Report for Water Efficiency Site Assessments & Action Plans

Phase 3, Part 5 of North East Victoria Adapting to a Low Water Future

By WaterGroup Pty Ltd

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

Important Information:

- The opinions expressed throughout this report are those of the consultants who produced it, WaterGroup Pty Ltd
- Copyright for this document remains with the NEGHA
- WaterGroup would like to acknowledge Narelle Martin of the NEGHA, Charles Halter of Wangaratta Council, and all the staff of the seven business who took part in the free water auditing program

The NEGHA project **North East Victoria Adapting to a Low Water Future** is funded by the Australian Government through *Water for the Future*.

1 EXECUTIVE SUMMARY

The North East Greenhouse Alliance on behalf of City of Wodonga, Rural City of Wangaratta, Alpine, Indigo and Towong Shires, in partnership with the North East Catchment Management Authority, North East Water and Goulburn Murray obtained a grant from the Australian Government *Water for the* Future initiative.

Part of the "North East Victoria – Adapting to a low water future" project is the delivery of Water Efficiency Site Assessments and Action Plans for selected Small to Medium Enterprises (SMEs) under Phase 3 – Development and Delivery of Practical Solutions.

These assessments were intended to lead to practical water savings for selected businesses, while at the same time acting as case studies and a catalyst for others to follow. They were to encourage enterprises in the region to respond to the challenges of climate change, and help them to adapt. They were also to help improve understanding of what can be done at a local level to reduce the consumption of fresh water, increase levels of reuse and recycling, identify the costs and benefits and prompt thought on what additional support may be needed.

WaterGroup, a water conservation consultancy and contractor was selected to complete the water assessments and action plans. In undertaking these assessments, WaterGroup:

- Recruited a range of businesses within the North East Water area for inclusion in the program. The following businesses were included: Bright Chalet; Burder Industries; Wangaratta Livestock Exchange; Myrtleford Butter Factory; Victoria Alps Winery; Wodonga Caravan and Cabin Park; La Trobe University Wodonga Campus
- Undertook site visits to each participant to understand water use patterns
- Assessed options for improved water efficiency, better water management, and water reuse options (e.g. rainwater harvesting) at each site. Options were categorised into Tier 1 (water savings measures with a clear financial incentive for immediate implementation) and Tier 2 (longer term water savings measures)
- Provided each site with a summary report with an action plan to achieve identified water savings.

This report presents the methodology used in this project, the results of undertaking it, and provides analysis of these results. A summary of the water savings opportunities resulting from the assessments at these sites is shown in Table 1 below.

Table 1: Summary of Site Water Savings[1]

Site	Total Site Water usage (kL/yr)	Tier 1 Savings (kL/yr)	Tier 2 Savings (kL/yr)	Total Water savings (kL/yr)	Proportion of Total Consumption	Proposed Measures
Bright Chalet	2,485	172	275	447	18%	Amenity tap flow restriction, kitchen upgrades, toilet upgrades, rainwater harvesting
Burder Industries	675	103	66	169	25%	Amenity and hand washing tap flow restriction, cleaning upgrades, leakage remediation, rainwater harvesting
Wanagaratta Livestock Exchange	3,339	69	2,034	2,103	63%	Amenity tap flow restriction, café upgrades, rainwater harvesting
Mytleford Butter Factory	637	31	37	68	11%	Amenity tap flow restriciton, café upgrades, washdown upgrades, rainwater harvesting
Victoria Alps Winery	38,600	9,489	731	10,220	26%	Amenity tap flow restriction, cleaning process improvements, sub and smart metering, bore water use, irrigation system upgrade
Wodonga Car & Cab	3,213	392	0	392	12%	Amenity tap flow restriction, kitchen upgrades, toilet upgrades, laundry upgrades
La Trobe University	1,939	123	489	612	32%	Amenity and kitchenette tap flow restricion, toilet upgrades, café upgrades, rainwater harvesting
TOTALS	**50,888**	**10,379**	**3,632**	**14,011**	**28%**	

In general terms, the main opportunities available for the selected sites to save water are: Improvements to water efficiency of amenities fittings, improvements to cleaning practices and kitchen equipment, water using process improvements, and the use of an alternative water supply – predominantly rainwater harvesting. Some of the sites should also consider alternative water supply from bores and dams.

[1] kL/yr = kilolitres per year, or 1000's of litres of water consumed per year

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

To overcome the impacts of climate change on future water supply and availability NEGHA and the participating Councils we recommend that the NEGHA and the participating councils consider the following actions:

- An Information Campaign should be launched on the basis of the results of this program, based on case studies summarising the outcomes of the site audits for each of the sites involved (with the exception of the Livestock Exchange, due to there being only two other such sites in the North East Water area).
- Better water management should be encouraged by providing larger water users and those more interested in their consumption, with at least know how, and ideally also financial assistance to install smart meters. This will allow them to see their water consumption in near real time online. It is likely to lead to sustained and significant future water savings.
- In terms of focussing on a specific industry, water savings in the Accommodation industry should be pursued with priority. The most effective delivery model (in addition to the support from the Information Campaign and Rebate Program) to achieve savings in this industry is the Sector Engagement Model.
- Wineries should be considered as a second priority for an industry specific program, with an Upfront Commitment Model, a Sector Engagement Model or a Business Cluster Model used.

2 Table of Contents

Table of Figures

3 INTRODUCTION

The Australian Government Water for the Future program is a national response designed to meet the challenges of water scarcity and the impact of climate change in both urban and rural areas. Under this program grants were available for local governments in the Murray-Darling Basin to assist in community-wide planning for a future with less water and invest in water savings initiatives including cost effective water infrastructure that meets the needs of communities now and into the future. The "North East Victoria – Adapting to a low water future" project is funded by the Australian Government under the "Strengthening the Basin communities" component of the "Water for the future" program. It is being delivered by the North East Greenhouse Alliance on behalf of City of Wodonga, Rural City of Wangaratta, Alpine, Indigo and Towong Shires, in partnership with the North East Catchment Management Authority, North East Water and Goulburn Murray Water

WaterGroup, a leading specialist national water conservation company, was selected to deliver water efficiency site assessments and action plans for a number of sites throughout North East Victoria undertaking detailed surveys, assessment and analysis of all water supply, management and usage procedures and processes, in close consultation with the site personnel and the relevant stakeholders. The surveys covered the whole suite of potential improvements and opportunities in water supply, demand and treatment options, with a level of detail sufficient to inform a business case for investment and to develop an action plan to implement the identified improvements and opportunities. A particular focus of the action plans was to ensure that the "fit-for-purpose" water supply and use concepts were applied as well as investigation of potential re-use, use of alternate water sources and recycled water opportunities. The action plans provide detailed and demonstrated return on investment (ROI) for the identified opportunities.

