# Water Demand Management
# Options & Opportunities

## for Rangitikei District Council

**Technical report prepared for Horizons Regional Council**

**November 2006**

horizons regional council

AQUAS Consultants Ltd

# Water Demand Management
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## for Rangitikei District Council

**Technical report prepared for Horizons Regional Council**

**Prepared by**

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**November 2006**

Rangitikei District Council assisted AQUAS Consultants in its work for Horizons Regional Council assessing their proposed water-use guidelines for public water supplies. Information on the Bulls and Hunterville water supply systems was provided for analysis purposes. This report provides the District Council with some ideas and suggestions for demand management based on that information.

# Contents

# 1 Background

Horizons Regional Council (HRC) has identified 'increasing water demand' as one of four priority – or keystone – issues for the region. The total volume of permitted water takes has increased dramatically in recent years placing both surface water and groundwater resources under pressure.

The Council is taking a number of steps to address this, including development of water-use guidelines for public water systems – as a way to move towards more efficient use. HRC asked AQUAS Consultants to assess the draft guidelines, taking into account:

- strategies and approaches in *other* regions in the country, and
- current water consumption levels and practices *within* the region.

A further purpose of the work was to identify opportunities for improved water-use efficiency in public water supply schemes in the region and provide this information back to participating District Councils.

## 1.1 Water Use in Public Water Supply Systems

To carry out the second part of the study – assessing current water consumption levels and practices within the region – the Regional Council identified five public water supply systems to be examined. These were Bulls, Hunterville, Eketahuna, Levin and Feilding.

These range from small/rural systems to moderate-size urban schemes and were deemed to provide a *representative* picture of water use in public schemes for the region.

This report provides information on the **Bulls** and **Hunterville** water supply systems. Part 2 summarises the current situation. This is followed by suggested options and opportunities for demand management in Part 3.

# 2 The Current Situation

A common approach was used to gather and summarise the necessary information for the five water supply systems.

The consultant contacted each Council to outline the purpose and nature of the work and to seek their support. Once this was done, the consultant followed up by e-mail to confirm the work and to ascertain the Council staff member who would serve as liaison and help in data gathering.

## 2.1 Information/Data Gathering

As a first step, Councils were provided with a Water Supply Services Worksheet – a form used to capture and organise helpful information. Completed Worksheets were returned to the consultant, reviewed, and followed by e-mail back to the Council (as necessary) for clarifications.

A Data Summary sheet was prepared for each system based on the details in the Worksheet.

The consultant then spent time in the region to visit the area served by each water system and meet with each Council staff contact to gather information more easily obtained via discussion.

This allowed the Worksheet and Data Summary to be revised and amended *and* preparation of Additional Information for each system. All of this was subsequently provided to Councils for their review, and the necessary changes made to finalise each item.

Blank Worksheets were provided to Councils in mid-July, with completed copies returned to the consultant in August. All information/data was finalised and put in the form included in this report by the end of September.

## 2.2 Summary for Bulls and Hunterville

The completed Worksheets for Bulls and Hunterville appear in Appendices A and B respectively. The tables on the following pages summarise key data drawn from the Worksheets.

Additional information gained in discussions with the Council's Engineering Services Manager follow each table.

**Bulls Water Supply**
**Data Summary**

| Item | Data* | Calculations/Comments |
|---|---|---|
| **Consent conditions** | 1700/day | Source: four bores adjacent to Rangitikei River. Consent expires 2022. Flow not to exceed 33 l/s<br>Consent for water from new, deep bore in progress |
| **Current use (system)** | ADD 1200<br>PDD 1600 | ADD = 71% of consent<br>PDD = 94% of consent (PDD = 1.33 ADD) |
| **Water storage capacity** | 767 | = 64% of ADD and 51% of PDD |
| **Customer connections and water costs** | 662<br>All metered | Air Force block is bulk metered<br>Cost: $1.00 per cu m ($17.50 minimum 3x year) |
| **Current population** | 1,812 | 2006 estimate |
| **Current use (per capita)** | ADD 662 l/p/d<br>PDD 883 l/p/d | Includes NRW and Commercial (Riverlands meat processing consumes 500-800/day when operating). See recalculation below for more accurate picture. |
| **Use by category (estimate)** | Commercial ~50% | Riverlands meat processing currently takes 500 to 800/day = 42% of ADD and 50% of PDD |
| **Leaks/losses details** | Unsure at this time | 2003 Detection Services work is most recent analysis.<br>Helpful data for future analysis and comparisons: length of pipe network = 23 km and number of connections = 662; giving 29 connections/km. |
| **Recalculated use per capita** | ADD 386 l/p/d<br>PDD 442 l/p/d | From 1200 – 500 = 700 / 1,812<br>From 1600 – 800 = 800 / 1,812<br>Revised figures shown if Riverlands excluded from 'Current Use' totals given its volume skews data . This is based on Riverlands ADD at 500 and PDD 800. These per capita figures still include *other* commercial and NRW. |
| **Residential use estimate (net)** | ADD 309 l/p/d<br>PDD 353 l/p/d | Eliminate Riverlands and say 5% of remaining consumption is other commercial and 15% is NRW<br>ADD = 1200 – 500 = 700 – 140 (20%) = 560, so per capita = 560 / 1,812 = 309 l/p/d. PDD = 1600 – 800 = 800 – 160 (20%) = 640 / 1,812 = 353 l/p/d |
| **Possible future demand** | ADD 2040 = 82% of *new* consent<br>PDD = 2470 = 99% of *new* consent | Say by 2011, population increase of 7.5% (=1.5%/yr), ADD will be 1200 x 1.075 = 1290; PDD = 1600 x 1.075 = 1720<br>Add 600 for Riverlands + 150 for RNZAF and estimate new *total* consent (five bores) at 2500/day<br>ADD = 1290 + 600 + 150 = 2040<br>PDD = 1720 + 600 = 150 = 2470 |

* All water volume figures are cubic metres unless noted otherwise

## Additional Information – Bulls

***New Source of Supply –*** A new deep bore has been drilled and it appears it could produce about 1100 $m^3$/day. This will address periodic summer shortages when the current four shallow bores cannot deliver the consented amount and water restrictions need to be imposed. New (total) consent and supply should cater for possible future demand from increased production at Riverlands and higher occupancy rate at Ohakea (Air Force block).

***Air Force Block –*** The housing block accounts for about 25% of residential accommodation in Bulls. Occupancy could increase significantly adding to future demand (as noted above). The block is bulk metered. The Air Force pays water costs and this is surcharged on rent for housing (but not on a volume basis).

