
REPORT 2
(1215/52/IM)

WATER EFFICIENCY AND CONSERVATION – REPORT ON CONSULTATION AND ADOPTION OF A RECOMMENDED PLAN

1. Purpose of Report

This report recommends that the Committee agrees to adopt a water conservation and efficiency plan (attached as appendix 1).

The report includes an analysis of suggestions and comments made by submitters on a draft plan put out for public consultation during September 2010.

2. Executive Summary

On 15 October 2009 SPC considered a report outlining the bulk potable water supply and demand situation in the Wellington region. The report noted that given current levels of demand and water supply and storage infrastructure, Wellington region's water supply system cannot meet previously agreed security of supply standards.

That report also noted scenarios for addressing the water supply and demand situation into the future. It noted the cost-effective role that water efficiency and conservation could play in reducing the overall costs of providing a safe and secure water supply. In particular, it noted that it may be possible to defer decisions on major capital expenditure past 2014 - with potential financial, environmental and social benefits to the city.

The following report builds on the previous papers following a series of public meetings, written and oral submissions.

Managing demand, in the face of the projected growth in population and the anticipated effects of climate change, remains the priority as the deferral of supply augmentation or aggressive demand management options is the Council's preferred position.

Following below is analysis of the submissions received, findings from research conducted into the effectiveness of different water conservation approaches and a

breakdown of what steps are proposed for implementation over the next two years as we build a foundation for water conservation and efficiency practices to evolve from.

The steps offered in the attached plan are believed to offer noticeable reductions in water consumption across targeted areas. It is offered that by being able to demonstrate actual savings with key initiatives other programmes and derivatives will then develop within the community.

3. Recommendations

Officers recommend that the Committee:

- 1. Receive the information.*
- 2. Note that 120 written submissions were received and 8 oral submissions were heard on the Draft Water Efficiency and Conservation Plan and an associated discussion document.*
- 3. Note that as a result of this input and further analysis officers now recommend a revised Water Efficiency and Conservation Plan.*
- 4. Delegate to the Chief Executive Officer and Climate Change Portfolio leader the authority to make any necessary amendments to the recommended plan required as a result of decisions of this Committee, prior to the plan being published.*
- 5. Recommend that Council agree to adopt the Water Efficiency and Conservation Plan (attached as appendix 1 to this report), as amended in accordance with recommendation 4; and;*
- 6. Recommend that Council note that activities for Year 1 of the Water Conservation and Efficiency Plan will be funded via existing budgets.*
- 7. Recommend that Council agree to include additional funding where required in the financial planning cycle for the 2012/13 LTCCP.*

4. Background

During September 2010 Wellington City Council went to the community with a discussion paper on managing the city's water demand and an outline of a water efficiency and conservation plan.

Demand management is becoming more of an issue for the Wellington region as supply becomes stressed through population and economic growth and potentially the effects of climate change.¹ Currently the water system will cope with a one in twenty year drought without the need for water restrictions. However, this is well

¹ These are expected to increase demand over warmer, drier and longer summer periods. Some increased rainfall events may also occur but due to limited storage capacity for untreated water there is not expected to be much relief gained in this area from any increase in rainfall intensity.

below the one in fifty year standard that has been previously agreed for Wellington region.

Although water conservation and efficiency measures are seen as year-round initiatives the significant increases in demand are felt during the summer months. Approaches to address this peak demand, especially during periods of very dry weather, are the primary focus of the plan. This is because there is generally more than adequate supply of water at other times and it is shortages during dry periods of peak demand that will primarily drive the need for additional capacity.

In October 2009, the Council considered these issues and reached a number of decisions. Specifically it was decided to:

- Adopt “an interim target of stabilising water consumption in acknowledgement of the goal:
“To accommodate Wellington city’s population growth through to 2025 with the same amount of water we have available to us now.”
- Agree to a phased approach to water demand management whereby education and the more easily achieved water efficiencies are undertaken first prior to more expensive or onerous options being considered.

The purpose of this Plan is to assist in meeting the Councils agreed interim target and goal as described above, by applying a phased approach to water efficiency and conservation measures.

Whilst there are a number of drivers that impact water consumption, it is the effects of climate change that are less predictable. This uncertainty leads to the approach of managing peak demand, especially during dry periods, supported by introducing long-term conservation and efficiency measures.

Providing the means to maintain a constant level of consumption in the face of population growth, the effects of climate change and a more buoyant economic landscape will provide returns to the city in cultural, economic, environmental and social terms. Failure to manage the consumption is likely to see calls for an increase to the region’s bulk water storage capabilities or the introduction of other management tools such as universal metering and tariffs.

If the Council’s goal can be achieved, this will contribute to the deferral of any decision to construct a new bulk water storage dam (including a treatment plant and transmission pipeline) or any need to implement universal water metering. Both these options have major capital implications.