The main objectives of this project were:

- To develop an understanding of the key water needs, constraints and outcomes sought at a number of selected sites, through consultation with onsite personnel and relevant authorities
- To undertake Water Efficiency Site Assessments at the selected sites
- To identify, investigate and assess potential improvements and opportunities in relation to water supply, demand and treatment, at the selected sites, focusing on efficiency and demand reduction, use of alternate fit-for-purpose water supply, process improvements and water treatment solutions as well as key constraints and barriers to implementation
- To develop Water Efficiency Action Plans for each selected sites

4 KEY DEFINITIONS

Definitions of Acronyms and Abbreviations:

- GL — Gigalitre ($1x10^9$L; 1,000,000kL; 1,000ML)
- ML — Megalitre ($1x10^6$L; 1,000kL)
- kL — kilolitre ($1x10^3$L)
- L — litre
- ML/yr — megalitres per year
- kL/yr — kilolitres per year
- L/min — litres per minute
- KPI — Key Performance Indicator
- WaterMAP — Water Management Action Plan
- M — million
- m2 — square metres
- mm — millimetres
- mm/yr — millimetres per year
- OH&S — Occupational health and safety
- WELS — Water Efficient Labelling Scheme (Federal Government)
- WSUD — Water Sensitive Urban Design
- BAS — Building administration system
- FTE — Full time equivalent
- EFTSL — Equivalent full time student loading
- Amenity — Collective term for toilet facilities (toilets/urinals/hand basins)
- Rainwater — Water collected exclusively from roof surfaces
- Stormwater — Water collected from both roof and ground surfaces
- NGEA — North East Greenhouse Alliance

Water facts:

- 1 litre (L) = 1 kilogram (kg)
- 1000 L = 1 kilolitre (kL) ≈ 1000 kg = 1 tonne (t)
- 1 mm of rainfall or irrigation over 1 m^2= 1 L of water

5 METHODOLOGY

The key elements of the methodology for the selection of participants and participation in the water savings assessment process were:

- Recruitment Pre-screening: Determining suitable business sectors from which businesses could be recruited; contacting them to gauge their interest in participating in the program; and assessing each willing participant using a multi-criteria analysis
- Engagement of Participants: Engagement of individual businesses for inclusion in the program
- Desktop Analysis: Collection of base water use data for each site, site layouts, numbers of staff, etc.
- Site visits: half- to full day water audits carried out at each site to collect data regarding site water use trends
- Data Analysis and Reporting: Analysis of site water use trends (water balance modelling, production of single line diagrams, etc.), and production of report including water savings action plan for each site.

The following sections of this report provide further detail regarding each of these steps.

5.1 Recruiting Pre Screening

A project inception meeting was held on 07 October between representatives of the North East Greenhouse Alliance, Wangaratta City Council and WaterGroup. This meeting included a discussion of the business sectors that would benefit from participation in this program, and the various means available for recruitment of them. Key factors considered in the selection of business sectors to target included:

- Which sites could yield the highest volume of water savings?
- Which sites would present water savings opportunities that are most cost effective?
- Which sites typically had the budget to implement water savings measures?
- Which sites were amenable to alternative water sources such as rainwater harvesting and water recycling?
- Which sites were representative of common industries in North East Victoria, and thus could provide good case studies to drive further efficiencies beyond this project?

The results of this meeting included:

- Categorisation of small to medium water users (industry groups, estimated number of, indicative water use data, willingness to invest in water savings projects, financial and other criteria pressure points)

- The production of a program flyer, to provide simple and direct information to potential project participants (see the report Appendix for copy of this flyer)
- Development of a simple communication strategy, with WaterGroup elected as the body to contact potential participants

5.2 Engagement of Businesses

Each selected business was engaged using a simple Memorandum of Understanding document. This document outlined both the responsibilities of the project participants (such as providing background data on their site, assisting during the site audit, and authorising anonymous information from the results of the program to be used to promote wider water savings); and of the project sponsor (such as to provide a water savings report within 4 weeks of undertaking the site visit)

A copy of this Memorandum of Understanding is contained in the Appendix to this report.

5.3 Desktop Analysis

Before the site visit went ahead, a range of background data on the sites in question were requested. This included:

- Historical water consumption information, i.e. copies of water bills for at least the last 12 months
- Access to any sub- or smart metering data available
- Plans of the site
- Site details such as the numbers of employees working at the site, site operation hours, and key process or business activity parameters

This information was then analysed prior to the site visit, to ensure that the site visit would be effective as possible.

5.4 Site Visits

The visits to each took place during the week beginning 21 November and the week beginning 12 December. A general outline of the activities undertaken during the site assessments is as follows:

- Site walk through
- Assess nature, level of use, and security of supply of existing water sources.
- Assess the nature, water quality requirements, and level of use of the various water using processes on site, including:
    - Water used in manufacturing and food production processes.
    - Auxiliary water use, such as cleaning and cooling.
- Visit any water based cooling towers onsite, and assess operation in terms of water efficiency using maintenance records.

- Visit and assess a representative number of water using plumbing fixtures, including measuring flow and flush rates for items such as the amenity facilities and kitchenettes.
- Assess water consumption in "wet" tenancies within the sites, such as food outlets, cafés, etc. Include food preparation areas to assess fixtures such as pre-rinse spray guns, woks, dishwashers etc. and general practices.
- Review site practices towards water use and conservation, both on a whole of business and staff member level.
- Prepare a simplified water supply schematic (single line diagram).
- Take into account redevelopment/refurbish plans (if any).
- Assess opportunities to reduce water use through fire water testing.

5.5 Data Analysis and Reporting

The approach taken to analysis of the data produced by the site audits is detailed below. The key tools which were refined for specific use in this program were:

- An **End Use Survey**, to efficiently and accurately collect data for water end use at each site
- A **Water Balance Model**, to calibrate site observations against billing data to ensure they reflect reality
- Rain and stormwater harvesting **Design Models**, to calculate possible savings from alternative water sources
- **Financial Modelling Templates**, to calculate the costs, financial benefits, and return on investment associated with water savings measures
- The necessary **OH&S documentation**, including a safe work plan and job safety analysis

5.5.1 Water Savings Considered

During the site assessment, opportunities for water savings were examined based on the hierarchical approach in Figure 1:

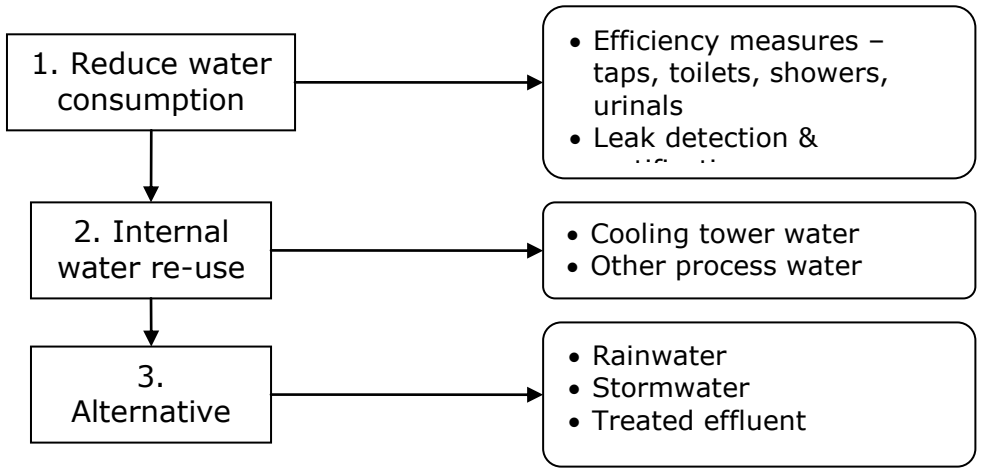

Figure 1. Approach to water savings applied during the site assessments

Fundamentally, water savings options fall into three categories:

- Efficiency improvement (doing more with less)
- Resource substitution (replacing potable supply with alternative resources such as groundwater or rainwater) and
- Wastewater Recycling (intercepting trade waste, greywater or sewage and treating to lower quality demands)

Each of these options has been considered for the each of the sites included in the program. Specific water conservation measures based on these three broad categories are further detailed below.

5.5.2 Efficiency Measures

A major source of information in the following section is The Water Efficiency and Labelling Standards Scheme (WELS), operated by the Australian Government. This provides an independent source of information about the water efficiency of devices such as showerheads, toilets, urinals, taps and dishwashers. The WELS product database can be accessed at: http://search.waterrating.com.au/. The figures in this section for optimum flush and flow rates are taken from WELS.

5.5.2.1 Taps

Flow rates for taps should ideally be around 4L/min at basin taps and 6L/min for other cases (including kitchen taps). This can be achieved by installing tap aerators or flow regulators (either in-line or in-valve) where appropriate in accordance with the manufacturers' recommendations. Sensor controlled taps, which ensure that the tap flows only when in use, can also be considered (including a consideration of any further maintenance requirements such taps have).