***Riverlands –*** Current use is some 42 to 50 percent of the water system daily total when the plant is operating. They have a bore for use when non potable water is acceptable and limited capacity for on-site supply. The 2003 Detection Services report indicated possible significant losses at the plant. Riverlands have not been proactive in managing water use (for efficiency).

***Mains Water Pressure –*** Pressure is generally not high in the system and some areas do not have good pressure.

***Garden Use –*** Outdoor use for watering gardens is not excessive (note modest difference between estimated residential ADD and PDD on Data Summary sheet). Thus, hosing bans have little impact on residential water use at this time of year.

***Tanker Water –*** The 2003 Detection Services report noted that a significant amount of water was drawn from the system to fill tankers supplying rural customers when their water runs low. At the time there was no charge to tanker operators for this supply. This has since been rectified. Council now charges \$2.50/$m^3$ throughout the district and no takes are allowed from the Bulls system in the summer.

## Demand Management Initiatives

***Current*** – Metering and volume pricing. Telemetry data collection and analysis for leaks and losses.

***Planned*** – Council intends installing data loggers at Riverlands to track water use. Provision of NZWWA booklet *Savings in your $H_2$OUSE*. Could choose efficient fixtures, etc when Council facilities updated. Next leak detection survey planned for 2010.

**Hunterville Water Supply**
**Data Summary**

| Item | Data* | Calculations/Comments |
|---|---|---|
| **Consent conditions** | 4968/day | Max abstraction rate 216 $m^3$/hr Consent to be renewed in 2007 likely seeking ~ 2200/day |
| **Current use (system)** | Urban 170 to 300/day, average 218<br>Rural – average 600/day (winter), 1200 (summer) | For the total system: Winter (low) = 170 + 600 = 770; Summer (high) 300 + 1200 = 1500<br>Urban: PDD = 1.38 ADD ( i.e. 300 / 218)<br>Rural: summer average use is 2x winter use |
| **Water storage capacity** | Urban – 300<br>Rural – 350 | Urban storage = same as daily maximum<br>Rural storage = 58% of winter average and 29% of summer average |
| **Customer connections and water costs** | Urban 243, all metered<br>Rural 158, all on restricted supply (not able to meter) | Cost: $2.50 per cu m<br>Cost: $150 per unit/year (unit = 1 cu m/day) |
| **Current population (urban)** | 504 | 2006 estimate |
| **Current use urban (per capita)** | ADD 432 l/p/d<br>PDD 595 l/p/d | From 218 / 504<br>From 300 / 504 |
| **Use by category (urban)** | Difficult to determine at this time | |
| **Current use rural (per connection)** | 3.78/day in winter<br>7.56/day in summer | = Use per connection (600 / 158 connections winter and 1200 / 158 summer) |
| **Leaks/losses details** | Unsure at this time | Most recent analysis done in 2003<br>Helpful data for future analysis and comparisons – *Rural system*: length of pipe network = 130 km and number of connections = 158; giving 1.22 connections/km.<br>*Urban system*: length of pipe network = 10.3 km and number of connections = 243; giving 23.6 connections/km. |
| **Future demand (rural and urban in total)** | Winter average ~ 35% of new consent<br>Summer average ~ 68% of new consent | No significant changes expected in population or commercial use/needs<br>Demand relative to likely new consent<br>Winter 770 / 2200 = 35%<br>Summer 1500 / 2200 = 68% |

* All water volume figures are cubic metres unless noted otherwise

## Additional Information - Hunterville

***Leaks & Losses Rural –*** Pipes are relatively new and it is a low-pressure system, so leaks and losses can be expected to be relatively low. There are bulk meters throughout the system, so areas can be isolated to assess for possible losses. Because it is a low pressure system, some customers might not get water if there is a leak in the pipes giving a further built-in 'alert' for leaks and losses.

***Leaks & Losses Urban –*** In the 2003 leak detection work, night flow measurements on the Consolidated School showed a regular use of 0.4 $m^3$ of water used per half-hour period. This equates to 19.2 $m^3$/day and was approximately 8% of total demand for the day. This was attributed to water use in urinal(s), presumably due to a cyclical flushing system.

***Mains Water Pressure –*** Pressure is generally good throughout the system.

## Demand Management Initiatives

***Current*** – Metering and significant volume price for urban customers. Urban system: telemetry data collection and analysis for leaks and losses. Rural system: water meters on branch lines read monthly and closely monitored to detect leakage.

***Planned –*** Provision of NZWWA booklet *Savings in your $H_2$OUSE*. Next leak detection survey planned for 2010.

# 3 Opportunities for Water Savings

The information in Part 2 of the report provides a basis for suggesting further demand management (DM) initiatives that could result in water savings for the system.

The first section below makes a few general comments based on the Part 2 summary. Section 3.2 builds on this with a brief outline of DM options that make sense given the current circumstances. Section 3.3 follows with some additional opportunities – ones that may be more challenging to implement, but have strong potential benefits if the need is there.

It is noted that the District Council has in hand a report – Methods for Implementing Conservation Plans – prepared by a consultant and that a Conservation Plan is now prepared for each water supply scheme as a part of its resource consent application. Appendices C and D included here are provided for DM planning purposes and can build on these other documents. Appendix C provides an extensive list of options for reference when devising specific initiatives. Appendix D notes potential water savings through residential and commercial retrofits and upgrades.

The suggestions included here are based on an analysis of *two* public water supply systems. There are some advantages, however, to having a water demand management plan implemented at the district level, so a broader assessment of needs would be helpful in order to map out the best approach for a district-wide effort.

## 3.1 Observations & Comments

The data and information summarised in Part 2 suggests that:

For Bulls …
- Full metering is helpful as a motivator for efficient use (generally), but not in the Air Force block as individual properties are not charged on a volume basis.
- Good opportunities exist to examine water use at Riverlands and strive for greater efficiencies.
- Due to modest pressure throughout the system, there would be limited benefits in installing flow restrictors, pressure valves, etc on residential properties as a means of reducing water use.
- Given current patterns of summer water use, little benefits can be expected from a campaign focusing on this.
- Net residential use is relatively low compared to other systems studied.
- Future peak day demand (given possible use at Riverlands and the Air Force block) will push the new consent limit.

For Hunterville …
- For urban customers, volumetric cost is significant which should be a strong financial incentive to reduce use.
- 2003 leak detection work showing water loss in the school overnight, demonstrates the potential value/water savings in conversion to on-demand or waterless urinal systems.

## 3.2 Logical Options

Here are some key options for water-saving efforts.