5. Discussion

5.1 Wellington region’s water supply

Greater Wellington Regional Council (GRWC) is the bulk water supplier to the cities of Wellington, Lower Hutt, Porirua and Upper Hutt. Each year a bulk water levy is established based on the previous year’s water demand and each Council receives a rebate or surcharge based on their individual consumption at the end of the year. A

city that reduces its percentage consumption from the previous year will receive a rebate while a city that has an increase in percentage consumption will face a surcharge.

Wellington's water supply is 'run-of-the river', which means that the water that flows through our water supply catchments is largely what is treated and supplied to residents and businesses the next day. Very little of the 81.5 megalitres supplied on an average² consumption day is stored in the city's reservoirs. What is will be mainly used to manage pressure issues arising from topography, provide a constant supply for any fire-fighting requirements or provide a buffer in case the supply is disrupted for any reason.

The majority of Wellington region's water is sourced through abstraction from the Kaitoke/Te Marua River (46%) with an additional 10% being supplied from the Wainuiomata River. The abstraction of water from the Waterloo / Gear Island aquifer contributes approximately 38%. The remaining 6% is supplied from the Orongorongo River, George Creek and Big Huia Creek.

Performing a dual role within the water supply network are the Stuart Macaskill lakes. These provide relief during times of low supply (through periods where the rivers' flows are low or there is increased turbidity following a storm) or increased demand. With a volume of 3,000 million litres, there is in theory enough water to keep the region supplied for approximately 20 days.

The lakes also allow sediment to settle prior to treatment which in turn reduces the chemical treatment and energy requirements to produce water suitable for drinking (potable) water.

5.2 Wellington's water consumption

Wellington city consumes 54% of the total water supplied by GWRC each year. Over the past 10 years Wellington's demand for water has averaged 81.5 million litres per day (29,730 million litres each year).

During the 2009/2010 year Wellington's gross consumption³ was equivalent to 400 litres per person per day (see graph 1). This continues a downward trend of water consumption over the past five years. However, it is not known exactly how much of this decrease can be attributed to focussed leak detection, conservation and efficiency exercises carried out across the community, the move to apartment living, or the gradual inflow of technologies that are inherently more water efficient (for example low-flow showers, dual flush toilets, new washing machines etc) or even the economic recession.

GWRC advised that water consumption has fallen by 2.4% whilst population is estimated to have increased by 1.1%. It is not clear how long the downward trend can/will continue past the 2010/11 projection below.

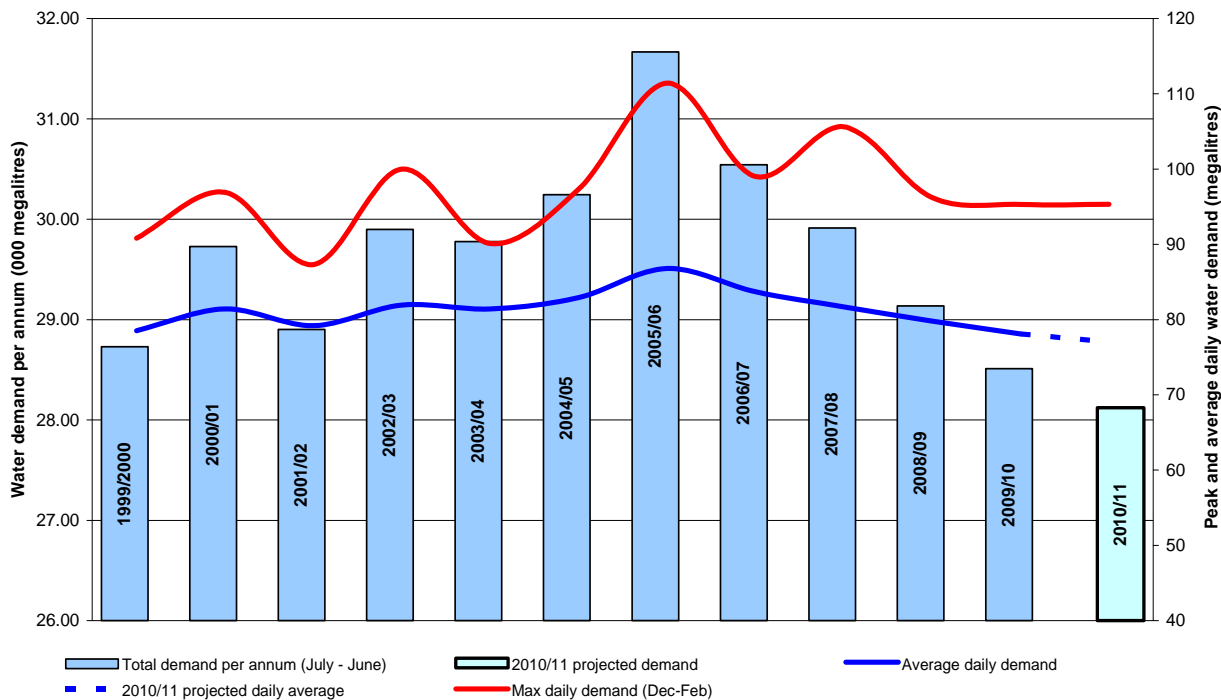
² GWRC, *Water Supply Annual Report for the year ended 30 June 2010*, Wellington 2010 (average 'Water Supplied to Customers' 1999/2000-2009/2010)

