# Auckland Regional Water Demand Management Plan

June 2011

Watercare services limited

## Executive Summary

Watercare Services Ltd (Watercare) is the water and wastewater service provider for Auckland. It is a limited liability company, wholly owned by the Auckland Council, and operates assets valued at $7.5 billion and has annual revenue of around $466 million.

By law Watercare has to manage its operations efficiently with a view to keeping the overall costs of water supply and wastewater services to its customers at minimum levels. The company does not operate to make a profit and it is prohibited by statute from paying a dividend to its owner.

The company's vision is to deliver **outstanding and affordable water services for all the people of Auckland.**

Watercare collects, treats and distributes drinking water from 11 dams, 26 bores and springs, and four river sources. A total of 140 billion litres of water is treated annually at 20 plants and distributed via 149 reservoirs and 108 pump stations to 450,000 households.

Our water distribution network includes more than 9,000 km of pipes. If that length of pipe were laid end-to-end it would stretch from Auckland to Shanghai.

On the wastewater side, Watercare collects, treats and disposes of wastewater at 19 treatment plants and operates 7,000 km of sewers. The company also works with approximately 1,700 customers on the transfer, treatment and disposal of trade waste.

Watercare supplies drinking water to around 1.4 million people. Auckland's population has doubled in the last 30 years, and more than 2 million people are expected to live in the city by 2040. This growth leads to higher demand and new water sources will be required. As our population continues to increase, reducing per capita consumption also delays the need for the development of costly infrastructure.

Water conservation is important to the sustainable use of natural resources as well as the wellbeing of our communities. As well as the sustainability considerations of encouraging people to use natural resources wisely, water efficiency makes good economic sense. Since Aucklanders pay for water on a metered (volumetric) basis, households and businesses that use water wisely are better off.

Auckland is already more water-efficient than most New Zealand towns and cities, and it compares well internationally. The region's current demand is about 140 litres per person per day less than it was in 1980. The financial benefits of these savings in terms of deferred investment are considerable. If per capita consumption had remained at the high levels observed in the late '80s the cost of providing new treatment works and other infrastructure to meet this demand would be over $400 million in today's prices.

The water demand savings target adopted by Watercare in this document is for a **15% reduction in gross per capita consumption by 2025** as set out in the Three Waters Strategic Plan. This target is ambitious and marks a significant commitment beyond the 5% per capita reduction target set in the 2004 region-wide water management plan, From the Sky to the Sea.

Reducing per capita consumption by 15% requires engagement with a wide range of stakeholders to ensure that strategies to help reduce the demand for water are effective. Collectively these approaches are known as demand management.

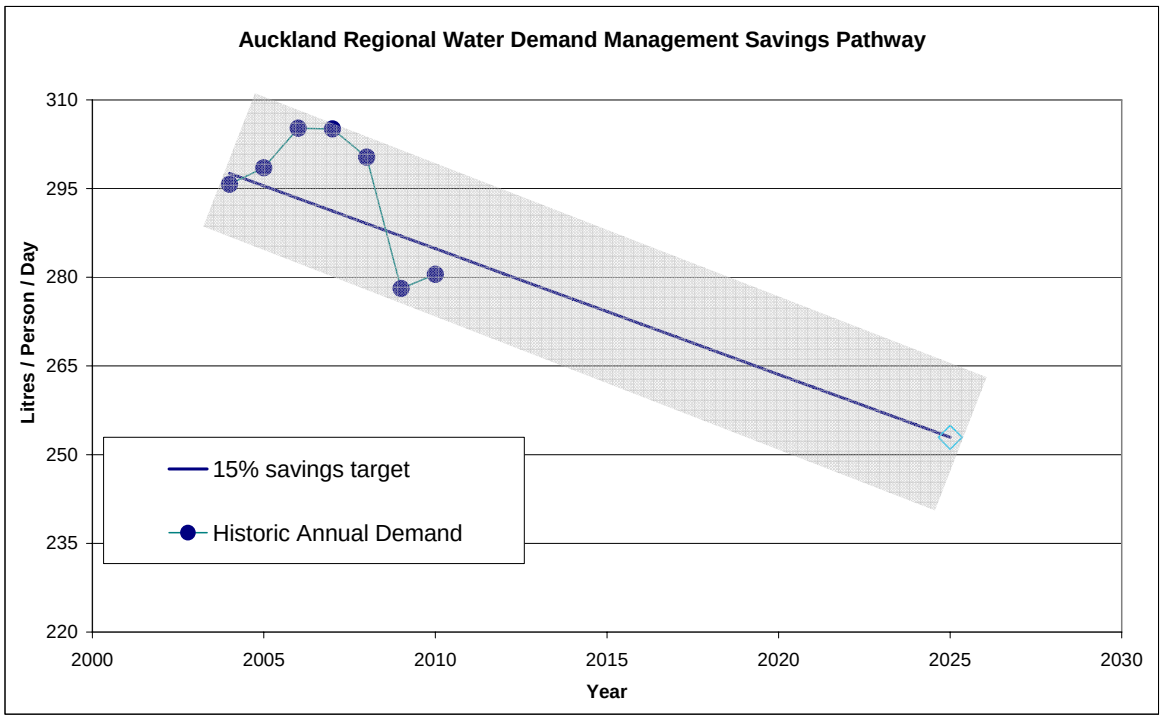
In developing water demand management approaches for the region, Watercare has considered previous local water demand programmes, overseas best practice and various national and local studies.

A key and effective tool for managing demand is charging for water based on consumption. Globally this is considered best practice in encouraging demand management and is already undertaken in Auckland. Price is also an effective tool in encouraging efficient water use. However, Watercare's statutory requirement to minimise costs and ensure that prices remain affordable presents more challenges to solely using price as a lever to limit demand.

As part of this Plan's development, Watercare has surveyed its customers and consulted with its Maori and Environmental Advisory Groups. It has also discussed the Plan with Auckland Council and sought feedback about the proposed demand management options.

Watercare's approach to demand management is built on best practice which includes *engaging* with customers and *educating* them about water efficiency. We also want to *encourage* people to change their behaviour and use *economic* tools to incentivise behaviour. Demand management may also require the *engineering* of new approaches to saving water and potentially to *enact* new regulations.

Programme performance against the 15% target will be measured within a tolerance for demand variability, uncertainties and the lag between implementation of water efficiency measures and when they take effect. The figure below shows the demand management journey to date and for the next 15 years.




Monitoring and evaluation of the adopted approaches is essential to ensure cost-beneficial demand management options are being implemented and savings are being achieved.

As a new integrated water and waste water company Watercare will continue to gather information which will inform the future programme and regular updates are planned.

The options and key actions in the first year are summarised in the table below. A full programme of works is included in Appendix 1.

| | |
|---|---|
| Schools' water use | Continue existing education programmes and continue working with schools to reduce high water use |
| Indoor water use | Work with government to investigate how to implement new guidelines to minimise water use in new homes |
| Large water users | Continue working with Housing New Zealand to meet targets for reduced consumption and continue to pilot options with other large water users for example tertiary education providers, health providers, manufacturers and hotel/restaurants/accommodation providers |
| Non-revenue losses | Meet targets to minimise non-revenue losses (fire fighting, operational use, water main bursts and leaks) |
| Auckland Council | Work with Council to reduce the water used for irrigation of parks and the water used in public buildings |
| Promotion of devices | Continue to promote water efficient devices to customers using existing national standards |
| Domestic customers | Investigate how domestic customers use water outside in the summer and identify options to reduce this demand |
| Commercial water use | Continue supporting a national study to investigate how water is used in commercial buildings and identify options for improving water efficiency |
| Metering | Maintain universal metering across the Auckland region |
| Council Controlled Organisations | Develop pilot studies to reduce the water used in operations and promote water efficient messages to staff |
| Price | Continue to provide affordable water in accordance with the Statement of Corporate Intent |
| Communications | Continue to communicate with customers through Watercare's website and other communication channels while also promoting water efficiency on customer bills |

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# Appendices

# 1 The importance of demand management

## 1.1 Effective resource management

Water is a precious resource that needs to be valued and managed effectively to provide for its continued use in our lives. Efficient use of water is not a practice limited to drought-stricken countries but is a vital component of effective water management throughout the world.

Within New Zealand, the initial framework for considering demand management is set out in the *Resource Management Act 1991.* The aim of the Act is to promote the sustainable management of resources, which is defined as:

*"managing the use, development, and protection of natural and physical resources in a way, or at a rate which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety…"*

Watercare's *Statement of Corporate Intent* (2011) sets six key goals that reflect its public and legislative responsibilities, including:

*Ko te wai Maori he taonga tuku iho, kaaore he take tua atu i tenei: ki te kore te wai, matemate katoa tatou. No hea tenei kupu? Ma ori – 'ma ori ori': i heke mai te wai i te rangi, i a Ranginui, ki runga i a Papatuanuku.*

Freshwater is a treasure that has been passed down to us, there is no more important issue: if there is no water, we all die. Where does this word 'Ma ori' come from? It encapsulates the continual descent of water from Ranginui, the Sky Father, to Papatuanuku, the Earth Mother.

- **Safe and Reliable Water Supply**: To manage water resources to provide a safe and reliable water supply
- **Sound Financial management**: To meet business objectives at lowest costs
- **Satisfied Customers and Stakeholders:** To provide great service and great value

## 1.2 Effective planning for the future

In a region the size of Auckland, both in terms of population and physical extent, considerable planning and investment is required to maintain a secure supply of drinking water into the future. While it is reasonable to expect that new or augmented water sources will be required, just when this investment might be needed will depend on how efficiently water resources can be managed now and in the immediate future.

The formation of the Auckland Council provided a new and unique opportunity for Auckland and Watercare to assess demand management, to identify water demand saving targets and to develop water demand programmes. The outcome of this plan will be a consistent framework for demand management practices across the region that is appropriate to Watercare's customers and to meet anticipated growth.

Demand management is simply "*the effective and efficient use of water*". The main principles of demand management are that Watercare should strive to supply water in an efficient and effective manner, customers should not waste water and should strive to use water efficiently and demand management should be considered as part of the water resources and water supply planning process.

There are many factors that influence how we use water within our homes, our businesses, our schools and our community facilities. It is this level of complexity that can make it difficult to pin-point and measure where improvements need to be made. But it is also this complexity that will allow for improvements in many different areas to have an overall benefit.

Water efficiency does not mean ***going without***…
But it does mean ***making the best use of what we already have***.

For demand management to be of value there needs to be support at many levels within the Auckland region. Watercare will work with many different stakeholders and organisations to help with water efficiency and ensure demand savings can be achieved.

## 1.3 The wider benefits of demand management

The benefits of a successful demand management programme are wider than simply saving water. The benefits affect our customers, the environment and Watercare.

By advocating water wise messages to our customers, they benefit from reduced charges for water and wastewater as they use less water. Importantly, as people use less hot water they will also use less energy, reducing fuel bills.

Effects on the environment are also reduced by implementing demand management measures across Auckland. Abstractions from the environment will be reduced and will make Auckland more resilient to any water shortages in the future. Furthermore, less wastewater will be produced for treatment and discharge to the sea.

If the demand for water is managed, less water will be abstracted, treated and pumped to homes and businesses. This reduces operational costs and can defer investment in future infrastructure. However, in the short-term reduced demand can impact on revenue, which needs to be carefully managed to ensure water prices remain affordable.

Effective demand management also demonstrates to regulators how Watercare uses water efficiently, an important component of complying with existing and potential future consent conditions.

In short, the benefits of demand management are wide ranging and can lead to real savings to the people of Auckland as well as protecting our environment.

# 2 Water supply management in Auckland

Watercare is the water and wastewater services company for the Auckland region and is owned by Auckland Council. This approach to water management was recommended as part of the 2008 Royal Commission on Auckland Governance. In November 2010 Watercare took over the full range of water and wastewater services in the region, having absorbed the ownership and management of local networks and retail functions from the previous Local Network Operators.

Before integration was implemented, there were inconsistencies in how water demand was managed across the region. The Royal Commission stated that:

> *"Another obstacle to water conservation is the different priorities applied by each of the seven water retailers in Auckland. Some are much more committed to demand management than others."*
>
> *"…if a single entity were responsible for the supply of both bulk and retail water and wastewater services, demand management targets are much more likely to be achieved".*

This sets the context for regional demand management and the effective implementation of appropriate programmes to achieve targets.

## 2.1 Watercare's supply network

The Auckland region covers approximately 5,000 $km^2$ and is home to around 1.4 million people. The climate is sub-tropical, with warm humid summers and mild winters. Rainfall averages 1250 mm per year, although there can be significant local and annual variations. Water shortages have occurred in the past but Auckland is not typically considered to be water resource scarce.

Watercare draws water from different sources in the Auckland and Waikato regions, including dams, groundwater and river water. These sources include ten storage dams in the Waitakere and Hunua Ranges, 26 bores and spring sources across the Auckland region and an abstraction from the Waikato River near Tuakau. The proportion of water taken from each source varies but on an annual basis approximately 60% of water supplied to metropolitan Auckland comes from the Hunua dams, 25% from the Waitakere dams, 10% from the Waikato River and 5% from bores and springs. The location of these sources and key supply pipelines is shown in Figure 1.

Whilst much of the water supplied by Watercare is for the metropolitan area of Auckland, Watercare also supplies water to non-metropolitan (rural) areas, for example towns such as Helensville and Warkworth in the north and the former Franklin District in the south. Appropriately, these areas often have discrete stand-alone water supplies to meet local requirements.