5.5.2.2 Toilets

Older style single flush toilets use up to 10-11L/flush and this should be reduced where possible (without compromising toilet performance) by adjusting the cistern float valve where possible. The replacement of these cisterns or flush handles with modern dual flush models (which use 3L/flush on half flush and 4.5L/flush on full flush) should be considered when their service life ends (see 'Amenities Upgrades' in section 5.5.2.5).

It should also be noted that the flush system upgrades should always be carried out according to what the pan (the ceramic bowl) of the toilet will allow. That is, many pans are not designed for low flush volumes, and hence upgrading the flushing system will result in flushing not adequately clearing the pan, in turn resulting in lowered hygiene standards in toilets or water wastage through 'double flushing'.

5.5.2.3 Urinals

Urinals which flush at a regular time interval, regardless of use, should be upgraded to incorporate motion sensor controls so that unnecessary flushing is not carried out. Where sensors exist already, their operation should be optimised to increase the time between flushes and optimising volume per flush whilst

maintaining amenity value and ensuring there are no offensive odours. Manually flushed urinals that flush low volumes are considered to have acceptable levels of water-efficient performance, so they can be left 'as is'. Depending on the level of traffic at a location, waterless urinals could also be considered.

5.5.2.4 Showers

Older-style shower heads have flow rates of up to 18L/min. This can be reduced to 7-9L/min by installing water-saving shower heads. Alternatively, in-line or in-valve flow regulators can be installed. However, it is noted that the vast majority of showerheads have already been replaced at the Bundoora Campus.

5.5.2.5 Amenities Upgrades & Forecast Capital Works

Many of the items listed above can be considered for replacement when the amenities at a particular location are due for an upgrade, for example replacing single flush cisterns with new dual flush models. Water Conservation Group recommends that during amenity upgrades, the most water-efficient devices available at the time should be considered for installation. Whilst there may be a slight additional cost involved, the long-term savings in water use generated by water-efficient fittings means that they pay for themselves over time.

5.5.2.6 Food Preparation

Improving water efficiency in areas used for food preparation can generate water savings. Water efficiency improvements can be made in the following key areas:

- Reducing flow rates in taps (unless sinks are used for filling) and pre-rinse guns
- Implementing waterless technology such as waterless woks
- Upgrading or optimising dishwashers to use less water during rinse cycles
- Changing attitudes and behaviour e.g. sweeping rather than hosing floors, scraping rather than rinsing plates etc.

5.5.3 Alternative Sources

5.5.3.1 Greywater and Blackwater

Greywater refers to water from sources such as laundries and showers, which is less contaminated than blackwater (which includes toilet and kitchen waste). Greywater requires a lower level of treatment prior to re-use compared to blackwater, and is thus often a more cost-effective means of saving water.

Blackwater refers to all waste (sewerage) from a site and requires a high level of treatment for utilisation in typical non-potable use areas in office buildings (such as toilet flushing or cooling towers) where there is still an element of human exposure and an associated health risk.

Generally speaking, to retrofit grey or blackwater recycling is very expensive unless refurbishment of plumbing is already occurring. However, possibilities for its implementation at the University are included in this report.

5.5.3.2 Rainwater

There is an average annual rainfall at Wangaratta, which represents a central location for the sites included in this program, of 625mm. Rain is usually heavier during the winter and spring months.

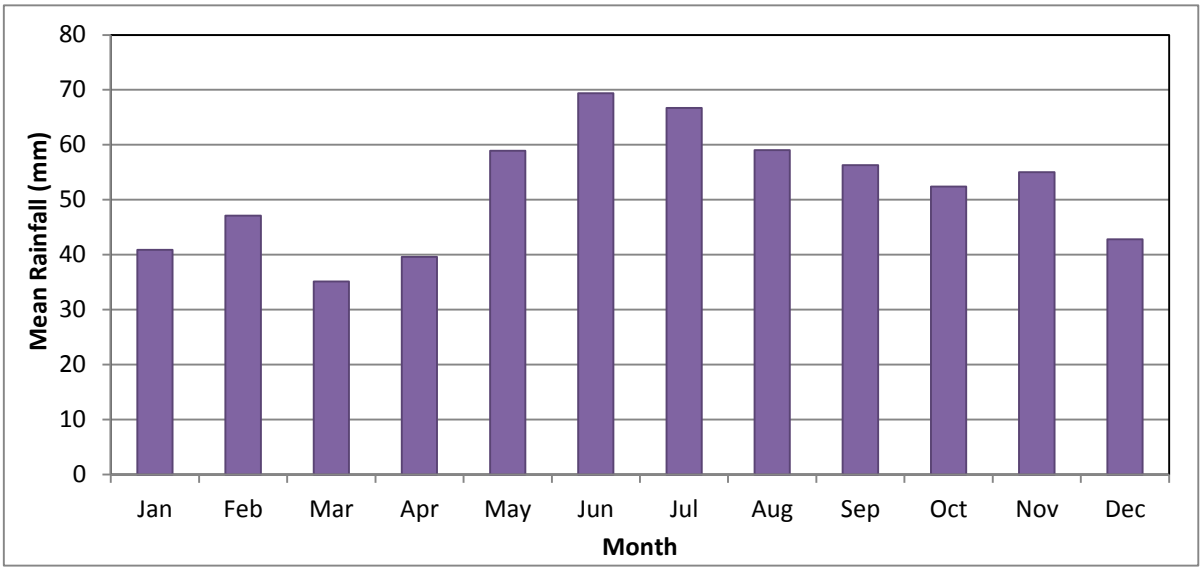

Figure 2. Mean Monthly Rainfall for Wangaratta

5.5.4 Water Balance Modelling and Savings Calculations

A detailed split of water use across each site was determined using Water Conservation Group's end use water balance model. It assesses water use across all relevant categories: taps, toilets, showers, urinals, food preparation, cleaning, cooling towers, leakage etc. The water consumption of each category is calculated by inputting the number of users (occupants) at the site, details of the fittings (e.g. flow rates / flush volumes), typical use practices (no. of toilet flushes [full/half], no. of and duration of hand washing etc.), benchmark figures for certain processes and site observations. Where available the modelled numbers are cross checked against (sub) and smart meter data where available. This important step allows calibration of the modelled total water consumption according to the audit observations against actual billing or metering data (any discrepancy between modelled and actual figures appear as 'unallocated' water use in the results of this report).

To determine the water savings achievable by implementing efficiency measures the following process is followed:

- Details of the number of fittings and flow rate or flush volume are entered, e.g. 20 lever taps at 11L/min, 13 single spout taps at 6L/min
- An overall average flow rate is determined by calculating a weighted average based on the number of fittings as a proportion of the overall total multiplied by the flow rate
- Details of how flows or flush volumes will be reduced, and to what value, are added, e.g. 20 flow restrictors to reduce tap flows to 4L/min, no modification where taps are already at 6L/min.

- Other process efficiency gains are assessed on a specific case by case basis

Applying the above usage patterns to the new upgraded fixture and process performance provides the savings. The model takes into account savings due to reduced water supply charges, reduced wastewater and trade waste discharge fees, saved hot water cost (estimated according to typical hot/cold water mixing in applications such as hand washing and showering) and other costs as well as additional costs such as e.g. for the maintenance of waterless urinals.

These are then compared to the budgeted turnkey supply and install costs which are based on typical unit rates including project management, the number of fittings requiring modification and the measures proposed. Costs are then divided by total annual savings to compute an efficiency rating based on years payback.

6 Results of Recruitment and Site Assessments

6.1 Recruitment of Businesses

After being provided with a list of possible candidates, WCG recruited the following participants into the project:

- Bright Chalet
- Burder Industries
- Wangaratta Livestock Exchange
- Myrtleford Butter Factory
- Victoria Alps Winery
- Wodonga Caravan and Cabin Park
- La Trobe University Wodonga Campus

The matrix used to undertake the multi criteria analysis for each of these sites is shown in Figure 3. As Figure 5 shows, each of the included participants scored at least a 'medium' rating in the category of 'Overall Water Savings Potential', which led to their being included in the program.