³ 'Gross consumption' is calculated by the total volume supplied by GWRC divided by the city's published population of 195,500 (400 litres per person per day)

At some point the effects of conservation and asset management programmes such as leak detection will plateau – it is pertinent to implement targeted conservation and efficiency measures before this happens.

Graph 1: Wellington City Water Demand

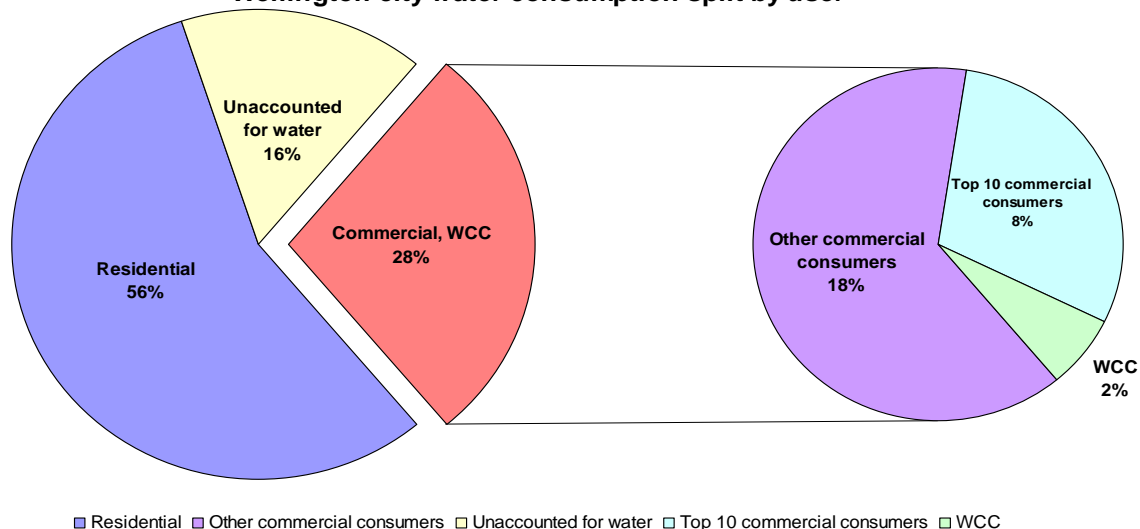
Wellington City water demand (Total annual / daily peak and average)



81.5 megalitres a day is Wellington City’s ‘gross’ consumption. It is spread across the city’s residents, social organisations, Government departments and agencies, public amenities and commercial enterprises. The following graph shows this breakdown across the different consumers.

Graph 2: Wellington City Water Users

Wellington city water consumption split by user



Residential uses account for nearly two thirds of the city’s consumption - almost twice the consumption of the commercial consumers. Each ‘segment’ has different characteristics and significantly different priorities, cost and values. This implies that a potential efficiency mechanism within one segment may not achieve the same outcome across other segments.

5.3 Consultation on the water conservation and efficiency plan

In total 120 submissions were received (refer Appendix 2) ranging from a single line to very complex submissions outlining regional strategies and the management of water supply issues.

Within the submissions there were a total of 520 references to different water conservation and efficiency areas – the ten most consistent themes, along with their respective levels of support or opposition are set out in the following table.

Theme	Reference tally	Support	Opposition
1. Water meters and/or volumetric charging	88	37%	45%
2. Education programme to improve level of knowledge regarding options, technology and water conservation tips	74	55%	7%
3. Subsidies, incentives or rebates for rainwater harvesting, grey-water recycling or water efficient technologies.	64	53%	
4. Rainwater harvesting	44	37%	
5. Support for increased or more stringent use or monitoring of restrictions and penalties to manage high demand.	41	34%	
6. Network leak management	37	31%	
7. Increasing supply capabilities and emergency resilience via a regional dam, ‘third lake’ option or an increased number of reservoirs.	36	17%	13%
8. Regulatory changes to District Plan and/or Building Code requiring water efficiency or compulsory rainwater harvesting on new buildings	30	25%	
9. Greywater recycling (from washing machines, sinks, showers)	23	19%	
10. Water efficient technologies (low flow showers, dual flush toilets, front-loading washing machines)	18	15%	

5.4 Environmental Reference Group

The Environmental Reference Group has been involved in the development of the Water Conservation and Efficiency strategies with officers being present at meetings twice during 2010^{4,5} (prior to consultation with the public).