Although there is usually plenty of water in Auckland, droughts do occasionally occur which reduces the available water for supply. As a drought intensifies, Watercare may restrict water use by, for example, implementing a hosepipe ban. At these times water efficiency programmes become vital and may help delay the need for restrictions.

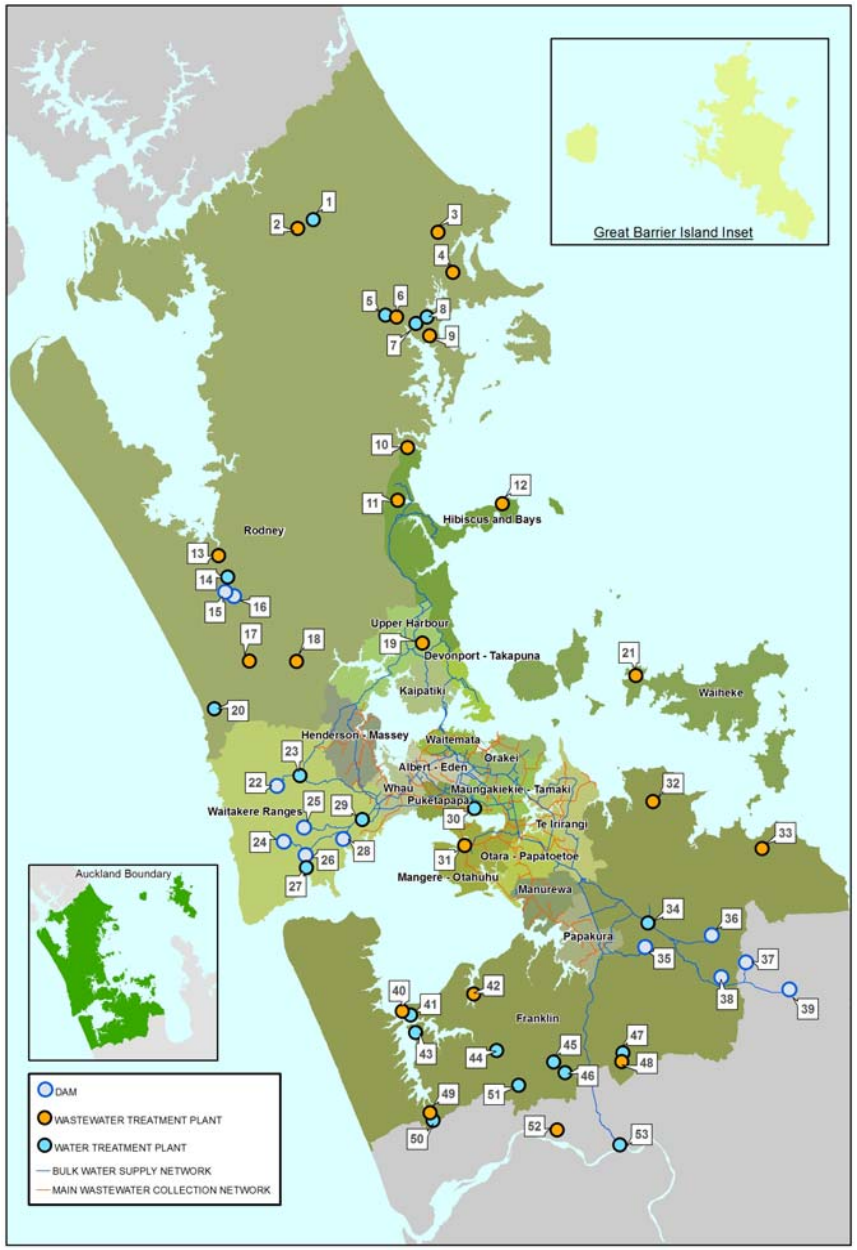



**Figure 1: Map of key sources and supply pipelines**

## Key to map locations

| | | | |
|---|---|---|---|
| 1 | Wellsford Water Treatment Plant | 27 | Huia Village Water Treatment Plant |
| 2 | Wellsford Wastewater Treatment Plant | 28 | Lower Nihotupu Dam |
| 3 | Matakana Wastewater Treatment Plant | 29 | Huia Water Treatment Plant |
| 4 | Omaha Wastewater Treatment Plant | 30 | Onehunga Water Treatment Plant |
| 5 | Warkworth Water Treatment Plant | 31 | Mangere Wastewater Treatment Plant |
| 6 | Warkworth Wastewater Treatment Plant | 32 | Beachlands Wastewater Treatment Plant |
| 7 | Hamilton Road Water Treatment Plant | 33 | Kawakawa Bay Wastewater Treatment Plant |
| 8 | James Road Water Treatment Plant | 34 | Ardmore Water Treatment Pant |
| 9 | Snells Beach Wastewater Treatment Plant | 35 | Hays Creek Dam |
| 10 | Waiwera Wastewater Treatment Plant | 36 | Cosseys Dam |
| 11 | Orewa Wastewater Balancing Ponds | 37 | Upper Mangatawhiri Dam |
| 12 | Army Bay Wastewater Treatment Plant | 38 | Wairoa Dam |
| 13 | Helensville Wastewater Treatment Plant | 39 | Mangatangi Dam |
| 14 | Helensville Water Treatment Plant | 40 | Clarks Beach Wastewater Treatment Plant |
| 15 | Lower Mangakura Dam | 41 | Waiau Water Treatment Plant |
| 16 | Upper Mangakura Dam | 42 | Kingseat Wastewater Treatment Plant |
| 17 | Denehurst Drive Wastewater Treatment Plant | 43 | Glenbrook Beach Water Treatment Plant |
| 18 | Huapai Wastewater Treatment Plant | 44 | Patumahoe Water Treatment Plant |
| 19 | Rosedale Wastewater Treatment Plant | 45 | Pukekohe Water Treatment Pant |
| 20 | Muriwai Water Treatment Plant | 46 | Buckland Water Treatment Plant |
| 21 | Owhanake Wastewater Treatment Plant | 47 | Bombay Water Treatment Plant |
| 22 | Waitakere Dam | 48 | Bombay Wastewater Treatment Plant |
| 23 | Waitakere Water Treatment Plant | 49 | Waiuku Wastewater Treatment Plant |
| 24 | Upper Huia Dam | 50 | Waiuku Water Treatment Plant |
| 25 | Upper Nihotupu Dam | 51 | Douglas Road Water Treatment Plant |
| 26 | Lower Huia Dam | 52 | Pukekohe (Tuakau) Wastewater Treatment Plant |
| | | 53 | Waikato Water Treatment Plant |

# 3 The demand for water in Auckland

## 3.1 Historic water use

This section provides an overview of the historical demand for water in Auckland. Figure 2 shows that the number of people living in Auckland connected to the metropolitan water supply has increased dramatically over the last thirty years. In 1980 the connected population was less than 700,000. Thirty years later the population has doubled to nearly 1.4 million people.

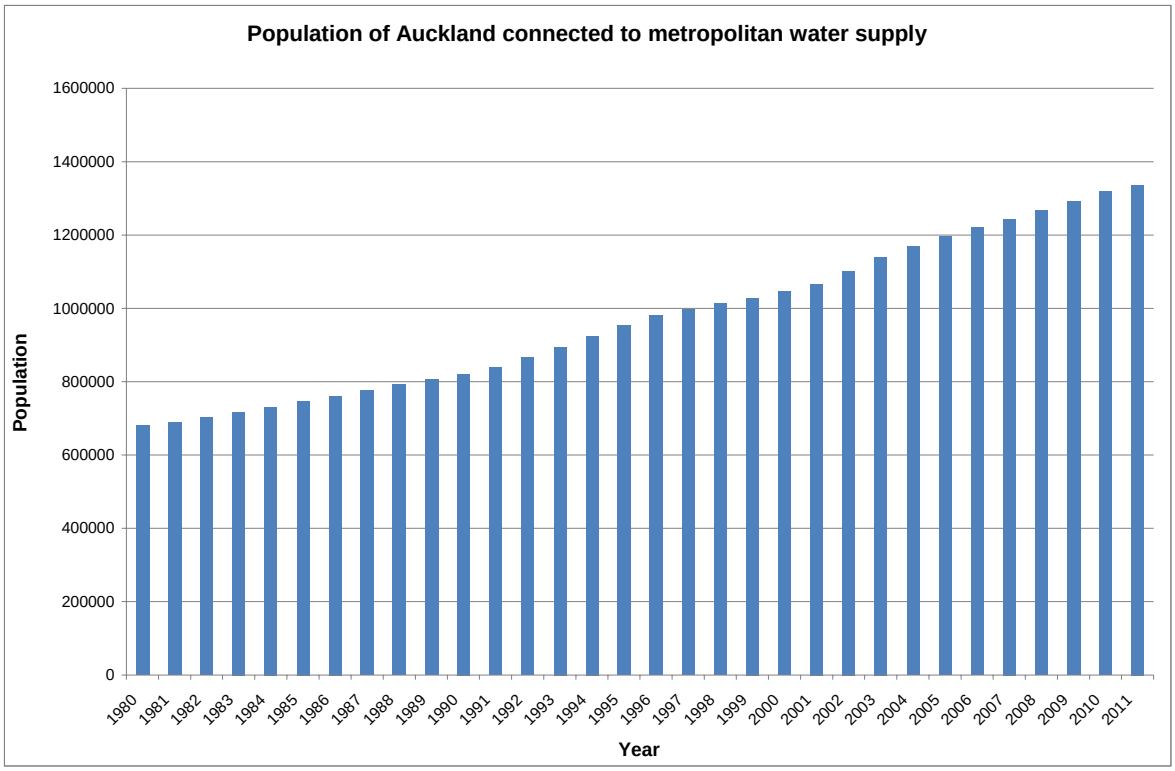



**Figure 2: Auckland's population growth since 1980 (connected to metropolitan water supply)**

Despite this massive growth in population, water consumption per person has reduced. Figure 3 shows how the total demand for water (shown in blue) increased by approximately 100,000 cubic metres per day over the past 30 years. Despite population growth, there was a corresponding reduction in 'gross per capita consumption' (total demand divided by total population) over the same period (shown in red below). Thirty years ago consumption stood at over 400 litres per person per day. Today this has reduced to approximately 275 litres per person per day, a significant decrease in water use.

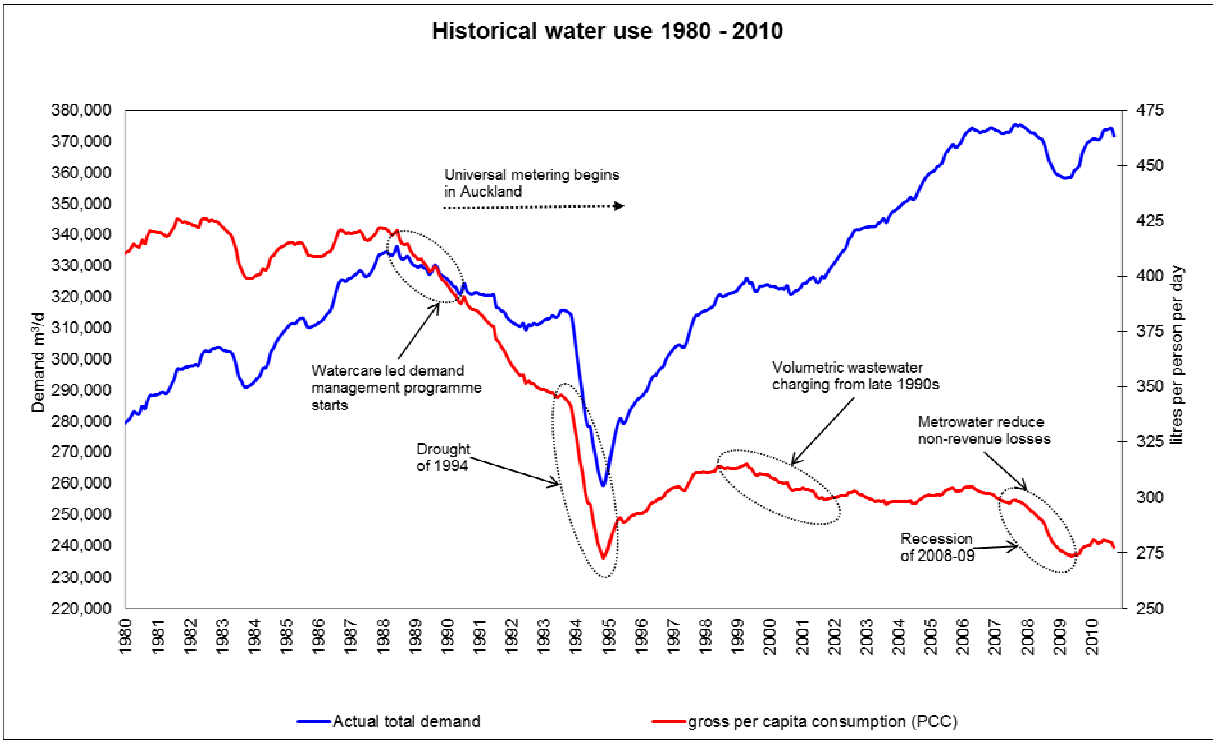



**Figure 3: Auckland's demand for water since 1980**

There have been a number of Watercare and Council led initiatives that have influenced and changed historical water use over the past two decades as highlighted in Figure 3. Significant demand management measures include the introduction of universal metering (including Auckland City from 1990 to 1992), demand management programmes from the late 1980s onwards, volumetric wastewater charging by some Local Network Operators from the late 1990s onwards and non-revenue water loss programmes.