***Industrial/commercial water advisory*** – Depending on the nature of their operation, a few large customers can take a considerable portion of total daily supply – with Riverlands being an extreme example. It makes sense, then to focus water-efficiency efforts on larger commercial customers first, then move on to medium-size and smaller businesses. Water audits and an advisory service for this customer class could play a significant role in helping to reduce total demand. This may require special expertise, so it would be worth exploring a cooperative effort with nearby Councils to reduce costs and enhance results.

***Residential metering*** – While Bulls, Hunterville and Mangaweka are fully metered, there is no metering on residential properties in Marton, Taipahe and Ratana. Information provided for this study

noted the significant reduction in demand in Hunterville urban with the advent of metering. This is consistent with experience in other places. International comparisons show significantly lower water use in systems with universal metering compared to those on a flat rate structure. In New Zealand, Tauranga City Council has fairly recently gone to universal metering and estimates a 20% reduction in water use as a result. This is supportive evidence as the Council considers the possibility of residential metering in the townships noted above as a part of the LTCCP process.

***Summer water-use campaign*** – While Bulls does not experience high residential summer water use, an earlier report for Horizons Regional Council by Aqualinc Research Ltd notes high seasonal use in Marton. A campaign focusing on residential customers and outdoor/garden watering would address high season use which places extra stress on water resources. This will be challenging when areas without residential metering are targeted as they have no financial incentive to reduce water use. (This is another good argument for universal metering.) Such a campaign will, thus, require a well-planned communication/social marketing effort. Summer water use has been identified as an issue in Palmerston North, Levin and Feilding, so a cooperative effort (even involving the Regional Council) would again maximise benefits.

***On-property leak detection*** – Leak detection efforts can help to identify water loss not only in mains but also in customer lines running off the mains. This is especially true where there is no metering which helps to pick up losses via abnormally high readings. A leak detection programme such as this by one District Council on the North Island determined possible leaks on 80 properties. A letter sent to owners resulted in 75% of them doing the necessary repairs (confirmed by follow-up scanning). Subsequent correspondence and discussion with owners addressed the remaining problems. Cost to the Council is for the detection scan and administration for letter writing, etc., as it is the responsibility of customers to fix leaks on their own property.

***Public, community, and commercial toilets*** – There are significant benefits in retrofitting or upgrading urinals from cyclical flushing to on-demand or even waterless models (and upgrading taps and toilets as needed). This would reduce both water supply requirements and wastewater flows – a double benefit. As an example, leak detection work done earlier for the Council attributed 0.8 $m^3$/hr or 19.2 $m^3$/day (8% of total use) in the Consolidated School in Hunterville to continuous flushing of urinals. This goes on all night, on weekends and during school holidays when these facilities are not even in use. Another Council in the region is upgrading public facilities (with manual flushing systems on urinals and dual-flush cisterns in some premises). This has reduced water use to about 15% of previous levels. This sort of work can be done in Council-owned facilities, schools, community and sports clubs, and commercial establishments such as restaurants and pubs. Metered customers will be inclined to upgrade and further motivation could be provided through a variety of financial incentives (e.g. reduction in wastewater charges for those with more efficient systems).

***Residential water advisory*** – This can include simple checks for leak repairs and install flow-control devices (such as a cistern weight in old single-flush toilets). It also provides an opportunity to discuss customer water-use practices and promote conservation with customers. This is particularly helpful for older houses that may not have been upgraded to include water-saving fixtures. This is another area where Councils might cooperate to share costs and time for an individual who could serve as a domestic water advisor (and even be coordinated with the industry/commercial water advisory service outlined above).

***Rural customer water use*** – Metering extraordinary users and restricted-flow systems can help to manage water use on properties that might include horticulture or stock watering. Educational efforts to help customers achieve 'best practice' levels of water use can bring real benefits as well.

***Education/promotion support*** – All of the efforts noted above will require strong communication support – to create interest and awareness, motivate for change, and gain customer commitment and action. There are likely some materials that would have application throughout the region so, again, looking at cooperative efforts makes sense.

## 3.2 Additional Opportunities

A two additional opportunities should be noted.

***Financial incentives*** – Providing a customer water advisory service – if it is free or subsidised – is a form of financial incentive. Retailer discounts or rebates for purchase/install of water-saving fixtures or appliances is an additional form of financial incentive. These have proven effective in places where they have been employed. Council could easily manage and budget for an incentives programme by controlling the range and number of items available in any given time period.

***Outdoor water-use practices*** – While restrictions in times of shortage are a common approach to water management, innovative jurisdictions are now moving to a general policy covering permitted outdoor water-use activities. This includes both schedules and timing for garden watering and stipulations for activities such as vehicle washing and the hosing of sidewalks and paved areas. These steps can have significant benefits in reducing water use at the time of year when demand is generally high and river flows are low.

The above points provide just a few examples of the opportunities available – and a sense of the water-reduction benefits that are possible when implemented over a period of time. The key is to successfully integrate *demand management* options into the long-term water supply strategy.

# References


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Berryman, S (2001) *Council Practices in Urban Water Conservation and Demand Management*. A report prepared for Ministry for the Environment.

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Horizons Regional Council (2006) *One Plan*. Working Document, Version 5, sections of Chapter 6.

Institute for Sustainable Futures (2003) *Residential Retrofits – Analysis of Water Savings: Progress Report No. 2.* Prepared for Sydney Water Corporation.

Ministry of Health (2004) *Household Water Supplies: The selection, operation, and maintenance of individual household water supplies.*

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## Appendix A

**Horizons Regional Council**

**Public Water Supplies – Water Efficiency Guidelines Project**

# WATER SUPPLY SERVICES WORKSHEET

**for**

# BULLS

**Provided to Rangitikei District Council 12 July 2006**
**Completed Worksheet received 9 August**
**Additions 28 August**
**Reviewed by RDC, Finalised 4 September**

## Public Water Supplies – Water Efficiency Guidelines Project

## Review of Sample Water Supply Systems in the Region

Horizons Regional Council has asked AQUAS Consultants to examine the proposed efficiency guidelines for public water supplies. Part of this work involves looking at a few water supply systems in the region as examples to consider appropriateness of the guidelines and to explore opportunities for improved water-use efficiency.

This exercise will:

- help refine the guidelines to assist discussions amongst the Councils
- identify possible opportunities for improved efficiencies (particularly relating to customer water use) and provide this information to the District Councils for their own planning purposes.