In general the observations made by ERG reflect the submissions that were received from various organisations and members of the public later in the year. There was concern about the lack of central guidance on water conservation and efficiency programmes with central Government seemingly happy for regions to take the lead.

The potential for metering was raised with both support and opposition being expressed but consensus was present on the need to educate the public more thoroughly on the water issues that are on the City's planning horizon.

The use of different strategies such as partnerships with trade associations or retailers, leak detection programmes, targeting high end users (adopted for commercial consumers) have either been addressed below or incorporated in the draft plan (attached as appendix 1).

5.5 Wellington Residents' Coalition petition

In December 2010 the Wellington Residents' Coalition presented Council with an 18,000 signature petition. The petition stated:

"We the undersigned recognise that water is a necessity of life, and therefore a basic human right – not a commodity to be traded for commercial interests. Accordingly, we call on our elected representatives in local, regional and national government to:

- *reject water metering as a method of domestic water management*
- *promote and subsidise alternative technologies that enable the collection and use of rainwater and greywater*
- *support publicly-controlled, not-for-profit management and conservation of our water resources"*

The position held by the Council on the various points raised by the petition was reaffirmed by the Strategy and Policy Committee as:

"Agree that the Council again reconfirm that it wants to avoid the need for either compulsory residential water metering or major storage dams, and to this end is considering a range of means to promote water conservation and efficiency"⁶

The subsidisation of rainwater tanks (or other conservation and efficiency measures) is discussed later in this paper and although this is not the forum for discussing 'publicly controlled, not-for-profit management' of the water supply the Council has

⁴http://www.wellington.govt.nz/haveyoursay/meetings/comgroup/Environment_Reference_Group/2010/27Apr1730/pdf/ERG_2010_April_27.pdf

⁵http://www.wellington.govt.nz/haveyoursay/meetings/comgroup/Environment_Reference_Group/2010/21Jun1730/pdf/ERG_21.pdf

⁶http://www.wellington.govt.nz/haveyoursay/meetings/committee/Strategy_and_Policy/2010/02Dec0915/pdf/December_2_SPC_Minutes.pdf

also confirmed its desire to see water assets remaining in public hands, which, in any event, is required under the Local Government Act.

5.6 Cost / benefits of water conservation and efficiency programmes

Estimating the benefits of saving each marginal megalitre of water is extremely challenging.

The Council's costs for providing water to its residents and commercial customers can be broken into two separate elements: the cost of purchasing the bulk supply of from GWRC and the cost of operating and maintaining the network that transports the water from bulk supply points to the end user.

The basis of the bulk water levy ensures that GWRC can meet the cost of their water supply operations. If all of the Councils reduce their consumption the levy is then split according to the entire year's consumption against the relative percentage consumed by each Council.

The current structure means that if Wellington City can reduce their water consumption by five percent and the other Councils remain the same WCC will save money.

Based on this year's levy (\$23.46million) a five percent reduction (1,426 megalitres), would generate a reduction in Wellington City's levy payment of approximately \$300k. With the reduced levy spread across the year's consumption the savings equate to \$11.05 per megalitre.

Wellington City's costs for running the water supply operations are set out in the following table. This table also indicates how a five percent reduction would affect the overall costs (based on last year's levy).

Cost area	2010/11	Demand -5%	Cost (\$/ML)	Saving (\$/ML) (Demand -5%)
Operational expenditure	5,660,000	5,660,000		
Capital expenditure	11,950,000	11,950,000		
Network operation (incl. bulk water levy)	13,072,000	12,772,665		
Asset stewardship (incl. rates, overheads, interest, insurance, depreciation)	15,543,000	15,543,000		
Total	46,225,200	45,925,665	1,586.53	10.27

A study carried out by the University of Arizona on 44 water conservation programmes across eleven states concluded that actual savings on a given conservation measure are "almost impossible to find."⁷

⁷ Little, V., *Evaluation & cost benefit analysis of water conservation programmes*, College of Architecture and Landscape Architecture, University of Arizona, USA, 2008

This study is the most detailed analysis of water conservation programmes that officers were able to find.

Several approaches were analysed in that study for their respective costs and benefits against predicted results with the six prominent conservation measures shown in the following table.