These water demand management initiatives have resulted in current demand being significantly less per day in 2010 compared with 1980. The financial benefits of these savings in terms of deferred investment are considerable. If per capita consumption had remained at the high levels observed in the late eighties the cost of providing new treatment works and other infrastructure to meet this demand would have been over $400 million in today's prices.

Auckland has already come a long way in terms of reducing water use and as a result further reductions are likely to be more challenging to achieve and will require cooperation from all relevant stakeholders.

## 3.2 Current water use

### The water supplied by Watercare

During 2009/10 Watercare supplied 134.6 million cubic metres of water to our customers, or on average about 370,000 cubic metres per day. This is equivalent to 150 Olympic size swimming pools a day. The demand for water is higher in summer as people use more water outside, as shown in the average monthly demand profile (Figure 4).

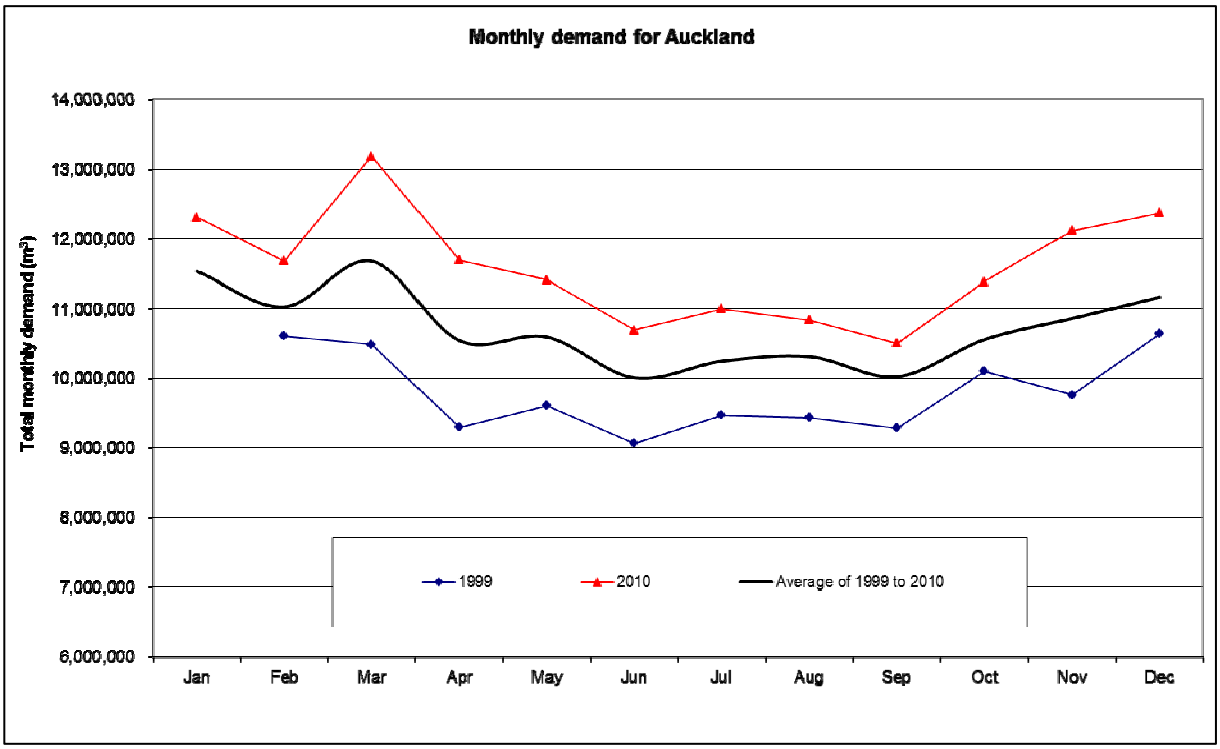



**Figure 4: Average monthly demand for water in Auckland between 1999 and 2011**

The highest monthly demand for water in Auckland was recorded in March 2010, when average daily demand for the month reached 425,000 cubic metres per day. Daily and weekly peaks are higher, with the highest demand recorded in 2008 of nearly 500,000 cubic metres per day. Water stored in reservoirs is available to meet these peaks in demand but significant infrastructure is required to treat the water, pump it through the bulk transfer network and the reticulated network to people's homes. Figure 4 also shows how there is a clear increase in the total demand for water over the last ten years, which has been mainly driven by population growth.

Water is supplied to a wide range of customers. This includes domestic, commercial, industrial, institutional and agricultural users. An overview of the proportion of use from each customer sector for 2009/10 is shown in Figure 5, which is broadly representative of demand patterns for the past 10 years. More information about the different customers is set out in section 4.

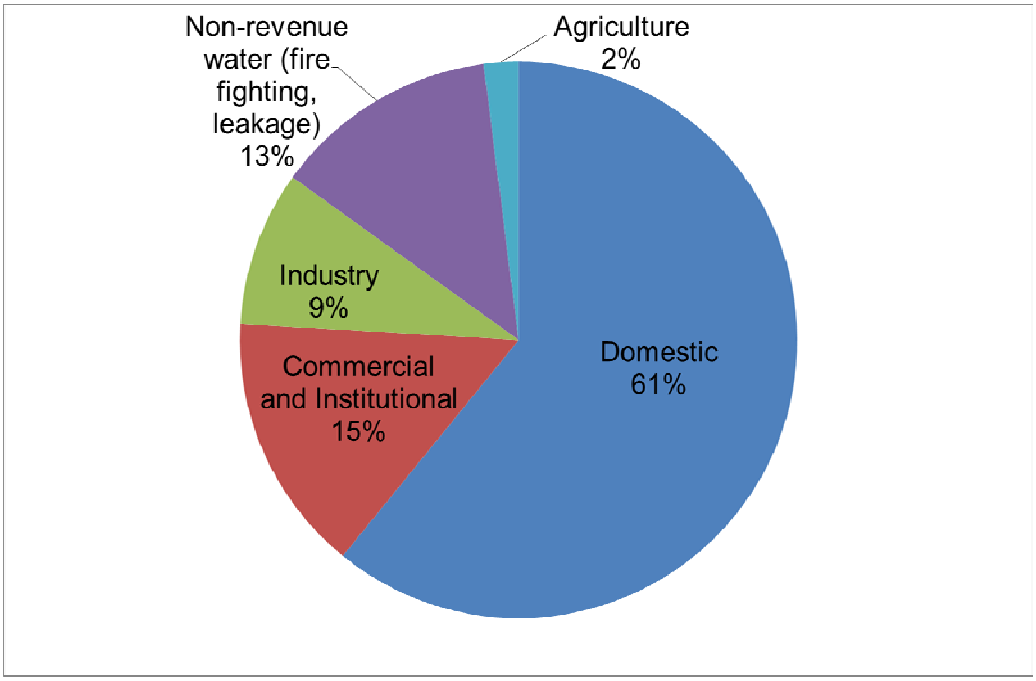



**Figure 5: Volume consumed by customer type in 2009/10**

Non-revenue water is the water that is produced by Watercare but is not charged for. This includes water supplied for use in fire fighting, treatment processes at Watercare's facilities and water lost through the water supply network, for example through leaks and bursts.

## Benchmarking of consumption

It is possible to benchmark consumption and so compare water use over time or in different locations. Consumption figures stated earlier in this report relate to *gross* per capita consumption which is the total demand divided by the population. Comparison using this metric is difficult, as it includes a wide range of demands and external influencing factors. Instead, the *domestic* per capita consumption is frequently used for comparison. This is calculated by dividing the domestic consumption by the total population.

Some information to compare water use in different Local Authority areas was developed by the Auditor General, and is summarised as Table 1.

*Domestic per capita consumption*

Auckland's domestic demand is relatively low when compared to many other New Zealand cities. This shows that Auckland's current metropolitan domestic demand of approximately 175 litres per person per day is similar to Nelson (reported as 180 litres per person per day) and less than Tauranga (reported as 198 litres per person per day). Some of Auckland's non-metropolitan water supplies have domestic consumptions of typically 145-165 litres per person per day.

Overseas information from Australia and the United Kingdom provides more information about water use. Sydney Water report domestic per capita consumption as 160 litres per person per day (although reductions have been driven by the drought in Australia). In the United Kingdom, with its highly regulated water industry, domestic consumption is between 125 and 170 litres per person per day.

It is also important to consider the impact of price when comparing domestic consumption. For example, the average Sydney Water customer pays around 80% more for their annual water and wastewater than the average Auckland customer, with high volumetric charges discouraging excessive consumption.

**Table 1: Water use by New Zealand Local Authorities (Office of the Auditor General, February 2010)**

| Local Authority | Household water meters | Average drinking water consumption (litres per person per day) | |
|---|---|---|---|
| | | Domestic | Gross |
| South Taranaki District Council | No | 408 (excluding farms) | 888 (including farms) |
| Kapiti Coast District Council | No | 440 – 763 depending on the supply | |
| Nelson City Council | Yes | 180 | 500 |
| Christchurch City Council | Yes | Not available | 435 |
| Opotiki District Council | Yes | Not available | 300 |
| Tauranga City Council | Yes | 198 | 270 |
| **Auckland region** | **Yes** | **175** | **275*** |

** The 2025 target is to achieve 255 l/p/d*

*International comparative data*

| | | | |
|---|---|---|---|
| Sydney** | Yes | ~215 | 310 |
| Perth** | Yes | ~290 | - |
| Brisbane** | Yes | ~150 | - |
| UK (average) | Yes | ~125-170 | - |

***Based on the WSAA 2009-10 performance report*

*Gross per capita consumption*

Auckland's gross consumption of approximately 275 litres per person per day is similar to Tauranga, reported as 270 litres per person per day, but significantly lower than many other towns and cities in New Zealand.

Sydney Water report gross per capita consumption (weather corrected) as approximately 310 litres per person per day. However, any comparison of gross per capita consumption should be treated with caution due to other external factors impacting on demand.

Based on this information, Auckland's existing performance is excellent for New Zealand and compares well internationally. However, there are still some opportunities to reduce water consumption and demand further.

## 3.3 Future water use

### Key demand drivers

It is essential that Watercare forecasts the future demand for water to ensure there is sufficient available for people's needs. Currently the key drivers for water use are the summer peak and the potential growth in population.

The increased consumption of water during the summer means that Watercare must provide significant capacity at its sources, water treatment works and in its pipelines to make sure that customers can use the water they require. This summer peak period drives much of the investment in new infrastructure. Demand management approaches could be used to help reduce the summer peak demand for water.

The growth in Auckland's population has been the main factor affecting the overall demand for water. Even though per capita consumption has significantly reduced over the last thirty years the population has doubled, increasing overall consumption. In the future this trend is expected to continue. Demand management alone will not be able to reduce the demand for water sufficiently so that the increased population can be supplied by the current level of use of the existing water resources.

Watercare is currently developing a forecast of the future demand for water as part of its 2011 Asset Management Plan. This will take a wide range of statistics into account, including forecast changes in population, changes in the customer base including industrial and commercial economic drivers and the effect of Auckland's spatial plan and this demand management plan. This demand forecast will be published later in 2011.

### The Auckland Plan

"*Auckland Unleashed*" is the title of the Auckland Council discussion document that sets out the ideas and initial proposals that will go towards creating the draft Auckland Plan. It is intended that the Auckland Plan will be adopted by the end of 2011 in order to give a basis for the 2012-2022 Long-Term Plan.

In this document, Auckland Council forecast that the population will increase by approximately 700,000 over the next thirty years, reaching over two million people by 2040. This is a significant population increase and will be a key driver for water demand in Auckland.

One of the issues that the spatial plan will consider is how to accommodate anticipated future growth. Growth can be either accommodated by increased intensification within the existing metropolitan urban limits, or by expanding outwards. This decision will impact on water demand (due to changes in occupancy and water consumption patterns). Further consideration will also need to be given to the balancing of demand management against economic growth. The economic base of the region supports the population and as the region grows it will be important to ensure that water does not become limiting to economic growth but that where needed it is used efficiently.

## The benefits of demand management

Demand management will not replace the need for new infrastructure and water resources, but it can defer when these will be required. A schematic which illustrates how reduced demand can defer investment in new water sources is presented as Figure 6. The solid lines show when investment would be required to meet increasing demand. The dashed lines show the potential effect of demand management reducing demand and delaying when infrastructure investment is required.