As part of the recruitment process, information regarding the free water auditing program was circulated throughout the region. This process was assisted by the economic development officers of the municipalities, which also circulated material through their networks. Flyers detailing the nature of the program were also made available at meetings and workshops.

BUSINESS NAME	QUOTED TOTAL POTABLE WATER CONSUMPTION (kL/year)	ESTIMATED POTABLE WATER SAVINGS	ESTIMATED POTABLE WATER SAVINGS (kL/year)	WATER SAVINGS POTENTIAL FOR PARTICIPANT	WATER SAVINGS POTENTIAL FOR INDUSTRY SECTOR	COST EFFECTIVENESS OF WATER SAVINGS	LIKELIHOOD OF PARTICPANT/ INDUSTRY TO HAVE FUNDS TO IMPLEMENT MEASUREs	SCOPE FOR ALTERNATIVE WATER SOURCES	LIKELIHOOD OF MULTIPLYING FINDINGS ACROSS SECTOR	OVERALL WATER SAVINGS POTENTIAL FOR THIS PARTICIPANT
Myrtleford Butter Factory	250	15%	38							
Burder's Metal Finishers	350	20%	70							
Bright Chalet	1,250	20%	250							
Vic Alps Wine Company	30,000	10%	3,000							
Wangaratta Livestock Exchange	3,500	15%	525							
Wodonga Caravan and Cabin Park	3,000	20%	600							
La Trobe University, Wodonga Campus	2,000	15%	300							

KEY:
- Low rating
- Medium rating
- High rating

Figure 3. Multi Criteria Site Assessment Matrix

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

The geographical spread of the sites included is shown in the map contained in Figure 4.

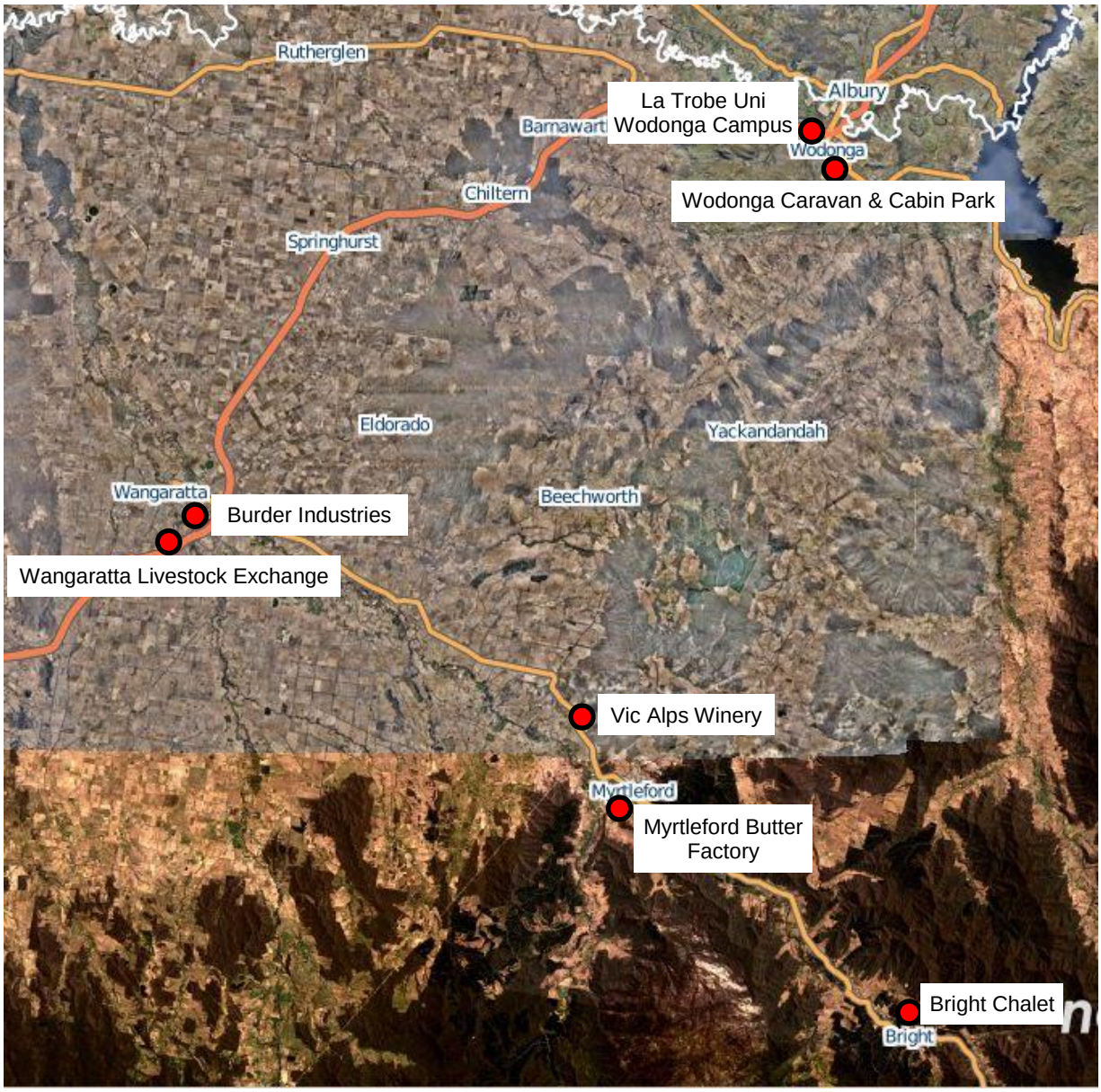

Figure 4. Geographical Spread of Businesses Included in the Program

6.2 Water Audits

The ultimate results of the water audits are the Water Audit Reports and Water Savings Action Plans for each site. These are included as attachments to this report. Table 2 summarises the total water usage and potential savings for each of the sites included in the program:

Table 2: Summary of Site Water Savings

Site	Total Site Water usage (kL/yr)	Tier 1 Savings (kL/yr)	Tier 1 Savings (%)	Tier 1 Payback	Tier 2 Savings (kL/yr)	Tier 2 Savings (%)	Tier 2 Payback	Total Water savings (kL/yr)	Total Water savings (%)	Total Payback	Proposed Measures
Burder Industries (Industry: Metal Fabrication)	675	103	15%	5.1	66	10%	51.7	169	25%	21.4	Amenity and hand washing tap flow restriction, cleaning upgrades, leakage remediation, rainwater harvesting
Bright Chalet	2,485	172	7%	3.8	275	11%	53.8	447	18%	30.2	Amenity tap flow restriction, kitchen upgrades, toilet upgrades, rainwater harvesting
Wangaratta Livestock Exchange (Industry: Livestock Exchanges)	3,339	69	2%	5.2	2,034	61%	891.7	2,103	63%	851.5	Amenity tap flow restriction, café upgrades, rainwater harvesting
Mytleford Butter Factory (Industry: Boutique Food Production)	637	31	5%	7.5	37	6%	91.8	68	11%	46.7	Amenity tap flow restriciton, café upgrades, washdown upgrades, rainwater harvesting
Victoria Alps Winery (Industry: Wineries)	38,600	9,489	25%	5.6	731	2%	241.2	10,220	26%	21.6	Amenity tap flow restriction, cleaning process improvements, sub and smart metering, bore water use, irrigation system upgrade
La Trobe University (Industry: Tertiary Education)	1,939	123	6%	5.6	489	25%	57.1	612	32%	44.3	Amenity and kitchenette tap flow restricion, toilet upgrades, café upgrades, rainwater harvesting
TOTALS	**50,888**	**10,379**	**20%**	**5.3**	**3,632**	**7%**	**604.1**	**14,011**	**28%**	**232.5**	

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

7 DISCUSSION AND RECOMMENDATIONS

7.1 Recruitment of Businesses

The recruitment process was successfully completed in the limited timeframe available. Recruitment began in early November and was completed in early December, allowing all site audits to be completed in 2011. The following factors facilitated the recruitment process:

- Direct contact of businesses involved: After being provided with a list of potential candidates, WaterGroup contacted each by telephone to discuss the program. WaterGroup's experience has shown that this type of direct contact (as opposed to passive means such as advertisement on websites, etc.) is necessary to recruit businesses for programs of this nature.
- No requirement for financial commitment from sites: Participants did not have to make a financial commitment to take part in the program. This meant it was essentially risk free from their perspective.
- Production of flyer: A program info sheet was produced (see Appendix) showing a simple overview of the program. It provided potential participants with the information they needed to evaluate their participation.

