Appendix 6
Sustainable development approaches to supplying drinking water

Local authority	Approach to sustainable development
Tauranga City Council	The Council's approach to sustainable development and water supply appears to be largely focused on environmental sustainability. However, the Council has identified sustainable development as an area of future focus. The Council adopted a corporate approach to sustainability in October 2008. This means that the Council will take opportunities to enhance environmental sustainability in all areas, considering improvements and making them where practical. In terms of water supply, the City Waters team has adopted a "Source to Sea" approach. It is shifting focus to investigating opportunities for integrating the management of storm water, water supply, and wastewater. The City Waters team also aims to "balance efficiency, environmental impacts and future needs" to deliver water services. The water supply asset management plan identifies environmental awareness and sustainability as a growing community expectation. It links sustainability to the need for demand management techniques and reducing consumption. The Council has an active water demand and conservation programme and uses lifecycle management to manage its water assets. The water supply asset management plan includes an item in its improvement plan to do further work on sustainability. We found no written information on how the Council intends to deal with social and cultural sustainability in terms of water supply.
Nelson City Council	Actions consistent with taking a sustainable development approach include: • universal metering and charging; • hydro-electric generation at the treatment plant; • re-using abandoned pipes as service ducts; • preference for gravity pressure rather than pumping; • timing pump use to off-peak; and • programmes to investigate and remedy water loss. Other actions under consideration and investigation include: • use of hydro and solar power generation; • demand reduction; • requirements for rainwater and greywater use for non-potable water; and • promotion of efficient and sustainable appliances, fittings, and pipes.
Kapiti Coast District Council	The Council published Water Matters Kapiti Coast District Sustainable Water Use Strategy in 2003. This Strategy views water as a finite resource. It states that the Kapiti community must make decisions about its use – for residential uses and economic development. The Strategy also states a preference for sustainable water management within each local catchment area. The Council has adopted a change to its District Plan. All new dwellings constructed in the Kapiti Coast District will be required to have either a 10,000-litre rainwater collection tank for toilet flushing and outdoor uses or a 4500-litre rainwater tank for toilet and outdoor use plus a greywater collection system for underground garden irrigation. The Council has taken several actions to encourage sustainable water use, including: • *Green Plumber* offers free advice on leak detection; • *Green Gardener* offers free advice on adapting gardens to local conditions; • Sustainable Living is a two-day garden show event with an overall theme on sustainable water use; • Plan Change 75 requires the use of rainwater and greywater for toilets and underground garden irrigation systems for all new developments; and • the Council installed a bore pump at Campbell Park in Paekakariki for irrigating the park. This reduces the demand on the water treatment facility.

Local authority	Approach to sustainable development
Tasman District Council	The Council is primarily focused on economic development – encouraging growth and focusing on providing more water to meet demand. It is actively seeking resource consents (for greater water abstraction and supply augmentation) to meet increased water demand generated by the growth in the district. The Council has started an integrated catchment management project with draft water policies and rules for managing the district's water resources. One example of this is the Council's participation in the Integrated Catchment Management for the Motueka River project. This is a nine-year project that investigates sustainable land use practices and effects on river and stream systems. The project also attempts to answer a range of questions (for example, about how water should be allocated during water shortages).
Opotiki District Council	The Council has made economic development a priority, but has not shown enough evidence of an integrated approach to planning. The Council has prepared proposals to expand agriculture in the area, develop the harbour and marina, and build a mussel farm. However, we have not seen strong evidence that the Council has considered the effect that these developments will have on water supply. The Council has publicly available information related to leak detection in homes and encourages the use of low-flow showerheads.
Christchurch City Council	The Council is aware of sustainable development principles, and prepared a Sustainability Policy in 2008. This policy is a high-level policy framework to help guide the Council's activity. The Council identified two key aspects in considering "sustainability" in its 2006 Asset Management Plan – the availability of the water resource and the capacity of the Council's asset infrastructure system. The Council's Greater Christchurch Urban Development Strategy has given some consideration to taking a sustainable development approach to water supply. The Council is also preparing a water use strategy. The Council has recognised the importance of a demand management programme that focuses on reducing water demand. The Council is also continuing to work on the Water Supply Strategy 2009-2039 to ensure the security and delivery of clean and safe drinking water. In terms of water supply, the focus is shifting to investigating opportunities for integrating the management of storm water, drinking water supply, and wastewater. There is no financial incentive for installing rainwater tanks and water-saving devices in homes. It is unclear whether installing rainwater tanks is a cost-effective way of approaching water shortages in the Canterbury region. The Council has hired consultants to model the benefits of installing rainwater tanks under a number of different options in Akaroa (the city's most water-short community). The results of the study will inform the Council's future policy directions.
Central Otago District Council	Based on the information available at the time of our audit, we consider that the Council has started to take a sustainable development approach to supplying drinking water. The Council adopted a Strategy for Sustainability in August 2008. This includes a discussion of what sustainability means in Central Otago. It notes water conservation is one area where this strategy can be implemented. The 2009-19 LTCCP includes a section on sustainability that cross-references to the above strategy. The 2009 water supply asset management plan also includes a section on sustainability that cross-references to the above strategy.
South Taranaki District Council	We did not find information explaining how the Council is taking a sustainable development approach to supplying water. However, the Council does have a strong focus on facilitating economic development.

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