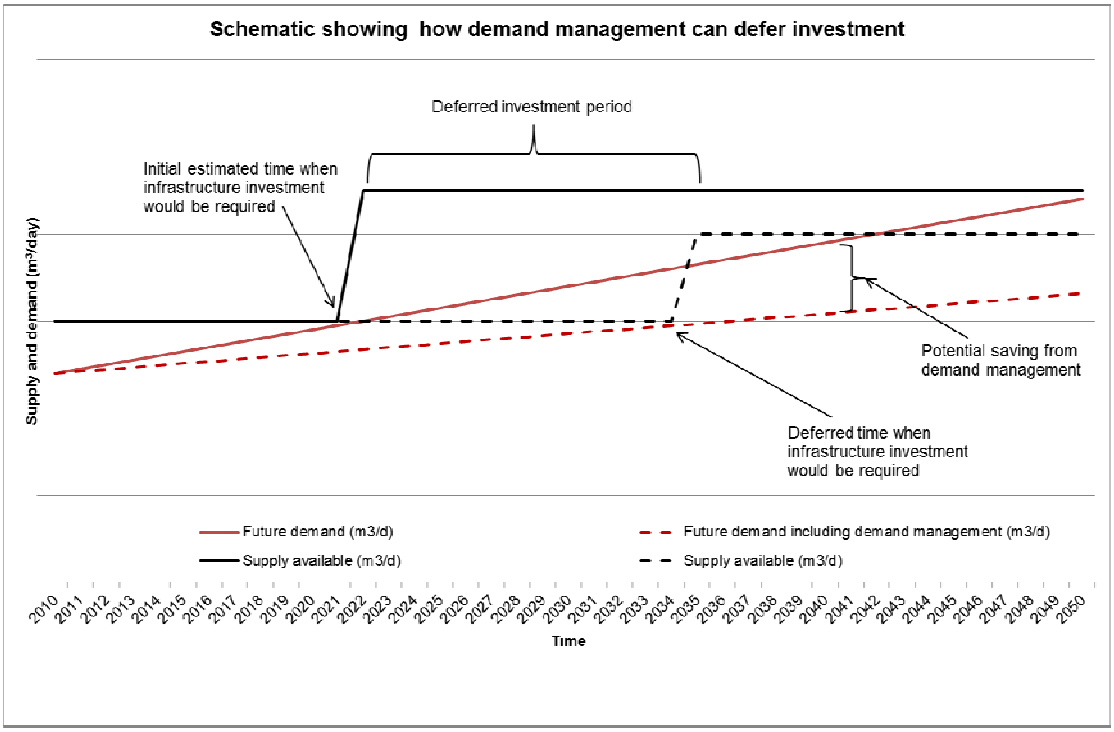



**Figure 6: Schematic showing the effect of demand management on the timing of new infrastructure**

# 4 Customers' use of water

This section provides an overview of how Watercare's customers use water.

## 4.1 Water use in people's homes

To understand how water efficiency could reduce water use, it is important to first understand how people use water in their homes. An extensive study of the water use in Auckland households was carried out by the Building Research Association of New Zealand (BRANZ) for Watercare in 2008. A total of 51 households spread across the city were studied from February to August 2008. Water use was accurately recorded using high resolution water meters which record flow every ten seconds. The data were analysed to determine the frequency of use of different appliances and the volumes of water used. The results of this study were used to assess which water efficiency options can be best used to reduce water use in Auckland. Figure 7 show how water use changes between summer and winter.

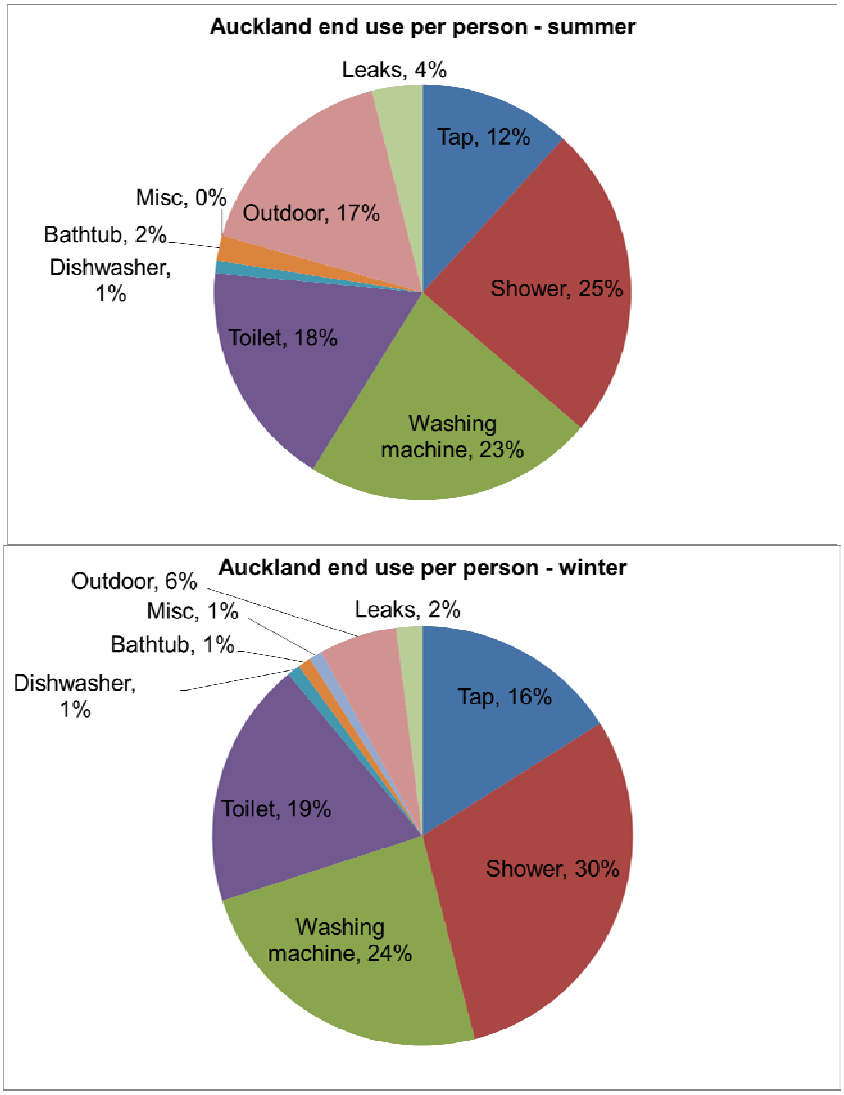



**Figure 7: Auckland customer water use during the summer and winter**

Figure 7 on the previous page shows that the outdoor use reduces from 17% of daily use in the summer to 6% in winter. The other major components of demand are reasonably constant all year and are described as leaks, taps, showers, washing machines and toilets. The bathtub, dishwasher and miscellaneous use are considered minor as it is only 3% to 4% of daily use. The major different types of water use are reviewed below, to consider where water use could be reduced. Reference is made to water efficiency standards included in the Water Efficiency Labelling Scheme (WELS), introduced to New Zealand in 2010. More information about this scheme is included as section 6.1.

**Leaks**

Leaks from properties include dripping taps and other fittings, plus leakage from the supply pipe between the meter and the house. Approximately one in ten houses in the study was shown to have 98% of the leakage; the remainder hardly showed any leaks at all. Some of the leaks were substantial, being far in excess of the water used in the house.

**Taps**

The study found that the majority of indoor taps were used efficiently. People do not tend to use taps for long periods (i.e. several minutes) and over 80% of uses would receive the WELS 6 star rating.

**Showers**

The results of the study show that showers are the highest use of water in Auckland homes. Although this is the highest use of water, the average length of time that people spend in the shower is between six and seven minutes and people shower on average just less than once per day.

A wide range of shower flow rates were measured in the study, from as little as three litres per minute to a maximum of approximately twenty. The average was approximately eight litres per minute and approximately 65% of showers would receive the WELS 3 star rating, the highest available category for showerheads.

**Washing machines**

The study found that 94% of machines are top loading, with the remainder being front loading machines. There was a wide range in volumes per load, from as little as 50 to above 190 litres. The average water use for a load of washing was 122 litres and on average there were 5.6 loads per household per week, or 0.35 loads per person per day.

Standards for washing machines are related to the load capacity of the machines, which was not captured as part of this study. For example, a WELS 4 star rated washing machine would use less than 52 litres of water for a 5 kg load.

**Toilet**

The study found that toilet flushing represents approximately 24% of water used in the home and that the average flush volume is 6.6 to 6.8 litres. Similarly to other devices, there was a wide range recorded between approximately three and thirteen litres per flush.

The results were compared against the WELS scheme requirements shows that the majority would receive a very low rating (0 stars) and only around 6% of toilets would be classed as 2 stars or better.

This information and analysis highlighted the key areas where improvements could be made to reduce water use inside the home. These are:

- Customer leaks, where one in ten customers is likely to be wasting water unnecessarily
- Washing machines which on average are highly inefficient
- Showers, where although average use is efficient a wide range of water use was recorded
- Toilets, where new designs use significantly less water than older models

## 4.2 Industrial, commercial, institutional, and agricultural customers

Industrial use represents approximately 10% of the total daily water consumption across Auckland. The top ten industrial users in the Auckland region consume in the order of 20,000 cubic metres per day. Large industrial users typically include process industries, manufacturing and food and beverage producers.

Commercial and institutional demand represents around 15% of the total water delivered by Watercare. Commercial and institutional customers are highly varied, from multi-storey commercial premises in the city to small local shops in the suburbs. An important component within this sector is Auckland Council's own demand for parks and sports-field irrigation and the very wide range of other community facilities that they are responsible for.

Although there is a perception of Auckland being a large urban area, on the outskirts of the metropolitan area there are a number of rural and agricultural users that are supplied by Watercare. These customers represent approximately 2% of the total water supplied, with the majority of use for horticulture. Many other large agricultural organisations have their own water supplies and do not rely on Watercare's supply system.

There is limited information available regarding the nature of water use by existing industrial, commercial, and other customers. With limited information about these sectors it is more difficult to identify approaches that will successfully reduce water use. However, some work is currently being carried out by the Victoria University of Wellington to investigate the water used in commercial buildings. Figure 8 on the following page presents the initial results, which shows the water used in different buildings related to net floor space. Preliminary results show that water use is consistently lower per square metre in Auckland and that even the highest users consume significantly less water in Auckland compared to Wellington. This is likely due to previous demand management programmes in Auckland, including universal metering.

Further information about actual water use is needed to identify potential water saving options and possibly develop benchmarks or targets for this sector. Watercare is currently working with BRANZ as part of a national study to collect improved information for non-residential water-use.

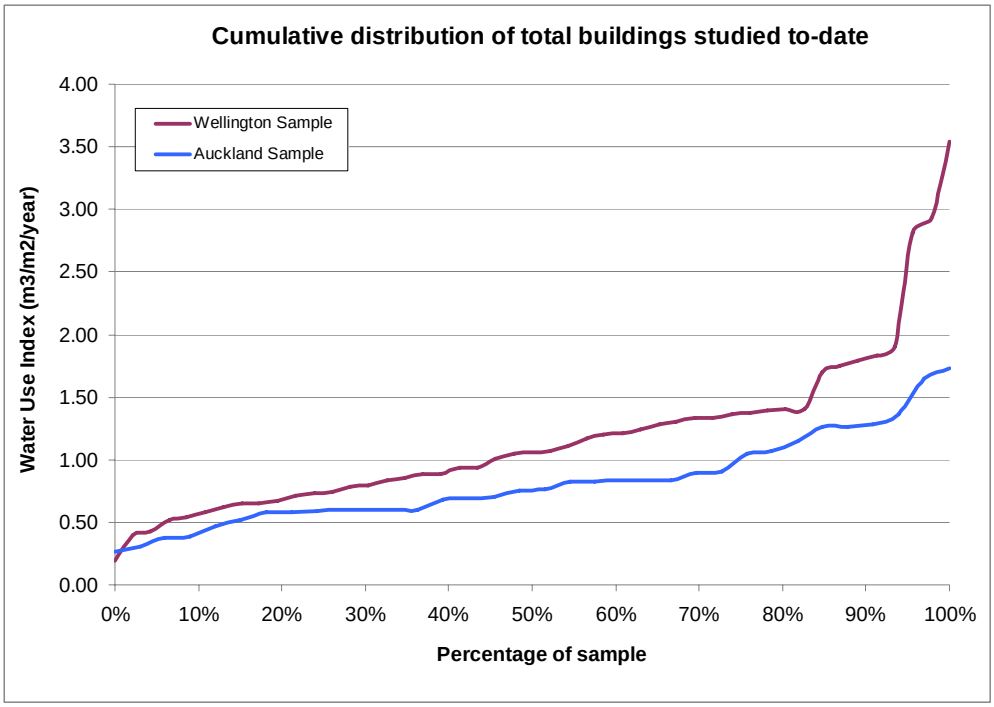



**Figure 8: Water used in commercial buildings (ref Victoria University of Wellington)**

## 4.3 Customer attitudes to demand management

Most approaches to demand management involve engagement with customers at all levels. Research completed by the Ministry for Environment and to which Watercare contributed (*On Tap? Attitudes, behaviours, and perceptions of household water use – informing demand management*, 2009) noted that water use behaviours can be very personal and making one-off actions is easier than changing habits. People may not necessarily understand the need to conserve water, particularly from an environmental perspective, but they do understand that saving money is important.

Project Oracle, *Water Usage and Conservation across the Auckland region*, was a survey that ran between October and November 2007. Nearly 1,500 households and businesses across Auckland were surveyed to determine water usage and conservation behaviours. This included how consumers value water, what motivates behaviour change, the impact of water efficiency products, future infrastructure needs and key initiatives for encouraging wise water use. Findings from the survey included:

- Water users were generally divided into 3 groups: 53% Pale Greens (conservation-conscious), 36% Traditionalists (water conservation not their responsibility, unrestricted right to use) and 12% Do-Nothings (water less valuable, only think about it when necessary, unrestricted right)
- Most water users regard water as a ‘valuable resource’ but awareness of water conservation and high water usage as an environmental issue is low
- A ‘sufficient’ number of householders would consider paying for water efficient domestic technologies
- Water itself is not widely regarded as a major expense by most businesses
- Infrastructure provision should begin sooner rather than later according to respondents
- There was little support for using public money to fund water efficiency retrofits

# 5 Options for demand management in Auckland

## 5.1 Development of the Plan

Potential approaches to demand management were developed by considering existing information and best practice. This included bringing together previous demand management approaches used in Auckland and New Zealand, best practice from overseas and a review of how people in Auckland use water. This information was combined with the drivers for water supply in Auckland in the future, which include population growth, infrastructure requirements and the requirements of regulators. The process of how this Plan was developed is illustrated in the flowchart in Figure 9. This also identifies the key processes of consultation and future monitoring, which are described later in this report.