A number of candidates who were contacted were not included in the program, either through inelligibility or unwillingness to participate. Overall, approximately 30% of contacted businesses were selected for participation. Reasons for exclusions were:

- Site water consumption too large: The program was nominally aimed at sites which used 10ML/year or less of water (though an exception was made for the Victoria Alps Winery). This led to the exclusion of sites such as larger fabric mills in the Wangaratta region.
- Site water consumption too low: A number of candidates had very little water consumption, with, for example, the only site water use being amenities. These sites were excluded because their low overall consumption limited their potential for water savings.
- Low potential for water savings: A number of candidates had already implemented a wide range of water savings measures. Thus they were excluded because they had little potential to show further water savings.
- Lack of desire: A number of candidates stated that they did not wish to be involved in the program.
- Lack of time: A number of candidates wished to be involved in the program, but did not have sufficient time at their disposal during the allocated site audit time (December 2011) to assist with the site visit, etc.

7.2 Water Audits

As shown in Table 2, the seven sites audited had a total water consumption of approximately 51,000kL/year. Approximately 14,000kL/year of water savings were identified across the seven sites. The savings were divided into Tier 1 and Tier 2: Tier 1 water savings were classified as those measures with a payback of 5-6 years or less. Tier 2 measures were those measures with a higher payback.

The Tier 1 savings identified at each site range from 2% to 25% of total site consumption, Tier 2 savings identified at each site ranged from 0% to 61%, and the total (Tier 1 + Tier 2) savings identified at each site ranged from 11% to 63% of total consumption. Figure 5 and Figure 6 provide a graphical view of the overall water consumption and potential water savings for each of the sites included in the program.

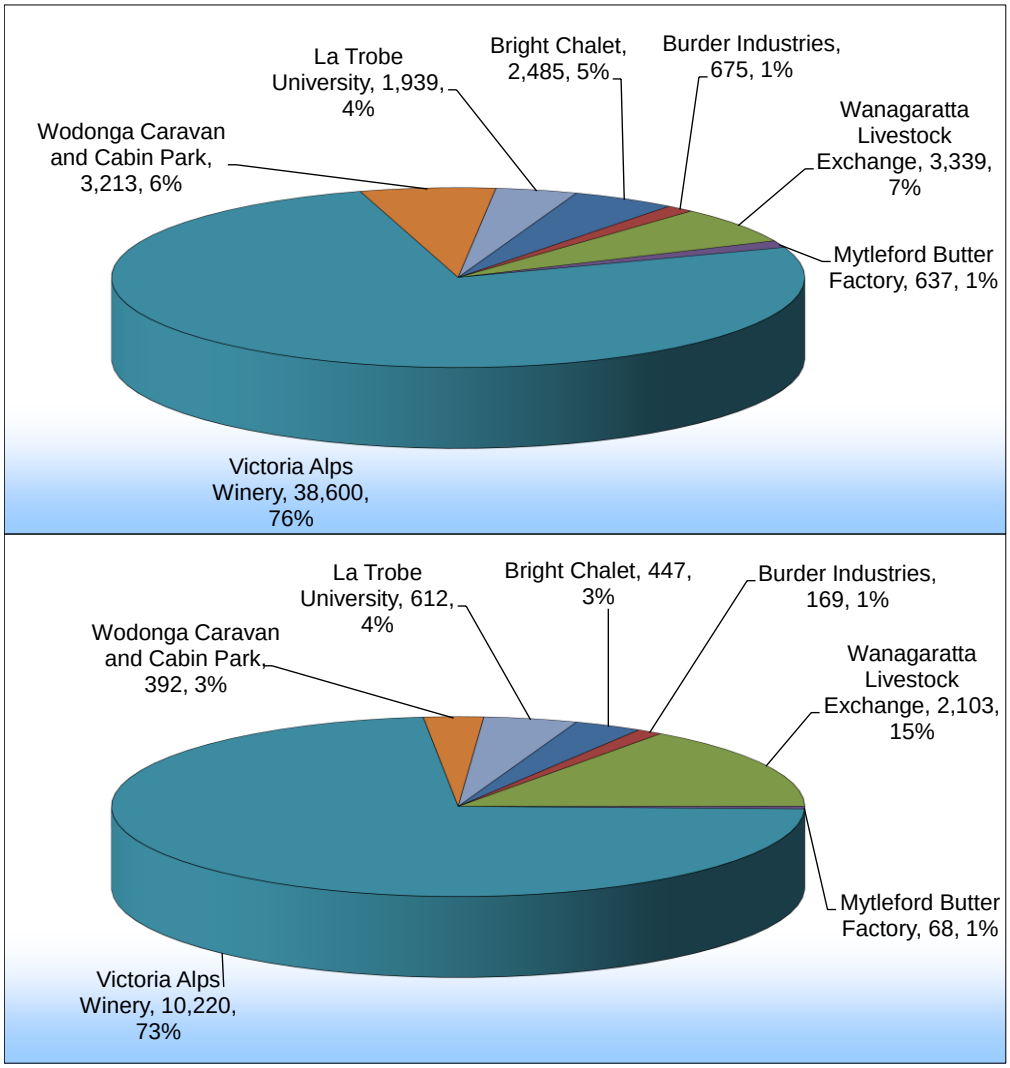

Figure 5. Breakdown of Total Water Consumption, All Sites (above)

Figure 6. Breakdown of Potential Water Savings, All Sites (below)

Both the total water consumption and the total identified savings were dominated by the Victorian Alps Winery, at 76% and 73% respectively. The other sites were of a relatively similar size in terms of water consumption, though Burder Industries and the Myrtleford Butter Factory were significantly smaller, with their water use at only 1% each of the total consumption across all seven sites. The water savings for these sites are commensurately smaller, again at 1% each of the total water savings identified in the program. In general, Figure 5 and Figure 6 show that larger sites using more water have the potential to deliver higher levels of water savings. The following table shows the contribution of each water savings measure suggested across the program. Results are ordered by payback period, with the most financially attractive measures first.