Conservation approach	Average cost per participant	Cost per megalitre saved	Average reduction in consumption per participant
Water saving devices (giveaways – low-flow showerheads, aerators, shutoff switches)	\$ 9.33	\$1,387.95	-4.7%
Water use audits	\$154.67	\$1,188.00	5.0%
Washing machine rebates	\$192.00	\$494.00	2.0%
Low flush toilet rebates	\$201.33	\$471.30	6.7%
Low flush toilet exchange programme	\$441.33	\$436.70	15.1%
Landscape conversions	\$866.67	\$195.65	11.6%

Estimating the total value (financial and wider benefits) of water savings is also challenging. Each option has cultural, economic, environmental and social consequences for which inherent values need to be determined so that a full cost/benefit analysis can be carried out. Unfortunately, as has been discovered in numerous overseas studies the lack of a true market for the supply of water renders traditional economic assessments largely subjective⁸.

In designing responses to demand management issues the water authority has to decide whether it is better to invest *X* dollars into an education programme that potentially delivers long term returns or is it better to invest that same level of investment into an item of technology (low flow showerhead, front-loading washing machine) that would provide potential savings over the life-cycle of that product? However, even this decision is not straightforward, since programmes or technologies do not always deliver the outcomes expected, and actual savings are dependent on the behaviour of individual users⁹.

The following section provides some of the evidence available from the experiences of other water suppliers who have adopted conservation and efficiency programmes over supply augmentation, price based strategies or mandatory restrictions. Officers provide comments and recommendations on these options.

⁸ Olmstead, S.M. and Stavins, R.M., *Managing Water Demand: Price vs. Non-price Conservation Programs*, Pioneer Institute Public Policy Research, Mass. July 2007

⁹ Studies show that in some examples water consumption reduces by only a fraction of what was expected, and can even increase, as behaviour changes with a different environment.

5.7 Evidence of conservation/efficiency programmes and their effectiveness at influencing behaviour

Education / Information campaigns

Submitters strongly supported increased dissemination of water efficiency and conservation information and the establishment of education based initiatives.

Public information or education campaigns urging water users to conserve water often arise in conjunction with drought, and are frequently used to avert or delay more drastic measures such as mandatory restrictions. Some utilities are also using these campaigns on a long-term basis to instil a conservation ethic. Supporters claim they are effective in saving water and are more politically acceptable than other more restrictive measures. Critics charge that any savings from public information campaigns are small and likely to be temporary, and that other measures are more effective¹⁰.

Syme (2000) concluded that education campaigns can result in up to 25% water savings in short-term or crisis situations but their long-term effectiveness has not yet been shown¹¹. Mercer and Morgan (1980) used expenditures on publicity as a variable in a regression equation. They found an elasticity of publicity of -0.04 (i.e. a 10% increase in public education expenditures produced a decrease in water use of 0.4%).

Billings and Day (1989) reported that the effect of publicity was found to exist only as long as the publicity continued.

Based on this evidence, officers consider that ongoing communication of issues, demand levels, conservation or efficiency success stories (both commercial and private) and how initiatives are being developed will deliver a positive contribution to conservation and efficiency measures at a reasonably low cost.

Financial incentives

The use of subsidies, incentives or rebates to support the adoption of conservation or efficiency measures was second most popular approach with submitters.

Many water utilities have offered financial incentives to persuade customers to purchase water efficient technologies such as low flow toilets and rain sensors to shut off automatic sprinkler systems. Many studies have demonstrated significant water savings resulting from toilet retrofit programs (e.g., see Bamezai, 1996; Chesnutt et al., 1992; and Mayer et al., 1999). Additionally, many cities also offer water conservation kits that may include a variety of devices and information.

Renwick and Green (2000) found distribution of free retrofit kits with a low flow showerhead, tank displacement devices, and dye tablets for leak detection reduced average household demand by 9%. Palmini and Shelton (1982) found that a retrofit program undertaken to forestall long-term supply problems rather than in response to drought produced average annual savings of around 18,700 litres per household

¹⁰ Klein. B.M., Goemans, C., et al, *Factors influencing residential water demand: a review of the literature*, Dept of Agricultural and Resource Economics, University of Colorado, Boulder, 2007

¹¹ *Ibid* page 16

receiving a kit, and approximately 28,000 litres per home that installed one or more of the devices (since not all homes installed the devices).

Renwick and Archibald (1998) found that increasing the number of low flow toilets by one decreases household demand by 10%, increasing the number of low flow showerheads by one decreases household demand by 8%, and adoption of water efficient irrigation technologies reduced average household demand by 11%; overall, households with large landscaped areas reduced total usage by 31% while those with smaller landscaped areas reduced use by 10%.

Based on this evidence and the limited financial savings available through the current bulk water pricing model officers consider that the cost of subsidising considerably outweighs the benefits gained in the short term.

Officers will monitor initiatives and findings across the water management communities and report back to Council via the water conservation annual report any changes to the information currently available

Restrictions – voluntary and mandatory

Many submitters considered that the Council should make greater use or increase enforcement of water restrictions.

The use of water use restrictions (or more specifically the efficient enforcement of water use restrictions) in Wellington would require the establishment of a 'Water Supply Bylaw'.