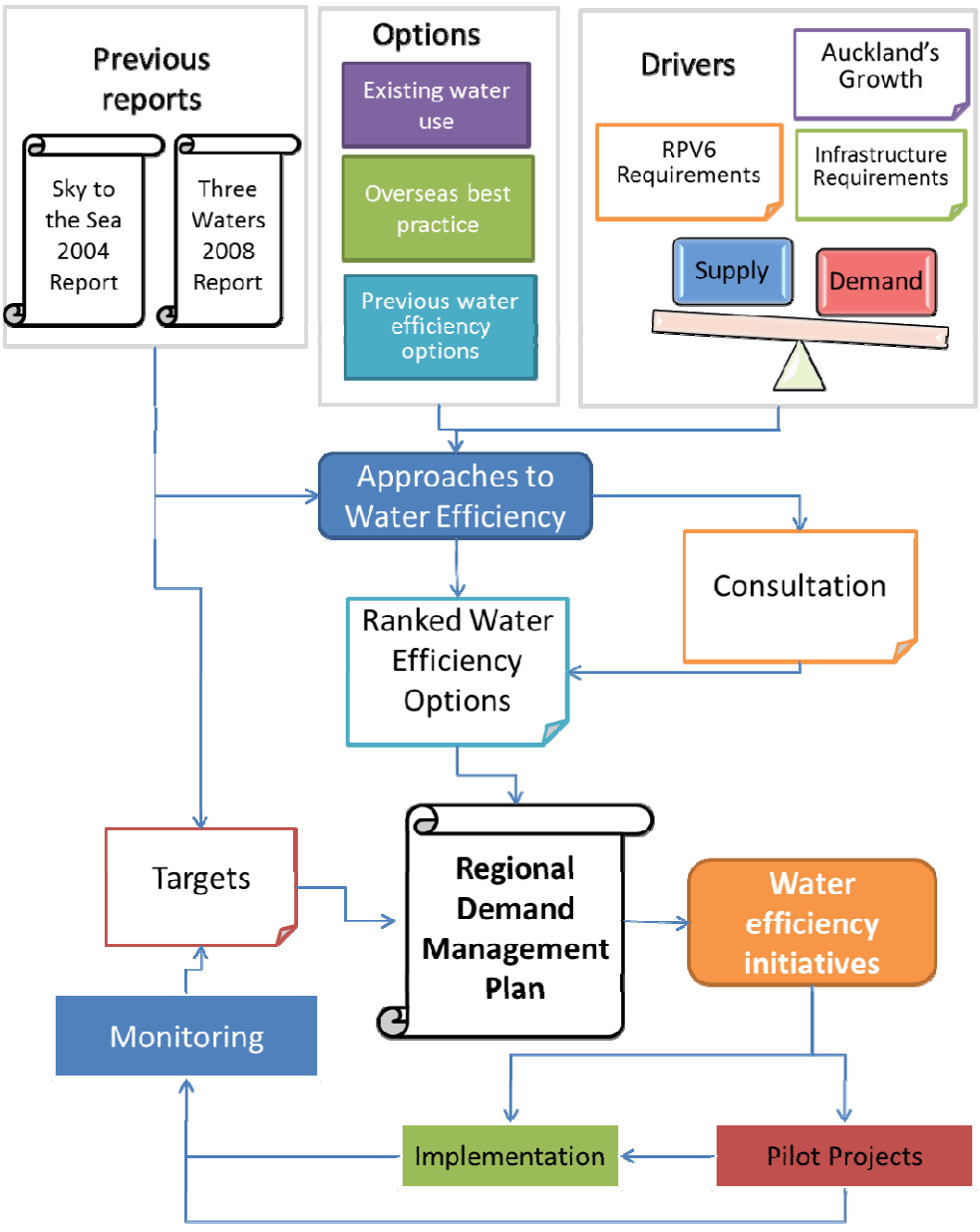



**Figure 9: Flowchart showing how this Plan was developed**

The water allocation section of Waikato Regional Council's Regional Plan: Variation 6 (RPV6) addresses both supply and demand. It sets the requirement for the development of a Water Management Plan that introduces demand management measures. As Watercare's abstraction from the Waikato River is regulated by the Waikato Regional Council, this Plan takes into account the requirements of RPV6.

## 5.2 Watercare's vision for demand management

Demand management is a holistic process that involves Watercare and its customers. Communication of messages about water efficiency is central to Watercare's vision. This Plan has been developed by considering the Six Es of water efficiency and demand management, presented as Figure 10.

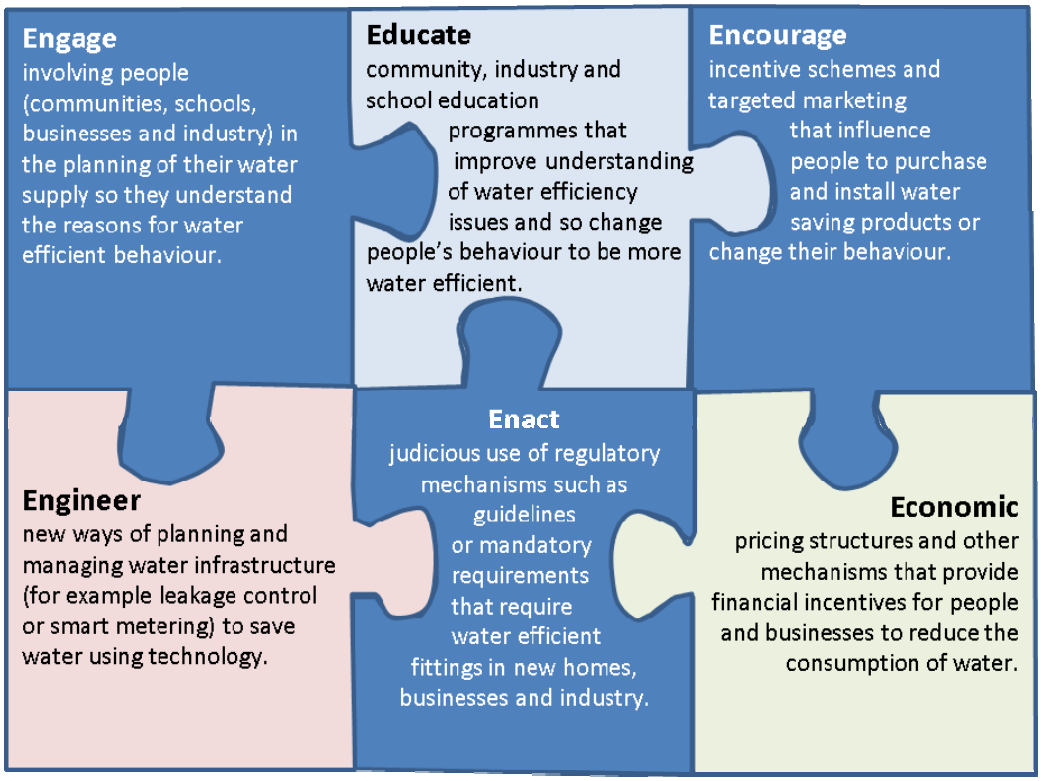



**Figure 10: The six Es of demand management**

The Six Es provides an overall framework for Watercare's approach to demand management, the development of options and projects and how messages are communicated to customers. This recognises the importance of people, focusing on approaches to **engage** and **educate** them about water efficiency. It also recognises that this is unlikely to be enough to meet the ambitious target for Auckland; it is therefore important to **encourage** people to change and use **economic** tools to incentivise water efficient behaviour. Watercare, Auckland Council and others also have an important role to play; these organisations should **engineer** new approaches to saving water where possible. Finally, to ensure that the forecast growth can meet the standards required for Auckland, it may be necessary to **enact** new regulations to ensure these standards are achieved.

Within this vision and framework, any demand management options identified need to be qualified as being cost beneficial to the region while also satisfying social, cultural, environmental and economic well-beings.

## 5.3 The demand management toolbox

As a starting point for this project, the water efficiency work that was carried out by the former Local Network Operators has been reviewed. This includes projects with schools, large water users and programmes to engage with customers and encourage them to use less water.

The *Sky to the Sea* report identified a suite of tools that can be used to influence supply and demand of water. *Demand management* involves targeting the activities of consumers to promote more efficient water use and dissuade unsustainable practices and wastage. *Supply management initiatives* involve the role of water wholesalers and retailers in preventing water loss and wastage within the network, maintaining water quality, and ensuring that there is adequate water supply to meet the reasonably foreseeable needs of both present and future generations.

Based on this work, Watercare shortlisted a total of 17 different approaches to demand management. These are summarised as:

1. Large water users – Identification of potential areas to reduce water use and develop large user / industrial programmes.
2. Communications and provision of information - Provide customers information about water use, ways of saving water and customer-side leakage.
3. Residential Customer water efficiency initiatives – to better understand customer use, behaviour and attitudes, to target programmes better and encourage water wise behaviour.
4. Promotion of efficient devices - Work with government, Auckland Council and retailers to promote water efficient appliances in existing homes and businesses.
5. Regulation of indoor water use - Change of bylaws, regulations and/or building codes to require installation of water efficient devices in new developments.
6. Commercial water use - Develop an audit toolkit and other key tools to enable existing commercial customers to reduce water use.
7. Schools' water use - Continue to work with schools to advocate water wise messages and investigate/implement initiatives to make more water savings.
8. Metering - Investigate future opportunities, improvements, technology advances and synergies with other utilities.
9. Price - Understanding price impacts of water and wastewater charging, including tariffs and volumetric charging.
10. Non-revenue losses – improve understanding and management of system to reduce non-revenue losses where practicable and economic.
11. Watercare and other Council Controlled Organisations water efficiency programmes - Identify areas of high water use during operation and develop capital or operational schemes to reduce this. Advocate water wise messages internally.
12. Auckland Council's water use - Water efficiency leadership by Auckland Council including targets for water efficiency.
13. Options (13 – 16) relate to the beneficial use of non-potable water (greywater and stormwater), either for new build or retrofit.
17. The beneficial use of treated wastewater for industrial or other uses.

Options 13-17 are considered supply-side solutions rather than demand management options. However, they were included in this assessment as they had previously been considered as part of demand management by some of the local Councils.

## 5.4 Consultation and options assessment

This Plan was developed using a range of information sources including on-going water efficiency work with customers. Watercare undertook customer surveys to better understand attitudes to water conservation and usage. More specific consultation was undertaken with Auckland Council, Watercare's Maori and Environmental Advisory Groups as part of the water demand programme development. This was in the form of a Multi-Criteria Assessment (MCA) workshop in May 2011 which reviewed the series of 17 approaches to demand management.

Multi-Criteria Assessment is used to compare different options or approaches to solve a problem, and implement the most appropriate option based on a range of criteria. This therefore takes a range of different views and issues into account and identifies the most appropriate option. The workshop was also attended by Watercare and was facilitated by an independent consultant.

The aim of the MCA was to identify particular issues or benefits (i.e. outliers) associated with the different options to prioritise a programme of work. The intention of the MCA was not to select a single option to take forward; but to identify key approaches that should form this programme. The MCA was also used to capture qualitative comments and information about the different options.

The 17 approaches were assessed during the workshop against five key criteria, as follows:

- Environmental well being
- Cultural well being
- Social well being
- Economic well being
- Technical criteria including the potential water savings and associated risks

The results of the MCA workshop were analysed and ranked and are presented as Figure 11. During the workshop, options 13 to 16 were effectively combined to a single option focusing on the use of non-potable water for residential or commercial use.

The weighting and ranking revealed 'schools water use', 'regulation of indoor water use', 'residential customer water efficiency initiatives', 'non-revenue losses', and 'Auckland Council' to be the top five options for implementing water conservation and demand management. It was accepted that all options would have some level of activity although potentially in the longer term. The MCA workshop also captured key qualitative comments about each of the approaches, and implementation of the options will have regard to the additional comments raised.