This Worksheet provided to participating District Councils is the first step in the process. It is divided into three sections as follows:

- General Statistics & Trends
- Water Supply Services
- Demand Management Activities & Opportunities

The Worksheet is designed to capture and organise a range of helpful information on the water supply systems being examined. It isn't the intention to ask you to do any additional data gathering or tracking. Please just provide information that is readily available.

In completing the Worksheet:

- Data and responses can be inserted directly into this WORD document immediately following each item/question.
- If you are appending data or information to complete the Worksheet, please reference the item/question numbers here (1.1, 1.2, etc).
- If you organise your data in ways different to how it is described in the Worksheet, please enter it in whatever format is easiest for you.
- If data or information is currently unavailable for any items queried, please indicate.
- If any items do not apply to the water system, note 'n/a'.
- If you would prefer to relay any information on the telephone or in a meeting, please indicate and this will be arranged.

When we have reviewed the completed Worksheet, we will come back to you for any clarifications and additional information needed.

If you have any questions or concerns when completing the Worksheet, please call Gord Stewart on 07 577 1565 (or 027 416 5672) or by e-mail to gord@aquas.co.nz.

## SECTION 1: General Statistics & Trends

### *Population*

**1.1** Population at 2001 Census - 1755

**1.2** Estimate of current population (July 2006) *or* most recent estimate - 1812

**1.3** Expected resident population in 2011 … in 2021 (*or* projected annual change in population)
2011 – 1900-2000
2021 – 2200

### *Industry*

**1.4** Industry/commercial activities – what drives the economy of the area
Services for the travelling public – cafes, public toilets, shops, etc.
Light commercial
Riverlands (beef) and Santa Rosa (chicken) processing.

**1.5** Any anticipated change in industry/commercial activities in next few years (e.g. gain or loss of large businesses)
Air Force Block housing currently not fully occupied. With the expansion at Ohakea occupancy could increase significantly.
Riverlands has indicated they are likely to upgrade the plant to process more stock and would need more water (approx 600 cubic metres per day).

### *Other*

**1.6** Any data held by Council on typical/average age of the housing stock
Most appear to be 1960-1970's era.

**1.7** Number of seniors/public housing units owned or managed by Council (if any) – 6 units

**1.8** Any other information that should be noted (i.e. things that might have an impact on demand for water)

## SECTION 2: Water Supply Services

### *Source, system and supply info*

**2.1** Resource consent limits (per day, max flow rate, take during low flow, etc.)
Water drawn from four shallow bores adjacent to Rangitikei River. Consent expires 16 January 2022. 1700 cubic metres/day, 33 l/s maximum flow

**2.2** Total storage/reservoir capacity for the system - 767 cubic metres

**2.2** Overall demand for water and seasonal variations
- ❑ Total annual production (note period)
- ❑ Average day demand 1200
- ❑ Peak day demand 1500
- ❑ Other (any other data/info tracked on water use)

Spreadsheet available.

**2.4** Estimate of water loss/leaks
- ❑ As a percentage of total production
- ❑ Location/cause of losses

2003 Detection Services analysis reports a conservative loss of 6.2 $m^3$/hr and additional 'floating value' of 3.13/hr (total 9.33/hr). This gives conservative loss of 126 $m^3$/day and total possible 223/day (=11 to 18% of *current* total). The report also notes additional losses/excessive use possible at meat processing plant and some of NRW attributed to tanker fillings (which has since been addressed). Current NRW includes estimated 10 $m^3$/day water lost during treatment process.

**2.5** Any seasonal water shortages – time period (months of the year), frequency of occurrence (looking back 10 years say) and severity
Every 2-3 years there tends to be times when the recharge rate in the well/bores reduces and 1700 cubic metres is not available. Hosing restrictions are put in place and industry is also restricted. Tends to be February to April period.

**2.6** Key concerns/issues looking ahead 1-2 years … 5 years … 10 years
Drinking water standards. Storage.

### *Customer information*

**2.7** Number of customer connections 662
- ❑ Number with meters All properties except Air Force block which is bulk metered
- ❑ Number without meters

**2.8** Number of *customers* served by water supply (different to population in 1.2?)

**2.9** Customer breakdown (e.g. % of total connections *or* water use by customer class):
- ❑ Residential
- ❑ Commercial/industrial (including schools)
- ❑ Council use (community facilities, public toilets, etc)
- ❑ Agricultural
- ❑ Other

**2.10** Any further breakdown of commercial/industrial customers (e.g. office/retail, manufacturing, hospitality)

**2.11** Water rates (by customer type if it varies) – UAC, targeted rate, fixed annual charge, volume charge, etc.

$1.00 per cubic metre ($17.50 minimum charge every 4 months)

***Industry water use***

**2.12** List the 5 to10 largest water users and their annual use. Is the use seasonal?

| | |
|---|---|
| Riverlands | 125,000 $m^3$ |
| Santa Rosa | 3,500 |
| Café near bridge | 3,000 |
| Truck depot | 2,500 |
| McDonalds | 1,800 |

Riverlands is seasonal with highest demand in February to April time when there is also slightly higher domestic use and when supply is more stressed.

Riverlands annual use gives an *average* of about 343 $m^3$/day, but this includes weekends and other times the plant is not operating. Demand *when operating* is about 500 ADD and 800 PDD as noted elsewhere.

**2.13** Anticipated future increased needs from industry/agriculture - expansions, new arrivals, etc. (This may have been covered in 1.5.)

Riverlands extra 600 cubic metres per day

RNZAF extra 100-200 cubic metres per day

## SECTION 3: Demand Management Activities & Opportunities

### *Revenue Water – Customer Level*

**3.1** List/describe any current demand management activities targeting customers
- Metering/volume pricing (could have covered this in 2.11)
- Information and education
- Promotion of water-saving technologies and practices
- Financial Incentives (e.g. rebates for low-flow showerheads)
- Regulatory (e.g. water restrictions)
- Recycling/reuse (stormwater, wastewater)

**3.2** For any activities noted above, briefly describe the uptake, success, etc., to this point

**3.3** Please list/describe any customer-level demand management activities you are *now* considering *or* planning

Council has ordered copies of the new NZWWA booklet *Savings in your $HO_2USE$.* Will be available for pick up at Council office, etc., and could do a distribution.

### *Non-revenue Water – Council use, leaks/losses, etc*

**3.4** Do you suspect there are any ways to improve water-use efficiency in Council facilities (offices, community halls, public toilets, etc)? If so, please list.

Considered when facilities are upgraded.