Currently Wellington operates year round garden water restrictions – these are published in the Council's 'Water Charter' and on the Council website. They are also publicised during summer months with random patrolling providing information to residents that water outside the permitted times.

Restrictions can follow either a voluntary or mandatory path as the need for conservation increases. Voluntary restrictions generally involve requests that residents and businesses limit their outdoor watering to a particular schedule (i.e. every other day, every third day, two days a week, etc.) but without any enforcement mechanism.

Mandatory restrictions, on the other hand, require that customers follow a watering schedule and impose penalties, usually in the form of fines, for known violations.

The literature comparing the effectiveness of voluntary and mandatory restrictions generally concludes that mandatory outdoor water restrictions are more effective than voluntary restrictions, which often produce little savings. One of the few exceptions is provided in Shaw et al.'s (1992) finding that during the 1990-91 drought, voluntary restrictions reduced summer water use in San Diego by 27% (though this was less than Los Angeles' 36% reduction from mandatory restrictions). This large saving may have been in response to an extreme or crisis situation.

In most other studies voluntary restrictions had much less impact on water consumption.

The use of enforcement tools can be contentious and results vary from authority to authority due to different applications and conditions. Research shows that there are a number of reasons why residents may or may not cooperate with restrictions. First, they respond if the credibility of local government with regard to drought information is high. Credibility can be enhanced by mass media cooperation and proximity to communities with severe shortages. Second, fear of running out of water encourages cooperation. Finally, a sense of community spirit is a consideration. Credibility of water shortage information provided by local officials and fear of running out of water are more important determinants of whether residents conserve than penalties associated with mandatory restrictions.

Demographic characteristics may also play a role in whether residents respond to restrictions. Research has shown that areas with higher incomes and higher education levels responded less to voluntary conservation measures than areas with lower incomes and educational levels. However, these distinctions did not apply once mandatory restrictions were implemented.¹²

The evidence supports the use of water restrictions as an important tool for managing peak, or short-term demand. To be effective restrictions should be able to be made mandatory and be supported with credible enforcement. This is not possible under the existing Water Charter, and officers therefore recommend the development of a water bylaw.

Rainwater harvesting

Another option strongly supported by submitters was rainwater harvesting and tank systems.

Considerable attention around the world has been placed on the use of rainwater tanks to address water supply issues; predominantly where there is a prolonged shortage or decline in rainfall rather than a limited storage capacity.

Benefits that are currently available to offset the capital cost of a rainwater harvesting system include:

- to mitigate the costs and impacts of water restrictions on their lifestyle, amenity and property values;
- to help avoid the environmental impact of constructing new water sources;
- to improve civil defence and individual resilience capabilities; and
- 'community-mindedness' (through easing the burden on the public water supply).

The Council is supportive of rainwater harvesting (and greywater recycling). The key issue for this Plan is whether rainwater harvesting can be implemented in a cost effective manner across the required number of properties to sufficiently meet peak demand requirements and/or improve supply security in extremely dry years.

Further work on the costs and benefits of rainwater tanks and their contribution to Wellington's water demand is required. It is apparent that the 'spreadsheet' approach to rainfall analysis which is based on daily rainfalls has some shortfalls

¹² Cited in Klein, R.M., Kenney, D., *Use and effectiveness of municipal water restriction during drought in Colorado*, Journal of the American Water Resources Association, Feb 2004

over some of the other mechanisms available.¹³ It has been suggested that tools¹⁴ developed in Australia (PURRS and MUSIC for example) would provide a clearer indication of the benefit of rainwater tanks and rainwater harvesting and corresponding stormwater and wastewater impacts.

Nonetheless, some of the existing analysis^{15,16} on the costs and benefits of rainwater harvesting and tanks indicates that the expense of incentivising rainwater harvesting to the extent that peak demand and/or security of supply objectives would be met exceeds the benefits of undertaking other initiatives first.

There is a risk that the public will defer their own decisions to invest in rainwater collection systems if they expect the Council will offer an incentive in the future. Based on the existing analysis, such a subsidy is unlikely to be justifiable. Officers therefore recommend that the Council indicates now that it is unlikely that it will be offering any financial incentives for people to install rainwater collection and tank systems.

At the same time the Council could reiterate that it remains supportive of residents installing such systems for a range of reasons, including providing water supply during major natural events. With this benefit in mind discussions will be held with the Wellington Emergency Management Office in order to ensure that the most appropriate measures are investigated and reported back to Council.

Additional to this emergency supply aspect is the requirement for Council to establish robust parameters for the installation of rainwater tanks, their flow rate of top-up from trickle feeds (TTF), volume of top-up (TTV) and any health considerations. It is proposed that a 'Code of Practice' sits alongside a 'Water Supply By-Law' providing for the use of rainwater harvesting and greywater reuse. This will be carried out with the appropriate advice from Regional Public Health.