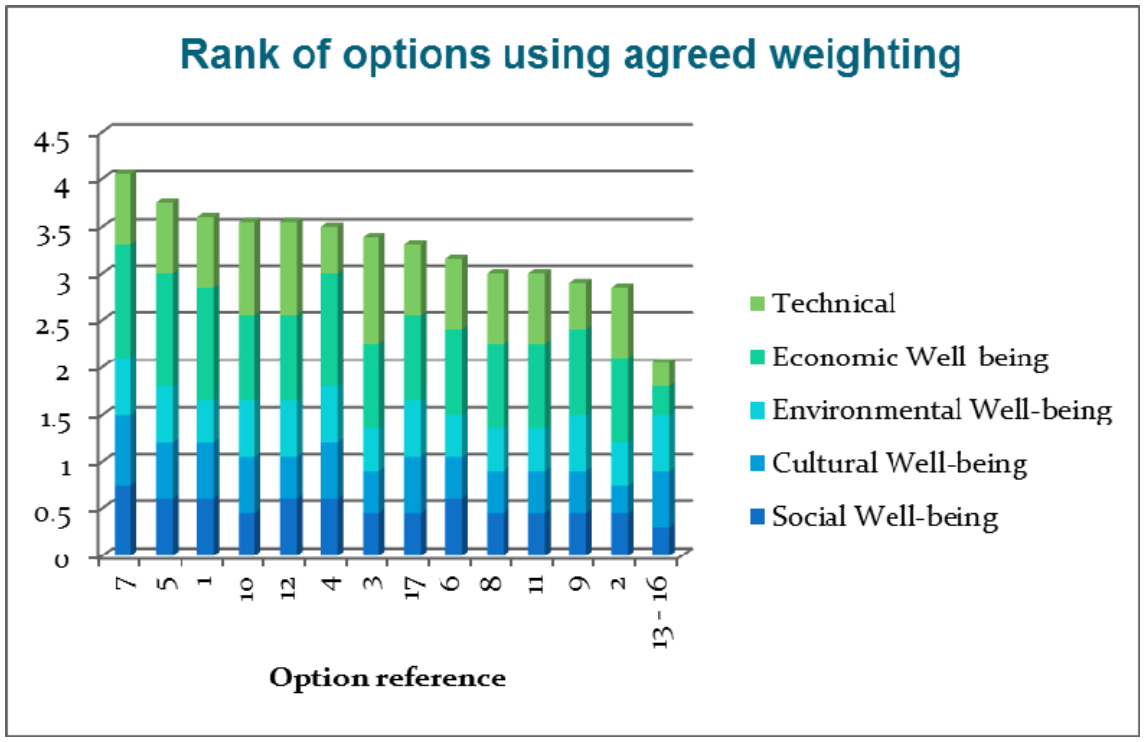



**Figure 11: Ranked options using the agreed weighting**

The order of ranking and key to Figure 11 is as follows:

| | |
|---|---|
| Option 7 | Schools' water use |
| Option 5 | Regulation of indoor water use |
| Option 1 | Large water users |
| Option 10 | Non-revenue losses |
| Option 12 | Auckland Council's water use |
| Option 4 | Promotion of efficient devices |
| Option 3 | Domestic customer water efficiency initiatives |
| Option 17 | The beneficial use of treated wastewater |
| Option 6 | Commercial water use |
| Option 8 | Metering |
| Option 11 | Council Controlled Organisations water efficiency programmes |
| Option 9 | Price |
| Option 2 | Communications and provision of information |
| Options 13 - 16 | The beneficial use of non-potable water (stormwater and greywater) |

# 6 Auckland region water demand management

This section summarises Watercare's approach to regional water demand management including the programmes and initiatives that Watercare will promote. The programme of works for the short, medium and long term is summarised in Appendix 1.

## 6.1 Demand management targets

Measuring and reporting the benefits of demand management is complicated. Reductions in demand as a result of water efficiency are masked by the climate and other influences on how customers use water. Previous strategies have recommended targets for demand management. The Auckland Water Management Plan 2004 *From the Sky to the Sea* was developed in a co-operative manner, led by Watercare working with the region's water authorities. The plan recommended different approaches that should be adopted to manage demand and promoted an objective of reducing gross per capita consumption by 5% by 2024 from 2004 levels.

Watercare, in collaboration with the region's Councils and water providers, published the *Three Waters Strategic Plan* in 2008. This Plan looked at the opportunities for integrated water, wastewater and stormwater planning for the Auckland region over the next 100 years. As part of this assessment the *Three Waters Strategic Plan* identified an aspirational stretch target of a 15% reduction in gross per capita consumption by 2025, subject to a cost-benefit analysis.

Watercare propose to adopt the Three Waters target of a 15% reduction from the 2004 gross per capita consumption by 2025. This target is a significant commitment beyond the 5% target previously adopted by the region in the Sky to Sea plan.

The target is ambitious and will require full engagement from all stakeholders. This report identifies the key areas of focus and the stakeholders Watercare will need to work with to ensure the demand management programmes are successful.

During the first year of implementation work will be done to determine how progress will be measured within a tolerance for demand variability and results lag, including specific customer metrics and metrics assigned to other parties. This includes, for example, Auckland Council's water efficiency programme. Importantly, the programmes of work will be subject to ongoing assessments of costs and benefits to ensure they represent value for money. The pathway to achieving the target is shown in Figure 12 below.

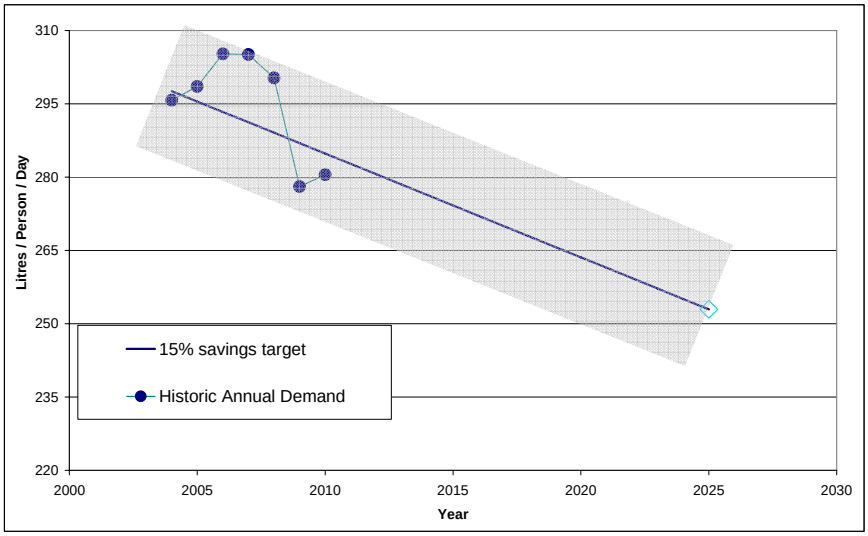



**Figure 12: Auckland regional water demand management savings pathway**

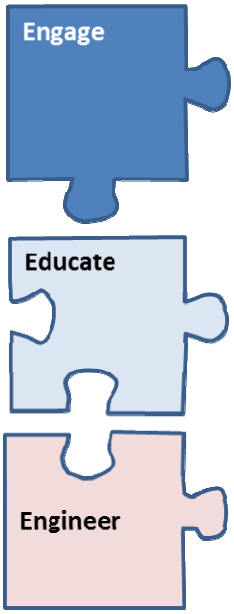
## 6.2 Approaches to demand management

### Schools' water use

Schools are central to Auckland's approach to reducing the demand for water. There are opportunities to both improve water efficiency and reinforce positive messages about water use. The programme therefore enables water efficiency messages to go from school to the home. Watercare already has the successful education programme 'Adopt a Stream' and positive links with schools.

Watercare will continue to run the 'Adopt a Stream' programme across different schools in Auckland. The programme will be updated to reflect lessons learned from other approaches to water efficiency included in this plan.

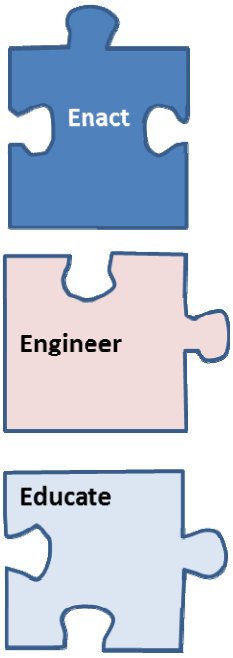
An important part of working with schools is also to find ways to appreciably reduce the water used for irrigation, toilet flushing and other uses, as well as stopping any leakage. As a trial, Watercare will work with a number of schools to audit water use and highlight some of the best approaches to reduce the volumes of water used. Watercare will also seek ways to engage with the Ministry of Education and develop approaches to work with a wider range of schools in the future and opportunities for water efficiency in new schools. This will include the identification of a priority list of schools based on the water used per student and in the longer term to assess the most practical water efficiency options to be implemented at schools.




The schools programme is therefore a key part of the proposed water efficiency programme as it aims to change behaviour and implement practical approaches to reducing water use. It relies on Watercare, schools and the Ministry of Education to work together in the long term to reduce water use in schools across Auckland.

*"It is a wonderful programme and the kids learn so much as well as having all the fun!"* – Wikus Swanepoel, Albany Junior High School commenting on Watercare's education programme

## Indoor water use




The water used in homes represents over 60% of the water supplied by Watercare. The development of new homes is one of the key drivers for the increased demand for water in the future. If these are built as water efficient homes from the outset this would remove the requirement to retrofit water efficient devices. It would also reduce water bills for people who buy these new homes.

Many countries have developed standards for water use in new homes, usually linked to sustainability standards. Examples for commercial buildings include Green Star in Australia and New Zealand, and for housing the Code for Sustainable Homes in the UK. Codes can be used to enforce standards related to energy, materials and water use.

The existing water use in Auckland's homes is summarised in section 4. This shows that leaks, toilets, showers and washing machines are the best ways to minimise the water wasted by new homes in Auckland. Guidelines of water use for new homes should be developed and implemented. These should focus on the use of water inside the home, particularly implementing water products which are rated highly by the Water Efficiency Labelling Scheme. The guidelines should include recommendations about all indoor water to ensure that efficient fittings are used throughout the home. This includes:

- Toilets, where these should achieve at least a WELS 4 star rating. The 4 star rating is equivalent to a 4.5 / 3 litre dual flush toilet which is commonly available.
- Showers should achieve at least a WELS 3 star rating, equivalent to a flow rate of between 7.5 and 9.0 litres per minute. This is equivalent to flow rates measured in existing properties in Auckland.
- Dishwashers, which if they are supplied should have a minimum rating of 4 stars, which will also reduce energy use.
- That taps are supplied with WELS ratings that are relevant to their use. For example, in high use areas such as the kitchen or laundry a minimum of 4 star rated taps should be used (less than 7.5 litres per minute) and higher ratings in other areas, such as washbasins where 6 star rated taps should be provided.

*An example of a 4.5 / 3 litre dual flush toilet*

- Washing machines are not usually specified in new homes but where they are, washing machines with a rating of at least 4 stars should be provided.

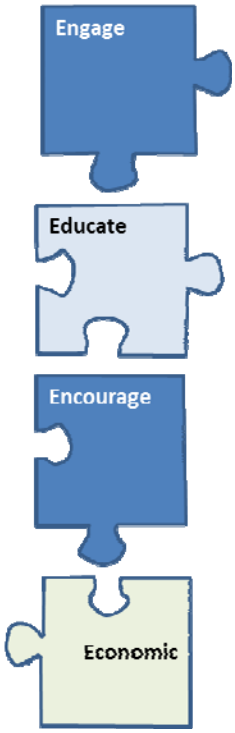
The implementation of these guidelines will significantly reduce the water used in new homes. Internal water use in these efficient homes would be expected to be less than 130 litres per person per day, significantly less than existing homes. Guidelines for water efficient devices in homes would enable the water used in new homes to be significantly lower than elsewhere across Auckland. Appliances with high WELS ratings are readily available across a range of products at reasonable cost and will save house owners money in the long term.

The development and implementation of these guidelines should be facilitated by local and national government, with technical support from Watercare.

## Large water users

Some of Watercare's customers use large volumes of water. By engaging with a number of these large use customers, Watercare has the opportunity to influence a reduction in their water use.

One of the largest water users in Auckland is Housing New Zealand, responsible for more than 69,000 homes across New Zealand, of which approximately 30,000 are within the Auckland region.




Housing New Zealand actively undertakes upgrade work to its housing stock and, for example, has insulated over 30,000 of its homes since 2001. There are opportunities to work with Housing New Zealand to reduce existing water use and to make sure that water efficient appliances are included as part of any refurbishment work. Per capita consumption is typically 200 litres/per person/day compared with the regional average of 175 litres/per person/day.

Housing New Zealand works across the whole of the Auckland region. Some of the Local Network Operators had previously worked with Housing New Zealand with varying degrees of success. Watercare has already commenced a regional water efficiency programme with Housing New Zealand to reduce water use and water savings have been made within the first few months of the programme. This will lead to achievable targets for leakage reduction and other efficiency measures being set, either as retrofit or for inclusion as part of refurbishment projects. This will help to ensure that less water is wasted and Housing New Zealand's water charges gradually reduce, enabling additional money to be invested in the housing stock.

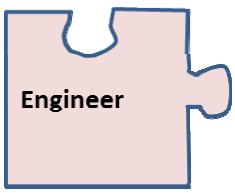
Watercare supplies a range of other large users in the industrial, commercial and agricultural sectors. Watercare is working with the Centre for Infrastructure Research at Auckland University and has already identified a select number of customers to develop pilot approaches to reducing water. These customers have been identified within tertiary education providers, health providers, manufacturers and hotels/restaurants/accommodation providers. Watercare will work with specific customers in these sectors and evaluate the potential long term benefits of water demand management, which could be extended to other users in the same sectors.

## Non-revenue losses

Watercare has responsibility for managing raw water, storing it before treatment and then distributing treated water to its customers across Auckland. Watercare is committed to the stewardship of this essential resource.

Water supplied classed as 'non-revenue' water includes a number of different activities. These are:

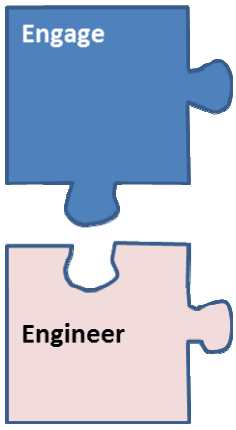
- Water used for fire fighting



- Water used for cleaning pipes and other uses during operation
- Leakage from the distribution network
- Water used as part of the treatment process

Some of the water included in this category is not wasted but has an important purpose – fire fighting, for example. Where it is wasted, such as leakage from Watercare's network this should continue to be reduced. This is recognised in the 2011 *Statement of Corporate Intent* which sets a measure to maintain unaccounted for water losses below 17.7 million $m^3$ of water per year. To achieve this target, Watercare works hard to repair leaks that are reported by customers across Auckland.