**3.5** Please note (briefly) any *current* pressure management and/or leak detection/reduction efforts

Telemetry data collation and analysis

**3.6** Please list/describe any pressure management or leak detection efforts you are *now* considering *or* planning

Next leak detection survey scheduled for 2010. Could possibly be done sooner if deemed to be a useful, cost-effective effort.

**3.7** Any other current activities *or* opportunities to reduce NRW in the system

## In Addition

Any other information that might be helpful/should be considered and not covered in specific points in Sections 1, 2 and 3 above?

Asset Age – Replacements of copper water mains and laterals have been carried out over the last few years.

The length of the pipe network for the rural scheme = 23 km
Number of connections = 662
Connections per km of pipe = 28.8

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## Appendix B

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**for**

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The Worksheet is designed to capture and organise a range of helpful information on the water supply systems being examined. It isn't the intention to ask you to do any additional data gathering or tracking. Please just provide information that is readily available.

In completing the Worksheet:

- Data and responses can be inserted directly into this WORD document immediately following each item/question.
- If you are appending data or information to complete the Worksheet, please reference the item/question numbers here (1.1, 1.2, etc).
- If you organise your data in ways different to how it is described in the Worksheet, please enter it in whatever format is easiest for you.
- If data or information is currently unavailable for any items queried, please indicate.
- If any items do not apply to the water system, note 'n/a'.
- If you would prefer to relay any information on the telephone or in a meeting, please indicate and this will be arranged.

When we have reviewed the completed Worksheet, we will come back to you for any clarifications and additional information needed.

If you have any questions or concerns when completing the Worksheet, please call Gord Stewart on 07 577 1565 (or 027 416 5672) or by e-mail to gord@aquas.co.nz.

## SECTION 1: General Statistics & Trends

### *Population*

**1.1** Population at 2001 Census – 507 Hunterville township. Rural area no info available.

**1.2** Estimate of current population (July 2006) *or* most recent estimate – 504

**1.5** Expected resident population in 2011 … in 2021 (*or* projected annual change in population) – No change expected.

### *Industry*

**1.6** Industry/commercial activities – what drives the economy of the area
Rural area – sheep/beef farming, limited dairy farming.
Town – some services for travelling public including cafes and public toilets.

**1.6** Any anticipated change in industry/commercial activities in next few years (e.g. gain or loss of large businesses)
No significant changes expected.

### *Other*

**1.6** Any data held by Council on typical/average age of the housing stock - properties date from 1900. Many houses 50 years plus old.

**1.7** Number of seniors/public housing units owned or managed by Council (if any) - None

**1.8** Any other information that should be noted (i.e. things that might have an impact on demand for water)

Rural scheme takes water from Rangitikei River via an infiltration gallery and apart from low dose chlorination there is no treatment. This scheme was established in the 1980s so most pipe materials are modern. It's a trickle-flow type system. The allocation of units is delivered over a 24-hour period and farmers must have at least 24 hours storage on-site.

The urban scheme was switched over to the Rangitikei River source when the rural scheme was installed. Further treatment and storage is provided for the urban area. Water meters were installed to all urban connections in February 2005. (See 2.3 regarding estimated reduction in water use as a result.) The pipe network is much older than for the rural system.

## SECTION 2: Water Supply Services

### *Source, system and supply info*

**2.1** Resource consent limits (per day, max flow rate, take during low flow, etc.)
4968 cubic metres per day Consent renewal in 2007 and will be asking for around 2200 cu m/day

**2.2** Total storage/reservoir capacity for the system
Rural 350 cubic metres
Urban 300 cubic metres

**2.3** Overall demand for water and seasonal variations
- Total annual production (note period)
- Average day demand
- Peak day demand
- Other (any other data/info tracked on water use)

Urban – daily demand ranges from 170 to 300 cu m, with an average of 218. Demand was about 80 cu m/day higher before metering (= approx. 26% reduction)
Rural – summer daily demand about 1200 cu m; winter daily demand about 600 cu m

**2.4** Estimate of water loss/leaks
- As a percentage of total production
- Location/cause of losses

Hunterville Urban – February 2003 report Jeff Booth Consulting Ltd report notes that minimum night flows for the entire reticulation was approx 8 cu m/hour and measured per hour per connection was deemed to be higher than acceptable. Detection Services work as a part of the analysis identified some 41 areas of water loss (including Council leaks, customer leaks and potential high users).
Current NRW includes estimated 5 cu m/day water lost during treatment process

**2.5** Any seasonal water shortages – time period (months of the year), frequency of occurrence (looking back 10 years say) and severity. None

**2.6** Key concerns/issues looking ahead 1-2 years … 5 years … 10 years
Meeting drinking water standards for urban supply. Identifying condition and performance of pipe network in urban area.

### *Customer information*

**2.7** Number of customer connections
- Number with meters
- Number without meters

Hunterville Rural – 158 all restricted supply (not possible to meter these type of connections)
Hunterville Urban – 243 all metered

**2.8** Number of *customers* served by water supply (different to population in 1.2?)

**2.9** Customer breakdown (e.g. % of total connections *or* water use by customer class):
- Residential
- Commercial/industrial (including schools)
- Council use (community facilities, public toilets, etc)
- Agricultural
- Other

Rural – mostly agricultural, a small number of domestic, school, commercial
Urban – mostly domestic , some light commercialand service (cafés, etc.)

**2.10** Any further breakdown of commercial/industrial customers (e.g. office/retail, manufacturing, hospitality)

**2.11** Water rates (by customer type if it varies) – UAC, targeted rate, fixed annual charge, volume charge, etc.

Hunterville Rural - $150 per unit per year (unit = one cu m/day)
Hunterville Urban $2.50 per cubic metre
Urban system water costs are capped and there is a degree of subsidy from general rates to keep the charge at $2.50/cu m

***Industry water use***

**2.12** List the 5 to10 largest water users and their annual use. Is the use seasonal?

Major non-residential users
Potato Packers 2015 cu m/yr
Resthome 1400

**2.13** Anticipated future increased needs from industry/agriculture - expansions, new arrivals, etc. (This may have been covered in 1.5.)

## SECTION 3: Demand Management Activities & Opportunities

### *Revenue Water – Customer Level*

**3.2** List/describe any current demand management activities targeting customers
- Metering/volume pricing (could have covered this in 2.11)
- Information and education
- Promotion of water-saving technologies and practices
- Financial Incentives (e.g. rebates for low-flow showerheads)
- Regulatory (e.g. water restrictions)
- Recycling/reuse (stormwater, wastewater)

See 3.5

**3.2** For any activities noted above, briefly describe the uptake, success, etc., to this point

**3.3** Please list/describe any customer-level demand management activities you are *now* considering *or* planning

Council has ordered copies of the new NZWWA booklet *Savings in your $HO_2USE$.* Will be available for pick up at Council office, etc., and could do a distribution.