Comment on other options

The following section offers comments regarding the remaining items on the table of 'options' referred to by submitters or raised in previous papers and discussion papers.

- **Water metering.** Whether this is opposed or supported by submitters (along with volumetric tariffs) Council has decided that this is not the preferred option for advancing water conservation or efficiency at this time. No additional comment on either position is warranted, since this is specifically outside the terms of reference for this work.
- **Network leak management.** Network leak management is an ongoing process sitting within the operations and maintenance programmes.

¹³ Coombes P.J., *Realistic simulation of rainwater tanks systems: revealing the detail*, University of Newcastle, Australia, 2006

¹⁴ Stan Abbott – Oral submission to GWRC 'Cultural and Social Wellbeing Committee – Te Marua, Upper Hutt, 2nd February 2011

¹⁵ Rabbitts, I., Brown, N., *Rainwater Tank Analysis Report for Wellington City*, Harrison Grierson, Auckland, 2011

¹⁶ Rabbitts, I., Brown, N., *Rainwater Tank Driest Summers Analysis Report for Wellington City*, Harrison Grierson, Auckland, 2011

The main component for the planning of active leak detection programme is the collection and analysis of data from area water meters. The analysis of maintenance records also can be used to determine where active leak detection might be required.

Increased funding is being sought to increase the level of active leak detection to the point where the economic return is maximised. If approved, this will result in an increase to the annual budget from \$157k to \$231k (+47%).

- Regulatory changes within the Building Code or District Plan. It is recommended that this option be considered as a possible future option should the measures proposed fail to provide positive results. Officers have examined this option and believe that the length of time and policy development required for any chance of success will be detrimental to other initiatives in the short-term. This is largely due to the requirements of section 32 of the Resource Management Act which would need to be able to stand up to legal challenge.
- Greywater recycling. Greywater recycling can present a number of difficulties in the area of public health if appropriate measures are not in place. Although the Ministry of Health has guidelines on greywater recycling there has not been a need for Council to establish a City wide position.

In a similar fashion to rainwater tanks there is little in the way of obstacles for individuals to utilise greywater recycling at the residential level. Where systems are incorporated with household plumbing there will be a need for the work to be undertaken by a qualified tradesperson or within the parameters of a building consent.

There is little to be gained across the city through the subsidising of greywater systems at this stage. However as with other initiatives this aspect will be revisited if additional information or technologies become known.

- Increasing supply capabilities via increased bulk storage. This option is also specifically outside the mandate of this work. GWRC is exploring other options to augment supply – these will need to be explored fully before any benefits (or costs) can be fully realised

Although it is recognised that the construction of a new dam would likely increase the region's resilience to supply interruptions and reduces the recovery time following a major earthquake¹⁷ - it is also a decision that requires the collaboration of the five territorial authorities affected.

Overall conclusions and implication for Wellington's Plan

The conclusion reached in Wellington's case is that a combination of education, information and empowerment will form a solid basis for long-term conservation and efficiency whilst peak, or short-term, demand should be able to be manageable with the application of effective water restrictions and enforcement.

¹⁷ Norman, D., and Sanderson, K., *Case Study: Reducing lifeline disruption losses – Whakatikei Dam*, Business and Economic Research Limited, Wellington, 2009

5.8 Recommendations for a Water Efficiency and Conservation Plan

Officers recommend the following activities as the basis of the Water Efficiency and Conservation Plan:

1. Establish a community engagement, education and information programme in conjunction with external and internal partners (e.g. Sustainability Trust or a commercial marketing company) and the Enviro-schools programme. This will dovetail with the water conservation initiatives currently advanced by GWRC and will be carried out to minimise the chance of re-invention and duplication of efforts and expenditure.

It is anticipated that this will encompass community workshops with ground level information that encourages water conservation and efficiency through xeriscaping, rainwater harvesting, grey-water reuse, water efficient appliances and fittings and water cycle knowledge.

Currently this is being explored with three budget caps in place - \$50k, \$75k and \$100k. The other key requirement of this approach is a level of scalability that will allow for initiatives and activities to overlap. It is currently believed that this expenditure can be sourced through the management and reprioritisation of existing budgets and workloads.

2. Establishment of a 'Water Supply By-Law' allowing for the enforcement of water restrictions. Currently Wellington operates year round restrictions that state:
"Use is only allowed 6.00am - 8.00am and 7.00pm - 9.00pm on alternate days. If you have an even-numbered address, you can use sprinklers on even days of the month and vice versa. A hand-held hose or watering can may be used at any time."

This is based on legal advice sought on the powers that the Council has to enforce water restrictions (or bans on certain activities if the need arose) outside of the provision of the Local Government Act 2002. This approach is consistent with other local authorities in the region and provides for a greater level of clarity over roles and responsibilities for both water supplier and customer.