## Auckland Council's water use




Auckland Council is one of the largest users of water in Auckland. The Council uses water in its buildings, community facilities, parks and gardens. The Council has the opportunity to lead by example and strongly influence how people use water in the future.

Parks and sports pitches are essential to local communities and the social well-being of Aucklanders. The Council manages over 800 parks and reserves for the people of Auckland which are free to visit. To maintain these high quality public spaces some are irrigated with water. It is important to minimise this demand for water and Watercare will work with Auckland Council to establish the locations of high water use, identify and tackle any leaks and reduce the volumes of water used for irrigation.

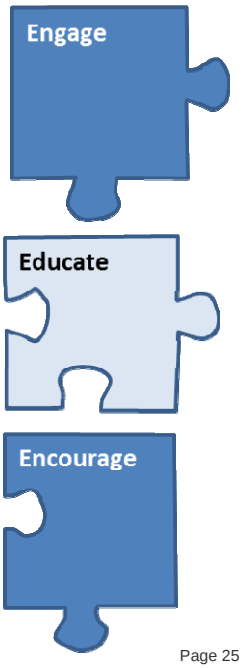
Council buildings and community facilities also use a lot of water. Reducing water use by retrofitting water efficient devices, specifying highly water efficient fittings during refurbishment and educating users is an important part of demand management planning. Council staff can also take water wise messages back to their homes and families. As Council staff interact with the general public they have an opportunity to spread positive messages about water efficiency through their actions.

There are also policy related areas where Auckland Council should promote water efficiency. These particularly relate to the regulation of indoor water use for new developments and the promotion of water efficient products in new homes and businesses.

## Promotion of efficient devices

Watercare intends to work with government, Auckland Council and retailers to promote water efficient appliances, particularly toilets and washing machines. The Water Efficient Labelling Scheme will be used to raise awareness about water efficient products such as toilets, washing machines, showers and taps.


The Water Efficiency Labelling Scheme (WELS) provides information at the point of sale about how much water products use. It was introduced to New Zealand



by the Ministry for the Environment in 2010 and applies to products such as dishwashers, toilets, urinals, showers, taps and washing machines. The labels enable consumers to identify how water efficient a product is. The aim of the rating scheme is to encourage consumers to purchase products that use less water and to encourage suppliers to design products which are more water efficient.

The WELS label displays a star rating to demonstrate how water efficient the product is, and a figure which states how much water it uses. The more stars shown, the more water efficient the product is.

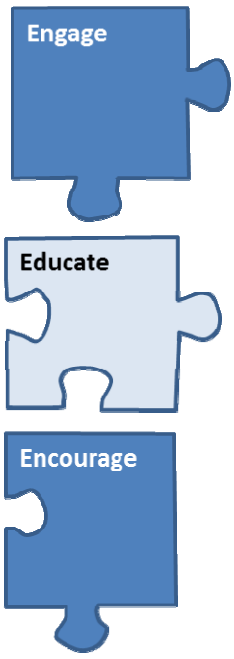
As a national standard, this is the best way of promoting water efficient products to customers. The labelling scheme is easy to understand and will be promoted to customers using bills, Watercare's website and other information.

Watercare will also engage with manufacturers and retailers to understand the types of products that are available, the numbers that are sold and how this is expected to change over time. As inefficient products are replaced with more efficient models, this is expected to lead to a reduction in water use in existing homes.

The Green Star NZ rating system for New Zealand also provides standards for non-domestic buildings. This enables buildings to be rated within an overall sustainability framework. Water efficiency is weighted at 10% of a buildings overall score. Promotion of this rating system should improve water efficiency in new commercial buildings.

## Domestic customer water efficiency initiatives

Existing households use over 60% of the water supplied by Watercare. By engaging with these customers, Watercare will promote water efficiency in existing homes. Watercare is already active in this area and expects to widen this approach to focus on other areas of water efficiency. The BRANZ study identified that the best way to reduce water use in existing homes is to tackle leaks and reduce the water used by toilets and washing machines.

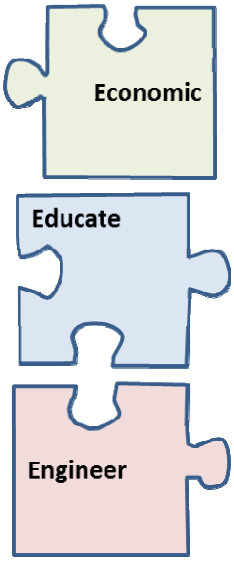



Some of these activities will be carried out by the promotion and distribution of water efficient devices at community outreach programmes and by continuing communication with customers. These programmes are currently being developed for implementation with a range of service providers.

Outdoor water use drives Watercare's investment in infrastructure and water resources. However, there is little information available about how people use water in the summer – is this for irrigation, pools or boat washing? Without this knowledge, it is hard to promote different ways of using water in the summer to reduce outdoor water use. Watercare intends to carry out a study of outdoor water use in existing homes to help understand this important aspect of demand.

## Commercial water use

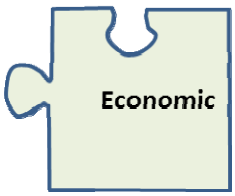
Over 15% of water supplied by Watercare is used in commercial buildings or for other institutional uses. Auckland Council estimates that there are more than 150,000 office buildings, hotels, shops and restaurants that employ more than 500,000 people. More of these types of buildings are expected in Auckland as the population grows and more jobs are created.




Although Watercare knows about how water is used in people's homes, we know less about how water is used in commercial buildings. There is a wider variety of uses than in the home and different drivers. To develop an approach to water efficiency for commercial buildings, Watercare is working with BRANZ and the Victoria University of Wellington to understand how water use in office buildings varies and is used. Some initial work has been carried out to compare water used in commercial office spaces in Auckland and Wellington. This indicated that a significant proportion of water use relates to temperature control systems.

Following the completion of these studies Watercare will investigate the potential development of benchmarks for water use in new commercial buildings, which could be used by the Auckland Council in guidelines or mandatory standards for new commercial developments. The study may also help identify different water efficient techniques that could be retrofitted to existing commercial buildings.

## Metering




Auckland is almost unique in being a large city with universal metering. There are few other major cities around the world which are universally metered. Metering encourages people to use less water as charges are related directly to water use, rather than when customers pay a flat charge regardless of the amount of water used. The water used in Auckland reduced significantly following the introduction of metering and this has been a key component of managing demand.

In the future, it may be possible to install smart meters at properties. Smart meters can communicate directly with Watercare, removing the need to read water meters in the street. Not only will this enable accurate billing on a frequent basis, but it can also be used to identify changes in consumption. Unusual demand patterns can be detected by the smart meter which can then be used to inform the customer that there is a possible leak.

## Watercare and Council Controlled Organisations water efficiency programmes

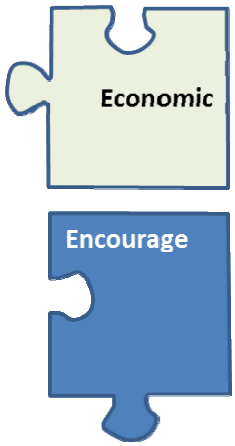

It is important that Watercare and the Council Controlled Organisations are seen as being water efficient. Not only does this reduce water use, but it can spread positive messages about water conservation.

There are other areas where Watercare uses water as part of its treatment process and its operations. Watercare has long sought opportunities to reduce the use of potable water at its wastewater treatment plants. Our four largest wastewater treatment plants all utilise recycled effluent in place of potable water where possible. Examples of the savings already achieved at Mangere and Rosedale wastewater treatment plants are described in the box below. As Watercare takes responsibility for a wider range of treatment plants, we expect to reduce the demand for potable water in the years ahead.

Mangere wastewater treatment plant is the largest treatment works in the Auckland region, treating approximately 300,000 cubic metres per day of wastewater flow from 1 million people. A detailed study of water use was carried out in 2004 with a focus on reducing the use of potable water. On site process units now screen and return approximately 10% of all wastewater arriving at the site as 'service water' for use on site. This avoids the use of 30,000 cubic metres per day of potable water for these purposes.

Rosedale wastewater treatment plant, situated just north of Auckland, is the second largest treatment works in the Auckland region. It treats approximately 58,000 cubic metres per day of wastewater flow from 220,000 people. The plant has three re-use loops, which re-uses up to 3,000 cubic metres per day, or 6% of the flow.

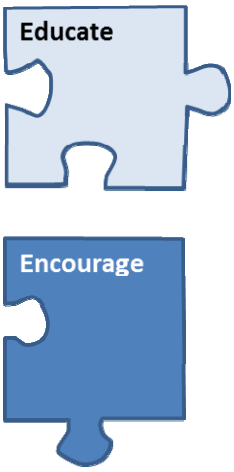
## Price




Changes in price can be used to influence demand. There are a number of different approaches to setting prices that can be used. The simplest of these is to increase the price to a level where people reduce their water use. Alternative approaches exist, such as increasing costs on a volumetric basis, or if smart meters are in place to introduce seasonal tariffs. Implementation of these approaches is complicated by the requirements for Watercare to meet business objectives at minimum cost and provide value to customers.

One price based approach which can be used to influence water use is to include both water and wastewater charges on the same bill. With wastewater charges linked to water use, customers can see that any reduction in water use will also result in reduced wastewater charges. Wastewater charges will be included on all customer bills from 2012 and Watercare sees this as a key component of its approach.

## Communications and provision of information




Watercare already actively communicates with customers about water use in people's homes. Current approaches include water efficiency tips and hints on Watercare's website and the provision of information on customer bills. Communication forms a key part of many of the other existing or proposed water efficiency programmes. Working with schools or large water users includes the delivery of water efficient messages, which will be taken home.

Customer bills already include information about average consumption and how a household compares to others. Figure 13 shows an example from a bill that enables customers to identify how much water they are using and whether this is above average.

The information provided on bills also allows customers to identify if they have a potential leak. Above average or increasing consumption from one period to the next could indicate a leak. Information on Watercare's website shows customers how to check to see if they have a leak, how to get it fixed and information about the leak remission scheme.

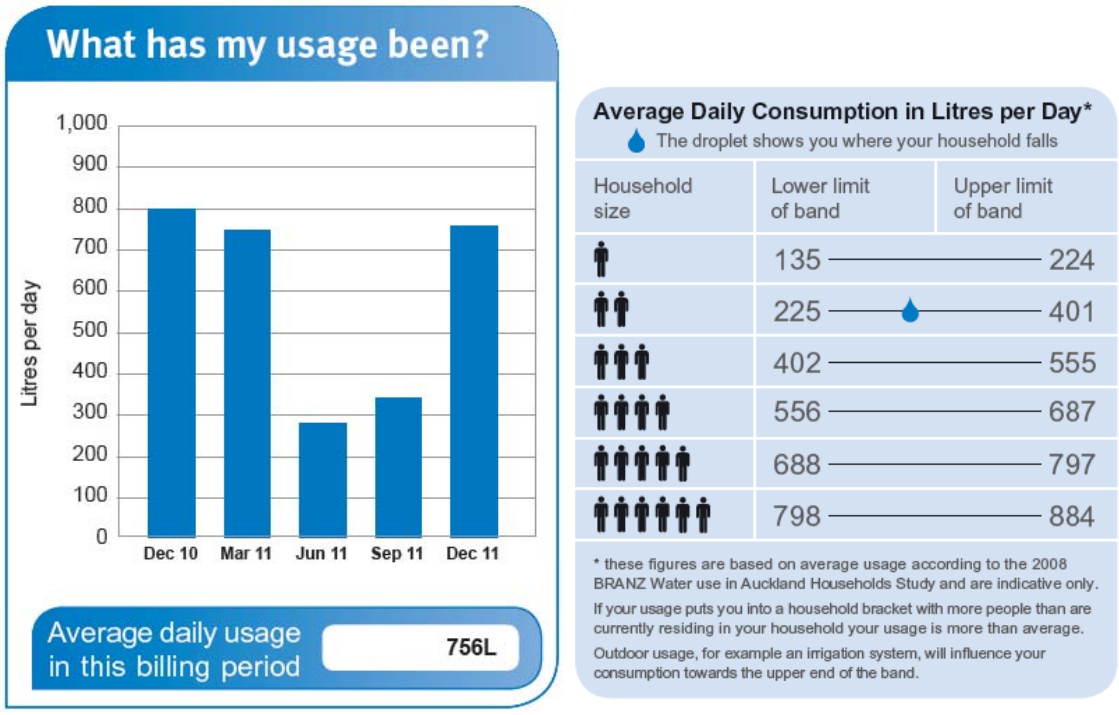



**Figure 13: Usage information included on customer bills**

## 6.3 Beneficial use options

Beneficial use typically includes replacing the supply of potable water with a non-potable supply, rather than improving efficiency at the point of use. Non-potable water is usually classed as:

- Stormwater (or rainwater) e.g. raintanks or groundwater recharge
- Greywater (water from bathroom sinks and showers that is treated before use)
- Reclaimed water from wastewater treatment works

The Three Waters Strategy looked at beneficial reuse programmes and proposed that 10% of supply could be provided by beneficial reuse by 2025 subject to a comprehensive cost benefit analysis.