### *Non-revenue Water – Council use, leaks/losses, etc*

**3.4** Do you suspect there are any ways to improve water-use efficiency in Council facilities (offices, community halls, public toilets, etc)? If so, please list.

Very few Council facilities in Hunterville

**3.5** Please note (briefly) any *current* pressure management and/or leak detection/reduction efforts

Hunterville Rural – water meters on branch lines read monthly and closely monitored to detect leakage.
Hunterville Urban – telemetry data collection and analysis

**3.6** Please list/describe any pressure management or leak detection efforts you are *now* considering *or* planning

Next leak detection survey planned for 2010.

**3.7** Any other current activities *or* opportunities to reduce NRW in the system

## In Addition

Any other information that might be helpful/should be considered and not covered in specific points in Sections 1, 2 and 3 above?

***Rural Scheme***

Length of the pipe network for the rural scheme = 130 km
Number of connections = 158
Connections per km of pipe = 1.22

***Urban Scheme***

Length of the pipe network for the rural scheme = 10.3 km
Number of connections = 243
Connections per km of pipe = 23.6

# Appendix C

## Detailed List of Demand Management Options

There are many demand management options available to help use water more efficiently and to reduce water loss. Suggested options noted in the body of this report are drawn from the wider list included here. This list is provided for reference purposes and can serve as a guide in devising specific demand management initiatives.

Six lists are included as follows:

**Measures** – specific devices or actions that result in reductions in water use

- Technologies & Practices – Indoor
- Technologies & Practices – Outdoor
- Water Capture, Reuse & Recycling

**Instruments** – supportive elements that encourage the adoption of a technology or a change in habits or practices

- Information & Education
- Regulatory Mechanisms
- Metering, Pricing & Other Financial Incentives

The table on the next page provides a summary list of the *types* of options available. The individual tables for each measure or instrument take it to the practical level by detailing specific actions. Comments are included where appropriate as a guide for implementation.

## Water-Use Efficiency Options ~ At A Glance

### Measures

| **Technologies & Practices Indoor** | **Technologies & Practices Outdoor** | **Water Capture, Reuse & Recycling** |
|---|---|---|
| Residential<br>*Fixtures and devices*<br>*Appliances*<br>*Audits and retrofits*<br><br>Industrial/Commercial/Institutional<br>*Fixtures and devices*<br>*Production processes and practices*<br>*Audits* | Residential<br>*Moisture gauges, timers and shut-off devices*<br>*Irrigation systems*<br>*Water-saving landscapes*<br>*Other applications and activities*<br>*Audits*<br>*On-property leak detection*<br><br>Commercial<br>*Irrigation*<br>*Audits*<br>*Broader management practices* | Water Capture/rainwater harvesting<br><br>Storm water management<br><br>Greywater reuse<br><br>Wastewater recycling |

### Instruments

| **Information & Education** | **Regulatory Mechanisms** | **Metering, Pricing & Other Financial Incentives** |
|---|---|---|
| General Communication<br>*Information/educational material*<br>*Media/advertising*<br><br>Personalised Information<br>*Water tax invoice information*<br>*Interactive tools and calculators*<br>*Water-use audits*<br><br>Personal Contact<br>*Displays and events*<br>*Presentations and workshops*<br>*Interaction in the community*<br><br>Promotional efforts<br>*Demonstration gardens*<br>*Cooperation with retail plumbing*<br>*Water conservation awards* | Bylaws, regulations and restrictions<br><br>Planning control/ building code<br><br>Support for legislative reform | Meter Installation<br><br>Pricing Strategies<br>*Flat rate*<br>*Uniform (or constant) rate*<br>*Increasing Block Rate (IBR)*<br>*Peak load pricing*<br>*Wastewater charges*<br><br>Financial Incentives<br>*Rebates and subsidies*<br>*Loans and savings schemes*<br>*Giveaways*<br>*Direct Installation*<br>*Subsidised/free water audits*<br>*Cash payments* |

## **Measure**: Technologies & Practices – Indoor

| Option | Comments |
|---|---|
| **Residential** | |
| Retrofit flushing-control device in single-flush toilets<br>Install low-flow (dual flush) toilet<br>Install composting or waterless toilet | Retrofits are easy and inexpensive and can lead to significant reductions in water use |
| Insert flow regulators on high-volume taps<br>Install low volume/volume control taps | Promote water efficient fixtures for renovations and new construction |
| Showerhead retrofit/adjustments to reduce flow<br>Install low-flow showerhead | |
| Leak repairs on all fixtures above | |
| Install pressure-reducing valve at hot water heater | |
| Install high efficiency clothes washer<br>Install water efficient dishwasher | Consider water and cost savings (including energy) over the lifetime of the appliance |
| Ensure efficient water-use practices with all fixtures and appliances above | Water-saving practices build on benefits from efficient devices |
| Home assessments/audits to repair leaks, retrofit fixtures as needed, encourage uptake of water-saving fixtures and appliances and promote efficient water use | This is a positive 'public relations' vehicle for Council in addition to a way of ensuring water-saving devices are installed, leaks repaired, etc |
| **Commercial/Industrial/Institutional** | |
| Retrofits, installs, repairs and audits (as in Residential above) for convenience facilities including toilets, showers and staff lunchrooms | Comments above apply |
| Retrofit urinals from cyclical to flushing on use<br>Install waterless urinals | Significant water savings from action here |
| Changes to production processes to improve water use efficiency | May require a specialist to analyse operating processes and water use practices |

## **Measure**: Technologies & Practices – Outdoor

| Option | Comments |
|---|---|
| **Residential** | |
| Install trigger nozzle on hand-held hose<br>Install tap timers on lawn and garden sprinkler<br>Include rain/moisture sensor on irrigation system<br>Adopt water-saving approaches (e.g. drip irrigation) for installed systems | Significant benefits possible from small/ inexpensive changes |
| Use mulch on gardens to improve moisture retention<br>Use native plantings and others requiring little water in landscaping<br>Favour ground covers over lawns that need watering | Education needed here to promote low water use gardening practices |
| Curtail practices that waste water<br>Outdoor/garden audits to improve watering practices and promote uptake of water-saving devices | Regulations/bylaws can address wasteful use of water |
| Use system-level leak detection work to identify significant leaks on customer properties | On-property leak detection is a natural by-product of system level analysis |
| **Commercial/Industrial/Institutional** | |
| Technologies/practices (as in Residential above) for landscape care | |
| Ensure effective water management practices for sports fields, reserves and passive areas | Audit service available from NZ Sports Turf Institute |
| Adhere to Irrigation New Zealand's irrigation system design performance standards<br>Follow Irrigation New Zealand's code of practice for on-farm evaluation of irrigation efficiency | These two INZ resources scheduled available/operational in late 2005 |
| Develop/participate in a community-based monitoring service for climate/soil moisture to ensure efficient pasture irrigation | Investigation into this already completed for Environment Waikato |