A considerable volume of work has been done over the years in this area within existing budgets. In the main the bulk of costs will be the preparation of the required consultation phase and reporting back to Council. The establishment of a Code of Practice will draw on existing plans, policies and procedures.

It is expected that this can be met through the management and reprioritisation of existing budgets and workloads.

3. Publication of water consumption figures on a regular basis showing increases or decreases in consumption for the different suburbs. This will be done through analysis of the city's area meters.

This will be completed as part of the Asset Management Plan process and published as a feature in the annual summary plans and with a detailed appraisal in the triennial detailed Asset Management Plan. The inclusion of

this data will not impact on the budget requirements for generating the Asset Management Plan.

It is also planned that the 'Our Wellington' page will be utilised – this has already been funded.

4. Increased discussion and interaction with retailers / service providers and regional authorities on methods available to make water efficient technologies more prominent.
5. Continue to explore options for subsidising, incentivising or rebating the installation of water conserving or efficient technologies. This could be based on the GWRC / Government 'EECA Energy-wise' schemes (for example).
6. Increase communication with significant water users in the Wellington area about how their water use might be made more efficient.

The activities are completely scalable and will be expanded or reduced as results become clearer.

7. Ongoing analysis of leak detection work and the costs and benefits for pressure management within the public network. Actions within this activity include investigating where pressure management can be implemented across the city.

Pressure management is an important tool for network management in that there is a direct, almost linear, relationship with physical network losses via leakage (for example, 10 percent more pressure translates to about 10 percent more leakage and vice versa)..

The investigation of pressure management is currently being undertaken and is likely to be managed via a reprioritisation of current workloads.

Items 4, to 7 will be carried out on an ongoing basis within the existing asset management workloads. Targeted approaches will initially be a 'cold call' based on the desired outcome and be advanced as opportunities present themselves.

If these activities prove more fruitful than others it may be that extra resources are needed. It would be then advanced through appropriate channels to establish whether resources can be diverted or obtained to meet any increased demand.

5.9 Budget implications

The budget implications that arise from the development of the education and informative programmes may be significant.

The other initiatives are planned to be largely undertaken from existing budget allocations through the management and reprioritisation of existing budgets and workloads.

Although there are efficiencies to be gained from utilising the Enviro-schools programme with GWRC there are wider costs associated with developing resources that will allow meaningful and targeted engagement with different community and business groups.

As per above quotes and business plans are currently being prepared by the Sustainability Trust and commercial organisations for the development of education programmes and resources that will augment or support GWRC initiatives. When these have been collected and appraised the financial implications will be presented to Council.

5.10 Reporting

Reporting on the outcomes of the plan to Council and the community is to be conducted in three stages:

- to Council via committee in August 2012
- to the community via the 2012 Annual report
- to the community via the 'Our Wellington' page

Reporting will provide details on:

- current demand (versus historical)
- effects of conservation efforts on demand (where it can be established)
- leak detection programmes (and outcomes)
- commercial customers engaged
- New initiatives
- Ongoing initiatives
- Costs
- Any other requested or relevant information

Reporting on the above is held back until 2012 in order to enable assessment of initiatives over the 2011/12 summer and allow for the effects of conservation and efficiency efforts to be analysed over a meaningful period.

6. Conclusion

In presenting this report and the attached Water Conservation and Efficiency Plan we believe the approaches will work towards increasing water conservation and efficiency in Wellington in an effective and rational manner.

It is intended that the use of multiple conservation and efficiency activities in a progressive fashion as outlined in the plan will allow for a greater likelihood of success in achieving the Council's goal of 'living within our means'.

Contact Officer: *Paul Glennie, Strategic Policy Analyst - Capacity Infrastructure Services Limited*

Supporting Information

1) Strategic Fit / Strategic Outcome

This paper and the recommendations sit alongside the seven strategic areas and community outcomes.

2) LTCCP/Annual Plan reference and long term financial impact

No LTCCP/Annual Plan impacts are evident at this stage. Activities or initiatives that may impact the LTCCP or Annual Plan will be raised independently with individual business cases for the 2012/13 year.

3) Treaty of Waitangi considerations

It is not considered that this document or its associated resolutions are affected by Treaty of Waitangi considerations.

4) Decision-Making

This is not a significant decision. The report sets out a number of options and reflects the views and preferences of those with an interest in this matter who contributed during the planning stages.

5) Consultation

a) General Consultation

Consultation has been carried out on this matter. The submissions and their respective assessments have been commented on in this paper.

b) Consultation with Maori

Refer section 3 - .

6) Legal Implications

No legal implications are evident at this stage. Should such a situation arise with the implementation of initiatives legal advice will be sought and brought before Council.

7) Consistency with existing policy

This report recommends measures which are consistent with existing WCC policy.

Appendix 1: Water Conservation and Efficiency Plan 2011