Table 3: Summary of Site Water Savings, broken down by Water Savings Measure

Possible Water Savings, Costings & Payback
Project: ***Overall NEGHA Water Efficiency Project***

Water Consumption kL/yr		50,889			
Item	**Measure**	**Water Savings kL/yr**	**Total Savings $/yr**	**Budget Cost**	**Payback yrs**
Showers	Replace high flow showerheads with low flow models, Install water conservation signage	85	$377	$650	1.7
Laundry	Upgrade washing machines	285	$841	$2,995	3.6
Urinals	Reduce flush volumes	6	$13	$50	3.8
Incidental Hand Washing	Install flow restrictors to bring flows to 4L/min	35	$77	$312	4.1
Wine Vat and Line Cleaning	Hold workshop to investigate possible procedural changes to save water (Vic Alps Winery)	471	$1,008	$4,440	4.4
Installation of Bore at Winery	Install bore onsite to feed irrigation header tanks (Vic Alps Winery)	7,468	$5,682	$29,200	5.1
Amenity Taps	Install flow restrictors to bring flows to 4L/min	348	$977	$5,521	5.7
Sub Metering	Install 2 new sub meters at key points around the site (Vic Alps Winery)	649	$983	$6,500	6.6
Leakage Remediation	Find and fix visible leakage	26	$66	$500	7.6
Smart Metering	Smart meter all water meters (including 2 new submeters) around the site (Vic Alps Winery)	865	$1,176	$9,000	7.7
Kitchen/Café	Install flow restrictors, Install/upgrade pre rinse spray guns	120	$271	$4,705	17.3
Cleaning	Install/upgrade trigger spray nozzles	12	$92	$2,025	22.1
Toilets	Reduce flush volumes, Upgrade cisterns	690	$1,518	$45,250	29.8
Rainwater Harvesting	Install systems to supply a range of demands, such as toilet flushing	333	$733	$48,950	66.8
Vineyard Irrigation	Install automatic control system and moisture sensors for vineyard irrigation system (Vic Alps Winery)	731	$651	$157,000	241.2
Installation of Roof at Saleyards	Install roof over cattle pens, include rainwater harvesting system for cattle troughs (Wangaratta Livestock Exchange)	1,887	$4,152	$4,000,000	963.4
Total for All Measures		**14,012**	**$18,616**	**$4,317,098**	**230**

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

Figure 7 provides the information above graphically.

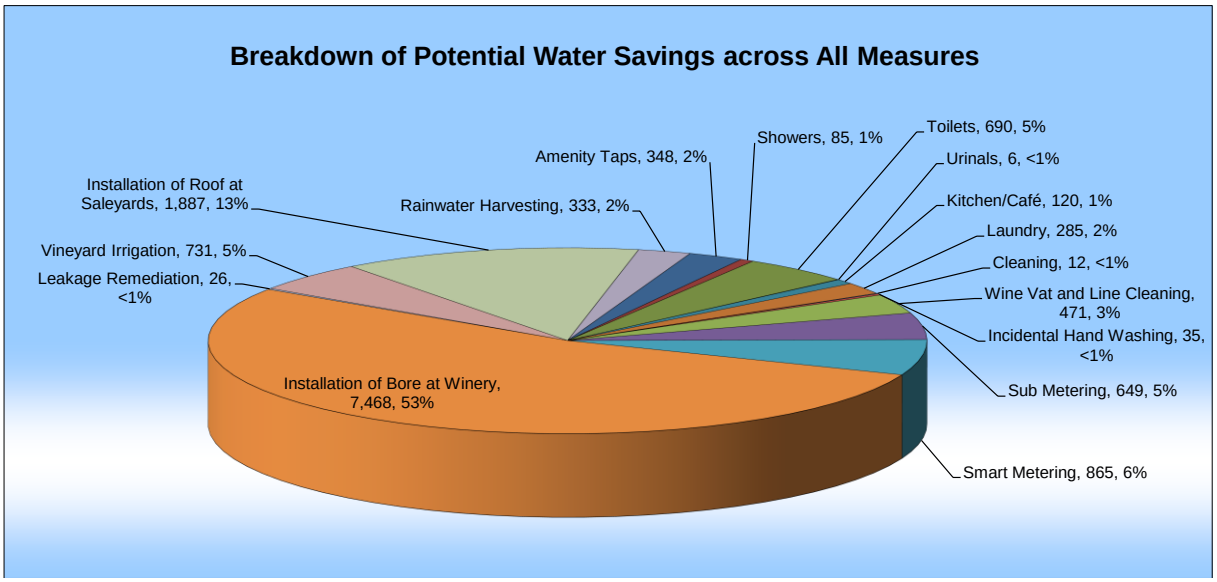

Figure 7. Breakdown of Potential Water Savings Across All Measures

The most financially attractive measures should be implemented with priority at the seven sites assessed, since they will provide the highest level of total savings for a given implementation budget. As mentioned in the individual site audit reports (see Appendix) it is recommended that the 'Tier 1' measures are implemented as soon as possible:

- Tier 1 measures were classified as those with a payback of 6 years or less. These should be seen as financially attractive, and thus widespread prompt implementation should be encouraged. These measures are mostly simple 'water efficiency' style measures such as showerhead upgrades, laundry upgrades, urinal flush modification, and amenity and incidental hand washing tap flow restriction. These are particularly applicable across a wider range of industries. Also included (but not as widely applicable) are changes to water using processes (e.g. wine vat and line cleaning at the Vic Alps Winery), and the large scale use of an alternative water source (e.g. installation of a bore at the Vic Alps Winery).
- Tier 2 measures can be split into 2 parts. Measures with a payback between 6 years and 12 years, while not as financially attractive, should still be encouraged for implementation. Such measures were limited to only a few of the sites included in the program, mostly at the Vic Alps Winery. They include 'water management' style measures such as sub- and smart metering, and also leakage remediation.
- Measures with a payback of greater than 12 years may be considered for longer term implementation or as part of a special initiative (e.g. outside funding, or as special showcase sustainability projects supporting a particular image and marketing aspect that the business is pursuing). These measures include kitchen, café, and cleaning equipment upgrades, rainwater harvesting and an upgrade of the irrigation system for the Vic Alps Winery.
- A separate category is the installation of a roof over the Wangaratta Livestock Exchange. Given that this has significant benefits beyond water savings (such

as in animal wellbeing), this is an option that should be pursued primarily for other reasons, with water savings seen as an additional benefit.

7.3 Extrapolated Savings

The savings which can be achieved from this program have the potential to extend beyond the seven sites included in it. Table 4 uses some assumptions to extrapolate the water savings identified for the seven sites included in this program across the industry sectors they represent in the North East Water / North East Greenhouse Alliance area. Note that this section only considers Tier 1 water savings measures, since they are those which can be considered the most financially viable and thus those which are most likely to achieve widespread implementation:

Table 4: Extrapolated Water Savings

Site (Industry)	Assumed Total Number of Similar Sites	Total Water Consumption of Sites (kL/year)	Total Possible Water Savings (Tier 1) (kL/year)	Cost to Industry to Achieve Savings	Payback Period
Burder Industries (Industry: Metal Fabrication)	95	64,125	9,785	$108,840	5.1
Bright Chalet & Wodonga Caravan and Cabin Park (Industry: Accomodation)	90	512,820	35,495	$312,080	4.0
Wanagaratta Livestock Exchange (Industry: Livestock Exchanges)	5	16,695	345	$3,920	5.2
Mytleford Butter Factory (Industry: Boutique Food Production)	15	9,555	465	$7,721	7.5
Victoria Alps Winery (Industry: Wineries)	40	1,544,000	94,890	$1,162,558	5.6
La Trobe University (Industry: Tertiary Education)	5	9,695	615	$7,540	5.6
TOTALS	**273**	**2,156,890**	**141,595**	**$1,602,658**	**5.1**
Industry: Larger Fabric Mills	*3*	*530,000*	*53,000*	*$641,300*	*5.5*

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

Note that this table contains a number of assumptions which need to be borne in mind in interpreting the data contained in it:

- The assumed total number of similar sites figures for each industry was derived through means such as contacting tourism boards and local councils, internet and Yellow Pages searches, etc. It is therefore subject to some inaccuracy.
- Calculation of the total water consumption of the industry sector and the total possible Tier 1 water savings is on the basis of site audits carried out in the program, multiplied by the assumed total number of sites figures. Given that the program only included a very low sample size of 1-2 sites for each industry, the overall confidence in the accuracy of this data is commensurately low.
- The extrapolated Tier 1 water savings for Wineries has been reduced by a factor of 75%. This is because while the majority of savings at the site come from the installation of a bore for irrigation purposes, discussions with Victorian Alps Winery staff indicated that most wineries in the area are already using non potable water for irrigation.
- The final row presents a possible alternative means of pursuing water savings in the area. As mentioned in section 7.1, some larger fabric mills in the Wangaratta area were not included in this program due to their large water use. However, assuming (in line with WaterGroup experience of large industrial sites) that Tier 1 water savings of 10% of total consumption at a payback of 5.5 years, water savings of 53ML/year may be achievable by working with only 3 sites – a methodology which may be preferable to wider ranging programs over larger numbers of sites.