## **Measure**: Water Capture, Reuse & Recycling

| Option | Comments |
|---|---|
| **Rainwater Use & Greywater Reuse** | |
| Collect rainwater for outdoor uses (as/when needed) – garden watering, vehicle washing, etc<br>Collect rainwater for indoor use where potable water is not required (toilet flushing, laundry) | Simple system can serve outdoor needs and reduce demand for mains water<br>Install costs higher for indoor/plumbing needs |
| Reuse greywater (from shower and laundry) for garden irrigation | Best using drip irrigation |
| Reuse greywater for toilet flushing | Install/plumbing costs to consider |
| Consider rainwater/greywater use in developments employing a communal system | Reduces per property cost |
| **Stormwater Management & Waste Water Recycling** | |
| Pipe roof water to drip irrigation system of sufficient capacity to keep water on the property<br>Use permeable pavement (bricks, paving stones)<br>Slope impermeable surfaces so run-off goes to lawns/gardens not the stormwater system<br>Reticulate stormwater to a (constructed) wetland<br>Use other water-sensitive urban design techniques in new residential or commercial developments | Triple benefit – environmentally-friendly and cost-effective stormwater management approaches also reduce demand on mains water normally used for lawn and garden irrigation |
| Use self-contained wastewater system in new residential developments. Can reuse grey and black water and eliminate wastewater from leaving the site | Potential cost savings over traditional systems even where reticulation is available, plus uses treated water as a beneficial resource |
| Use Council treated wastewater to irrigate public gardens; road verges; golf courses; turf, tree, and dairy farms, etc | Can be cost effective. May require education for public acceptance |

## Instrument: Information & Education

| Option | Comments |
|---|---|
| **General Communication** | |
| Awareness campaign on water supply issues<br>Information on water use practices and how to improve – *all* facets of use indoor and outdoor | Many print options available, including pamphlets, fact sheets, booklets and newsletters, plus same info online |
| Public signage in key locations noting pertinent water supply information | |
| Print/broadcast media to educate and inform (from water conservation generally through to water restriction announcements) | Make good use of community newspapers |
| **Personalised Information** | |
| Dye tables (for leak detection), shower flow gauge and cylinder to measure rainfall<br>Include information on water tax invoice relating to customer consumption levels<br>Online information explaining rates structure, billing procedures, dates, etc | |
| Online water-use calculator so customers can estimate household/per person use | Include specific tips to improve based on current use profile |
| Self-assessment programme for commercial customers | For example, Water Achiever |
| Online planning tool for water/energy efficiency in new construction | As per BASIX system in Australia |
| **Personal Contact** | |
| Display/booth for public events<br>Presentations to community groups<br>Workshops for residential customers on selection/ use of irrigation systems, water practices, etc | These allow for questions and discussion |
| Roving educator in the summer season to promote conservation and advise/remind about restrictions | Could be a student travelling by bike or on foot in designated neighbourhoods |
| Sustainable Households Programme | Group sessions – part of a national effort |
| Presentations to business groups<br>Training workshops for industrial/commercial customers | Target message to audience |
| Education for builders and plumbers | Solicit support |
| Home/business visits/audits | Detailed in other tables and in the report |

| *Information & Education … cont'd* | |
|---|---|
| **Promotional Efforts** | |
| Use novelties such as fridge magnets and bumper stickers | These serve as a constant reminder |
| Deck out Council car with 'roof tap' and slogans | Visible, positive promo/reminder |
| Promote uptake/install of water-saving devices and technologies | From showerheads to rain tanks to appliances |
| Institute water conservation awards(s) to recognize significant contributions | Integrate into existing regional awards and/or submit for MfE Blue Ribbon Awards |
| Establish demonstration garden in high profile location | Provides 'real life' examples of native and water-efficient plantings |
| Get plumbers on board to spread message during normal work | Like Australian Green Plumber programme |
| **School Education Programmes** | |
| Include special unit on water in curriculum, delivered by a specialist or teachers trained in the issue | For example, adapt from Tauranga's Waterline Programme for Years 5/6 |
| Water education as part of a broader sustainable schools programme | For example, get involved in Enviroschools Programme |
| Prepare entirely new programme | This would be costly and reinvent the wheel |

## Instrument: Regulatory Mechanisms

| Option | Comments |
|---|---|
| **Bylaws & Restrictions** | |
| Restrict lawn/garden watering to certain times of day<br>Restrict watering to certain days of the week<br>Restrict watering to maximum time per day<br>Progressive restrictions from sprinkler ban to complete hose ban and essential use only | First three items could be temporary, precautionary measures *or* permanent policy<br><br>Response plan for dry/drought conditions |
| Require trigger nozzles for hand-held hose<br>Require tap timers for sprinkler<br>Require rain/moisture sensor for installed irrigation system<br>Require certain types of installed irrigation systems | These could lead to efficient use of water outdoors generally and reduce the need for temporary restrictions or bans |
| Prohibit certain (wasteful) practices of outdoor water use | For example, hosing sidewalks/driveways |
| Ensure repair of significant on-property leaks | |
| Require audits for all commercial/community irrigation systems above a certain area or volume of water use | Partner with NZ Sports Turf Institute |
| Require agricultural irrigation to conform to design and efficiency standards set out by Irrigation New Zealand | Resources scheduled available/operational in late 2005 |
| **Planning Control/Legislative Reform** | |
| Requirements for indoor water-saving fixtures, etc in areas where water management issues warrant it<br>Requirements for water capture/stormwater retention in areas where such is warranted | Could innovate in areas where there are pressing demands and adopt proven practices in broader areas |
| Support changes to the new Building Code (due for implementation in early 2008) to ensure efficient, sustainable use of water – a principle embedded in the Building Act 2004 | Council submissions/support for desired standards will help in getting them included in the Code |
| Support moves to adopt a National water efficiency standards and labelling scheme (for toilets, taps, showerheads, washing machines, dishwashers and urinals) | Council support will add weight to the efforts and increase likelihood of adoption |
| Support efforts that create more opportunities for effective demand management actions (e.g. possible volumetric charging for wastewater under provisions of the LGA 2002 and LG (Rating) Act 2002) | Similar support here could give Councils additional, effective demand management options |