Beneficial use options were considered by some Councils as part of demand management programmes. For completeness, some of these options were reviewed as part of the demand management MCA workshop. However, beneficial use is considered by Watercare to be a supply side option (rather than demand management) and this plan recognises further work is needed to understand the social, environmental, cultural and economic benefit of such options before committing to the additional 10% use target proposed in the Three Waters Strategic Plan.

The Three Waters Strategic Plan reviewed options for future water sources out to 2100 and identified the Waikato River as the next preferred source followed by further aquifer and river sources (Figure 14). The planned beneficial use options, around which there are more social, environmental and cultural sensitivities, do not become economically viable on a regional scale until other water source options have been exhausted. As an example, rainwater tanks can provide localised benefits for water supply and stormwater management in appropriate circumstances. However, from a regional water supply perspective rainwater tanks do not become economically viable until most other options have been exhausted.

Auckland Council has assumed responsibility for stormwater management. Key to understanding opportunities in stormwater and greywater reuse is to determine costs and benefits, health risks, long term opportunities for their implementation and the resilience to drought. In long dry spells rainwater tanks would be expected to empty and would not meet Watercare's drought standards, against which infrastructure investment is planned.

Watercare and the Auckland Council will need to work together to fully understand the impacts of any policy developed around stormwater beneficial use, whether the adoption of a 10% beneficial reuse target could be achieved and whether it can be shown to be cost-beneficial

The Three Waters Strategy identified the opportunity of using reclaimed water for industrial sites in Auckland. Subsequent user assessments have shown it is currently not economic to pump reclaimed water long distances or provide treated water where there is limited demand. However, there may be opportunities to supply new industrial growth areas with treated wastewater. Watercare will continue to work with Council to explore the viability of these and other beneficial reuse options.

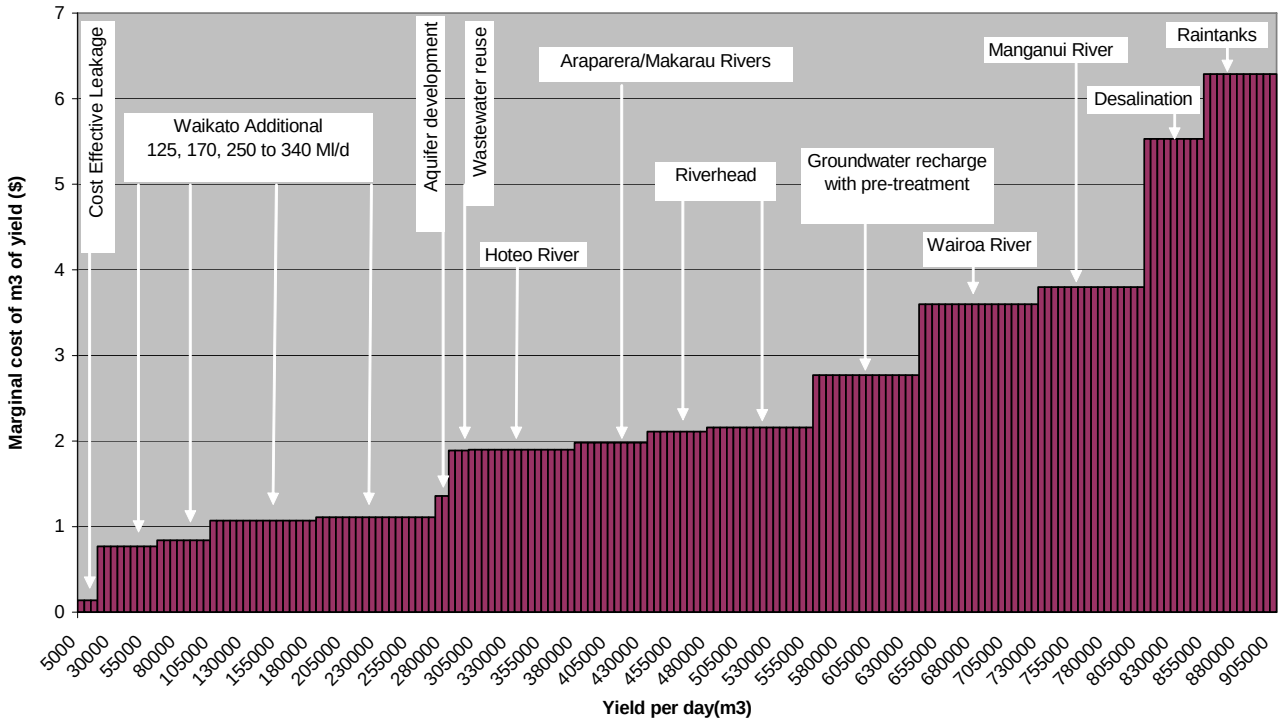



**Figure 14: Three waters cost curve showing increasing marginal cost of achieving each successive $m^3$ of water**

## 6.4 Implementation

Demand management is part of an on-going process to promote water efficiency and water conservation. This programme builds on the existing water efficiency work carried out by the Councils and Watercare.

Watercare, Auckland Council and stakeholders will have to work together to ensure the demand management target of 15% reduction in per capita consumption by 2025 can be achieved. Figure 15 shows the range of customers, influencers and others who will need to contribute to the implementation of this plan.

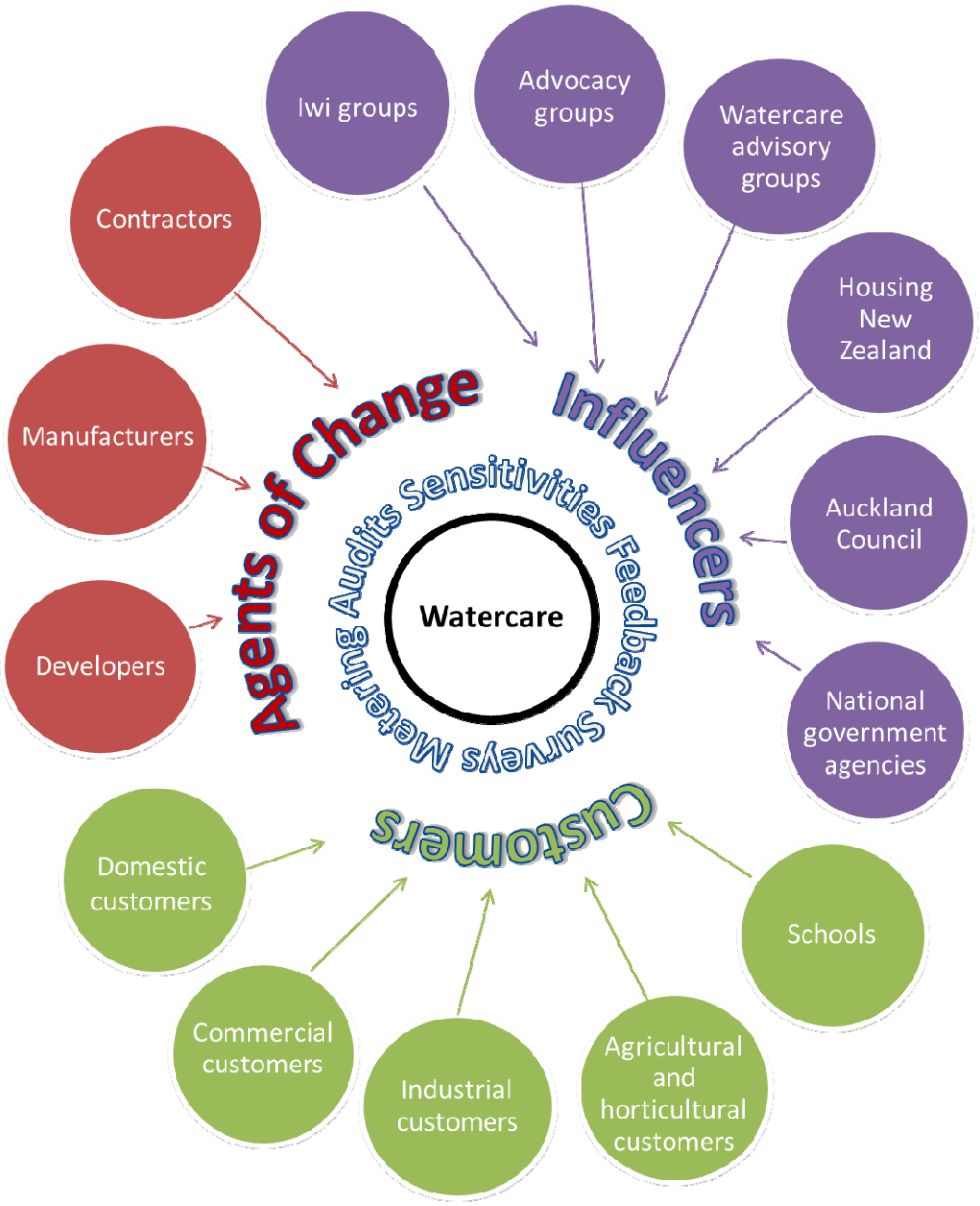



**Figure 15: Customers, influencers and agents of change**

## 6.5 Monitoring and evaluation

The process of monitoring and evaluation is important and will be used to refine demand management strategies in the longer term to ensure cost-beneficial demand management options are being implemented and savings are being achieved.

Evaluating demand management progress towards targets will require detailed assessment, trials and pilot programmes to determine relevant benefits against programme costs. Results will be used to refine future plans and will set out how successful demand management approaches should be applied more widely across the region.

There is uncertainty in calculating the demand for water from customers. Key uncertainties will arise from the influence of climatic variations, economic impacts, estimates of population and the lag between implementation of water efficiency measures and when they take effect. The reporting of performance will take account of these uncertainties by inclusion of a tolerance band around targets and these will continue to be refined in the next year for inclusion in future performance reports.

Watercare, as a new integrated water and waste water company, will continue to gather information which will inform future versions of this Plan and regular updates are planned.

**Appendix 1: Programme of works**

| Item | 6 Es programme | Short term: 2011-2012 | Medium term: 2012-2015 | Long term: 2015-2025 |
|---|---|---|---|---|
| **Schools' water use** | Engage, Educate, Engineer | Continue 'Adopt a Stream' programme.<br>Engage with the Ministry of Education about wider water efficiency work in schools.<br>Continue to identify and prioritise 'high water use' schools to target with water efficiency measures. | Continue and improve 'Adopt a Stream' programme.<br>Collaborate with the Ministry of Education to develop approaches for minimising water use in schools.<br>Audit water use in prioritised schools and assess cost-beneficial measures to improve water efficiency. | Monitor the effectiveness of the programme against demand management targets.<br><br>Review and monitor the effectiveness of individual demand management options.<br><br>Assess opportunities for implementing options more widely. |
| **Regulation of indoor water use** | Enact, Engineer, Educate | Discuss opportunities for implementing water efficiency standards with local and national government. Identify key approaches to implementation of the standards. | Support the technical development of draft standards.<br>Monitor implementation of standards on trial properties to assess potential benefits.<br>Support the implementation of the final proposed water efficiency standards. | |
| **Large water users** | Educate, Encourage, Engage, Economic | Continue working with Housing New Zealand and set key performance indicators to measure reductions in water use. Engage with other large users. | Identify key large users in the industrial, agricultural and commercial sectors and develop pilot projects and benchmarks to reduce water use. | |
| **Non-revenue losses** | Engineer | Maintain targets set out in the Statement of Corporate Intent. | Maintain leakage below target levels, investigate new technologies to enable further cost-effective reductions | |
| **Auckland Council's water use** | Engage, Engineer | Work with Auckland Council to identify areas of high water use and pilot different approaches to improve efficiency. Establish targets and how reductions in water use will be measured. | Review identified savings and identifies how to expand the pilot study more widely.<br>Promote water efficiency within the Council and trial approaches to saving water in public buildings. | |
| **Promotion of efficient devices** | Engage, Educate, Encourage | Continue to promote water efficient devices to households and businesses using the WELS standard.<br>Continue engagement with manufacturers/retailers. | Work with manufacturers and retailers to understand how efficient devices are expected to reduce water use in the long term. | |
| **Domestic customer water efficiency initiatives** | Engage, Educate, Encourage | Continue to promote water efficient behaviour to existing customers and communities.<br>Study how people use water outdoors to evaluate opportunities for improving efficiency. | Develop and implement a strategy to reduce outdoor water use based on knowledge of how domestic customers use water outside. | |
| **Commercial water use** | Educate, Engineer, Economic | Continue to support a current national study to evaluate water use in commercial buildings and assess opportunities for reducing water use. | Develop guidelines for reducing water use in commercial buildings based on the results of the national study | |
| **Metering** | Engineer | Consider metering strategies in light of 'Auckland Unleashed' and the possible nature of future development. | Review opportunities for installing smart meters as technologies advance. | |
| **Watercare & Council Controlled Organisations water efficiency programmes** | Educate, Encourage, Engineer | Continue to identify ways to reduce water use and promote water efficiency to staff internally.<br>Engage with CCOs to identify their demand management programmes. | Implement measures to reduce water use and promote water efficiency measures to staff internally across Watercare and all CCOs.<br>Measure and report on savings. | |
| **Price** | Economic, Encourage | Continue to provide water in accordance with the Statement of Corporate Intent | Examine the potential for different pricing structures to encourage customers to value water differently. | |
| **Communications and provision of information** | Educate, Encourage | Continue to communicate with customers and promote water efficiency through the website and billing information. | Investigate any new approaches for communicating water efficient messages to customers. | |

## Appendix 2: From the Sky to the Sea (Auckland Water Management Plan) 2004

## Appendix 3: Auckland Regional Three Water Final Strategic Plan 2008