Considering that even on the basis of this very brief and simple extrapolation exercise, water savings of almost 150ML/yr leading to savings (at current water prices) of nearly $1 million for the businesses in the region were identified, it seems well worthwhile to spend more effort to refine this data. Furthermore, the almost 150ML/year and thus $350,000 of savings identified were of course only for the industry sectors which were represented in the site audits completed. Other industries exist in the area for which further water and financial savings could also be achieved if further programs such as the one described in this report are run.

However, even given these qualifications, the data contained in Table 4 is sufficient to draw some generalisations. On the basis of the information contained in it, it is clear that the two industries identified in this program which have the most potential for significant water savings are Accommodation and Wineries. While the total estimated possible savings for Accommodation sites are much lower than those of Wineries, water savings work in the Accommodation industry has significant advantages:

- The payback period for the savings identified in the Accommodation industry is lower than for Wineries. Thus widespread implementation of these measures is more financially attractive and thus more likely.
- The kinds of water savings measures identified for the accommodation sites have a higher potential for widespread application than those identified for the Winery. This is because the vast majority of savings identified for the Winery come from the installation of a bore (which many of the other wineries

in the area already have in place), while for the accommodation sites the savings stem from common measures such as flow restriction of amenity hand basins.

In accordance with the two points made above, it is thus the recommendation of this report that priority should be given to pursuing a water efficiency program for the Accommodation industry. A water savings program for the region's Wineries should also be considered, either at the completion of the program for the accommodation industry, or simultaneously if budget permits. The means which can be used to promote water savings in each of these industries are discussed in Section 7.4 of this report.

7.4 Pathway Forward to Achieve Greater Climate Resilience

In order to achieve greater climate resilience in the North East Water / North East Greenhouse Alliance area, it will be necessary to achieve water savings which extend beyond just the seven sites included in this program, preferably to levels such as those described in section 7.3. Achieving these extended savings can be facilitated by employing a number of different funding and delivery models that are available to extend these savings. These include:

- Information Campaign
- Rebate Program
- The Upfront Commitment Model
- Sector Engagement Model
- Business Cluster Model
- Performance Contracting

Each of these models is discussed in further detail in the sections below.

7.4.1 Information Campaign

A program which is relatively simple and can act as a precursor to more targeted methods is to publicise the outcomes obtained in the seven completed site audits via an Information Campaign. This demonstrates to applicable members of the same industry that financially viable water savings can be achieved in their businesses, and also provides information showing the path to achieve them.

The recommended materials used in this information campaign are case studies. Case studies in the context of this program would provide a succinct description of the findings from each of the sites involved, though made anonymous to protect the privacy of the specific sites involved. The case studies would then be distributed (via for example the North East Water, the local Chamber of Commerce websites) to members of the industry in question to promote water savings.

7.4.2 Rebate Program

For certain water efficiency measures, a rebate program can effectively assist in encouraging widespread implementation. Rebate programs involve bodies such as water authorities, local Councils or industry bodies providing water savings equipment at a subsided price (even to the extent that it is free). A pertinent example of a rebate program is the showerhead exchange program used by various Water Authorities to achieve water savings in the residential sector.

In the current context, a rebate program would be most effective if used to encourage uptake of for example flow restrictors for use in amenity hand basins (amenity tap flow restriction was the most common water savings measure identified in this program). In such a program, the flow restrictors could be supplied either free of charge or at a discounted rate to the businesses in for example the hotel industry, encouraging their widespread adoption. Publicity for the rebate program could be included in the Information Campaign described in section 7.4.1.

7.4.3 Upfront Commitment Model

This model resembles the program described in this report, but with a financial commitment from the participant organisations upfront to proceed with investment into viable water savings measures identified. At an early stage a business is approached (by the entity coordinating the demand management program) and asked if there is budget to implement water savings, what the investment criteria are and what management interest is in supporting such measures. If these criteria are met, initial savings measures are discussed and a memorandum of understanding (between the business and the entity coordinating the demand management program) is signed that commits the business to implement identified water savings with a set payback period (typically less than 4-5 years).

With that commitment a detailed water saving assessment is conducted to confirm the business case (e.g. 'By agreeing to proceed you will commit up to $35,000 for water efficiency measures within a demonstrated 3 year payback').

This process will typically only work with large water users where there is budget available and a clear commitment to achieve savings. The process is more time intensive at the start to secure savings but once participants have signed a memorandum of understanding (MoU), savings identified are virtually locked in.

7.4.4 Sector Engagement Model

In this model a particular sector is chosen e.g. hospitality. Work is then done in consultation with this sector to identify water savings. This is usually set up through an industry association or peak body. It is typical that this body subsidises or pays for initial assessments for participants that have expressed a willingness to be involved and can achieve savings.

Government co-funding is then sought to subsidise measures and allow for group buying discounts across the sector with similar water savings upgrades e.g. flow restrictors for taps and WELS rated shower head installations. If such funding

cannot be sourced it is the water savings that will have to stack up on their merits alone.

7.4.5 Business Cluster Model

A number of businesses can be clustered together and labelled as a participant in the cluster program, thus gaining recognition. Typically in this model smart water metering is installed with monthly reports and benchmarks given to the businesses involved. The fee for smart metering can be supported through a program run by Councils or North East Water or as a joining fee.

No upfront capital commitment is sought to implement water savings, just a commitment to monitor usage, monitor leaks and observe unusual water usage patterns and then act on it. Where such patterns exist, assistance is provided to help implement water savings.

In this model no detailed water saving assessment is conducted, just establishment of benchmarks and monitoring. This is considered a more basic water savings model.

7.4.6 Performance Contracting

In this model, businesses sign up for guaranteed water savings for a set capital investment in a contract. The risk is then placed on the service provider to ensure that promised returns are achieved, or pay back any shortfall in projected savings. Hence, should savings not be achieved the contractor bears the financial risk. There are a number of companies that offer this service.

However, due to contract overheads this model is typically only feasible and cost effective for larger water users, or an aggregated group. There are not enough sufficiently high water users in the area to make this model financially viable. This approach could work sufficiently well if energy efficiency was also considered. This would also assist in mitigating emissions and reducing the various Councils' carbon footprint.

7.4.7 Applicability of Models

To assess the applicability of each of each of these business models to the industries included in this program, an assessment matrix was developed. This is presented in Table 5.

Table 5: Applicability of Models to Industries Included in Program

	Industry Sector					
Delivery Model	Accomodation	Livestock Exchanges	Tertiary Education	Metal Working	Boutique Food Production	Wineries
Information Campaign						
Rebate Program						
Upfront Commitment Model						
Sector Engagement Model						
Business Cluster Model						
Performance Contracting						

KEY:
- Low suitability
- Medium suitability
- High suitability

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

7.4.7.1 Recommendations

The following recommendations are made:

- An Information Campaign should be launched on the basis of the results of this program, based on case studies summarising the outcomes of the site audits for each of the sites involved (with the exception of the Livestock Exchange, due to there being only two other such sites in the North East Water area).
- A Rebate Program should be put in place focusing on providing low cost or free flow restriction devices for businesses to use in amenity taps should be launched.
- Better water management should be encouraged by providing larger water users and those more interested in their consumption, with at least know how, and ideally also financial assistance to install smart meters. This will allow them to see their water consumption in near real time online. It is likely to lead to sustained and significant future water savings.
- In terms of focussing on a specific industry, water savings in the Accommodation industry should be pursued with priority. The most effective delivery model (in addition to the support from the Information Campaign and Rebate Program) to achieve savings in this industry is the Sector Engagement Model.
- Wineries should be considered as a second priority for an industry specific program, with an Upfront Commitment Model, a Sector Engagement Model or a Business Cluster Model used.