## Instrument: Metering, Pricing & Other Financial Incentives

| Option | Comments |
|---|---|
| **Metering & Pricing** | |
| Install meters in certain areas to assist with leak detection and education<br>Install meters for particular customer classes<br>Universal metering | Meters allow pricing structures which can promote conservation |
| Move from a flat rate for water to volume-based pricing at a uniform/constant price per cu m<br>Institute increasing-block rate pricing to discourage high-end users<br>Institute peak-load pricing to address seasonal shortage/ high demand for summer outdoor use | If two-part pricing (fixed portion + volume rate), keep fixed portion low so price is volume responsive and encourages conservation |
| Institute charges for waste water | See previous chart and *Planning Guide* |
| Institute stormwater charges in instances where warranted | |
| **Other Financial Incentives** | |
| Provide free 'testing' items such as dye tablets (for leak detection), shower flow gauge and cylinder to measure sprinkler volumes<br>Provide free, inexpensive flow-control devices for retrofitting old toilets, taps and showerheads | Price of items can be reduced via direct purchase from the Council (or when installed in an audit), rebate after purchase, or via a discount voucher for presentation to other suppliers |
| Subsidise water-saving fixtures such as low-flow showerheads and dual-flush toilets<br>Subsidise rain tanks<br>Subsidise rain/moisture sensors<br>Subsidise low water use garden irrigation systems | |
| Arrange for discounts on purchase of water-saving appliances<br>Arrange for discounts on purchase of mulch and native or low water use plants for landscaping | |
| Provide free/subsidised audits | For residential and commercial customers |
| Offer low- or no-interest loans and installment payment plans for purchase/install of water-saving technologies | Can be dealt with via water invoice (continue regular payment until item paid off then reduce to new rate due to lower consumption) |

# Appendix D

## Sample Options – Water-Use Reductions

Significant benefits can result from repairs and retrofits of water-using fixtures, including showers, toilets, taps and urinals. An audit service can address these issues – reducing the unnecessary use of water and eliminating waste.

The first example notes representative savings from retrofits and repairs – these could be in community or commercial facilities or in homes. For discussion purposes, the example is a household with a family of four.

The second example shows savings by replacing a flushing urinal with a waterless model.

In both cases, total annual water savings are noted. The economic benefits of these savings will vary from district to district, depending on the 'price' of water *or* the cost for delivered supply and wastewater treatment – however the comparison is made. In any case, the benefits can be sizeable when the savings in *one* home or facility are multiplied by the results possible from a comprehensive audit/retrofit programme throughout a district.

## Annual Savings from Retrofits & Repairs
## Household Example – Assumes Family of Four

*Water reductions and parts costs drawn from Tauranga City Council home visit service and using standard figures for different types of water use and practices*

**Install one showerhead flow restrictor**
Saves 15 l/min (from 10 l flow restrictor to mains pressure delivering 25 l/min)
Annual savings: 4 people showering 6 min/day each = 24 min x 15 l x 365 days = 131,400 l
Parts cost: $12.00

**Install one toilet cistern weight**
Saves 6 l/flush (in old single-flush toilet)
Annual savings: 4 people, 5 flushes/day each = 20 flushes/d x 6 l = 120 l/d x 365 = 43,800 l
Parts cost: $1.00

**Install flow restrictor on one tap**
Saves 4 l/min
Annual savings: 4 people, 7 min use each/d = 28 min x 4 l/min = 112 l/d x 365 = 40,800 l
Parts cost: $8.00

**Fix one leaky toilet**
Savings (annual estimate) = 34,000 l
Parts cost: $2.00

**Fix one leaky tap**
Savings (annual estimate @ drops/sec) 10,200 l
Parts cost: $ .20

**TOTAL WATER SAVED ANNUALLY** from above actions = 260,200 l = **260 cu m** (rounded)

**AUDIT/RETOFIT COSTS**

| | |
|---|---|
| Parts total (from above) | $23.20 |
| Labour (say 1.25 hr @ $40) | $50.00 |
| ***Total*** | **$73.20** |

**COST PER CU M SAVED**

| | |
|---|---|
| Cost/cu m over one year (260 saved) | 28 cents |
| Cost/cu m over two years (520 saved) | 14 cents |
| Cost/cu m over five years (1300 saved) | 5.6 cents |

# Comparison of Annual Running Costs
# Flushing vs Waterless Urinals

*Predicted number of uses per annum*

CASE STUDY: McDonald's Family Restaurant – Auckland. New Zealand. Information provided by South Pacific Waterless Ltd

Approximately 4700 transactions per week made up of the following groups: (source; McDonalds)

| | | | | |
|---|---|---|---|---|
| 16% groups of 3 | 752 | x 3 | 2,256 | |
| 23% groups of 2 | 1,081 | x 2 | 2,162 | |
| 61% singles | 2,867 | x 1 | 2,867 | |
| | 4,700 | | 7,285 | customers per week |
| | | | 7,285 | divided by 7 days = 1040 customers/per day |

**Assumed usage of toilets:**

| | |
|---|---|
| Say 50% of customers are male | 520 / day |
| Say 60% use the toilet | 312 / day |
| Say 60% of them use the urinal | 187 / day |
| 187 x 365 days per annum | 68,255 uses / year |
| Say 2 urinals available (Assuming equal usage of both) | 34,127 uses / urinal / year |

**Running Costs:**

| ***Flushing Urinal*** | ***Waterless Urinal*** |
|---|---|
| Say 34,000 uses per year | Say 34,000 uses per year |
| Each flush requires approx. 4.5 litres of water<br>34,000 uses x 4.5 litres = 153,000 litres<br>153,000 litres = 153 m3 | Sealtrap cartridge replaced on average after approx. 12 - 15000 uses.<br><br>Therefore say 3 cartridges required per year |
| Cost of supply of water taken @ $1.10 / m3<br>Cost of waste water taken @ $2.55 / m3 | |
| 153 m3 @ $3.65 = $558.45 per annum / urinal | 3 Cartridges @ $59 = $177.00 |

**Note:** The comparison assumes the installation of a single urinal.
Supply and waste water costs taken as Auckland CBD charges by Metrowater.
Seal trap cost taken at recommended retail price.
On average 1.5 hours to install flushing urinal, ¾ hour for a Waterless Urinal.
All costs exclude GST.