8 BEST PRACTICE SURVEY

Included in the development process was a review of industry best practice for water efficiency, focussing mainly on the industries that were selected to be involved in the program. The best practice information was obtained from sources such as the City West Water Best Practice Guide (currently being updated), other Australian and overseas literature, as well WaterGroup's own database. The following sections of this report detail the information obtained for each industry included.

8.1 Accommodation

8.1.1 Building Maintenance

- Check water supply system for leaks and turn off any unnecessary uses

Maintenance

- Check for worn gaskets in sinks
- Check for dripping taps or obvious leaks
- Ensure regular maintenance of water-using devices, such as dishwashers and ice makers. Repairs and regular maintenance should be conducted by a qualified technician.

Equipment modifications

- Garbage disposal units, while not water intensive, add to pollutants in the sewer and reduce wastewater quality, making water harder to recycle. An alternative to garbage disposal units is to use strainers or traps that employ a mesh or steel screen to collect food waste for later disposal. Many companies provide a service of collecting food wastes to make compost for garden fertiliser. Investigate this opportunity for your kitchen.
- Install flow control to the rinse line to ensure the water flow and pressure is matched to the minimum settings recommended by the manufacturer.
- Where practical to do so, consider modifying dishwashers to recycle final rinse water for next initial rinse.

Figure 8. Excerpt from the City West Water Accommodation Best Practice Guide

- Repair dripping taps, showers and running or leaking toilets
- Install flow restrictors and aerators into all taps, spouts and showers (where possible)
- Reduce the water used for toilet flushing by installing ultra-low-dual flush models
- As appliances or fixtures wear out, replace them with water-saving models
- Minimize the water used for cooling equipment according to manufacturer recommendations – e.g. air compressors
- Reduce the load on air conditioning systems that use cooling towers - turn off when not needed
- Avoid excessive boiler blow down and cooling tower bleed – monitor total dissolved solids levels, and blow down/bleed only when necessary

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

8.1.2 Kitchen, Dining Room and Bar

- Turn off continuous water flows used to clean drain trays of the coffee/milk/soda beverage island – clean the trays only as needed
- Turn dishwashers off after use. Wash full loads only. Replace spray heads in dishwashers to reduce water flow.
- Pre-soak utensils and dishes in ponded water instead of rinsing them under running water
- Reuse water from steam tables to wash down cooking area
- Do not use running water to melt ice or frozen foods – place them in the refrigerator overnight
- Use water-efficient icemakers
- Reuse and recycle water where feasible – consistent with regulatory requirements
- Use connectionless food steamers
- Supply drinking water only on request

8.1.3 Laundry

- Reprogram washing machines to eliminate a rinse or suds cycle – if not restricted by health regulations
- Reduce water levels, where possible to minimise water required per load of wash
- Wash full loads only (when possible)
- Evaluate wash formula and machine cycles for water use efficiency
- Ask guests if they would like to reuse towels

8.1.4 Exterior

- Convert from high water-using lawns, trees, and shrubs to water efficient landscapes, incorporating plants that provide colour and require less water
- Design landscapes that will require less water
- Inventory outdoor water use for landscaped areas
- Water landscape only when needed – two to three times a week is usually sufficient.
- Water in winter only during prolonged hot and dry periods. During spring and autumn, most plants need about half the water needed during the summer.
- Wash automobiles less often
- Use a broom to clean paths and driveways instead of hosing them down
- Avoid landscape fertilising and pruning that would stimulate excessive growth
- Remove weeds and unhealthy plants so remaining plants can benefit from the saved water
- In many cases older, established plants require infrequent irrigation. Look for indications of water need such as wilt, change of colour, or dry soil
- Install soil moisture overrides or timers on sprinkler/irrigation systems
- Time watering for the morning or evening when evaporation is lowest. Do not water on windy days
- Make sure irrigation equipment applies water uniformly

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

- Investigate the advantages of installing drip irrigation systems
- Mulch around plants to reduce evaporation and discourage weeds
- Remove thatch and aerate turf to encourage movement of water to the root zone
- Avoid runoff. Set sprinklers to cover only the lawn or garden, not paths, driveways, or gutters

8.1.5 Pools

- Lower pool water level to reduce amount of water splashed out
- Reduce amount of water used to clean pool filters

8.2 Beverage Production

8.2.1 Process Equipment

- Install high pressure, low volume nozzles on spray washers.
- Use fogging nozzles to cool product. Inspect nozzles regularly for clogging.
- Adjust pump-cooling and flushing water to the minimum required.
- Determine whether water discharges can be substituted for fresh water being supplied to any other operation.
- Use water-efficient conveying systems, such as:
    - handling waste materials in a dry state wherever possible
    - using conveyor belts for product transport - preference should be given to those that are much easier to clean
    - using pneumatic conveying systems wherever possible; and use flumes with parabolic cross sections rather than flat-bottom troughs
- As equipment wears out, replace with water-efficient models.
- Equip all hoses with spring-loaded shutoff nozzles – ensure these nozzles cannot be removed
- Instruct employees to use hoses sparingly and only when necessary
- Adjust flows from recirculation systems by controlling the rate of makeup water by:
    - Installing automatic valve on the makeup line
    - Closing filling line during operation
    - Providing surge tanks for each system to avoid overflow
- Turn off all flows during shutdowns (unless flows are essential for cleaning)
- Use solenoid valves to stop the flow of water when production stops. The valves could be activated by linking them into drive motor controls
- Adjust flows in sprays and other lines to meet the minimum requirements

8.2.2 Potential areas for water reuse

- First rinses in wash cycles
- Can shredder, bottle crusher
- Filter backflush
- Caustic dilution

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

- Boiler makeup
- Refrigeration equipment defrost
- Equipment cleaning, floor and gutter wash

EXAMPLE OF DIFFERENT INDUSTRIAL WATER USES
1. Primary processing
3. Product washing
4. Cooling
5. Cooking
6. Blanching
7. Thawing
8. Packing and filling lines
2. Conveying systems
9. Vessel washing
10. Plant and equipment cleaning
11. Crates, bottle and container washing
12. Utilities

8.2.3 Potential sources of water for reuse

- Final rinses from tank/vat cleaning
- washers, and fermenters
- Bottle and can soak and rinse water
- Cooler flush water, filter backwash
- Pasteurizer and steriliser water

8.3 Food Processing

8.3.1 Process Equipment

- Install high pressure, low volume nozzles on spray washers
- Use fogging nozzles to cool product. Inspect nozzles regularly for clogging
- Adjust pump-cooling and flushing water to the minimum required
- Determine whether water discharges can be substituted for fresh water being supplied to any other operation
- Replace water-intensive units with alternatives.
- Divide spray wash units into two or more sections and establish a counter flow re-use system
- Use discharge water for flushing floor gutters
- Replace high-volume hoses with high-pressure, low-volume cleaning systems
- As equipment wears out, replace with water-saving models
- Equip all hoses with spring-loaded shutoff nozzles. Be sure these nozzles are not removed
- Instruct employees to use hoses sparingly and only when necessary.
- Adjust flows from recirculation systems by controlling the rate of makeup water by:
    - Installing automatic valve on the makeup line
    - Closing filling line during operation.
    - Providing surge tanks for each system to avoid overflow.
- Turn off all flows during shutdowns (unless flows are essential for cleaning)
- Use solenoid valves to stop the flow of water when production stops. The valves could be activated by tying them into drive motor controls.

8.3.2 Materials Handling

- Handle waste materials in a dry state where possible

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

- Use conveyor belts for product transport - preference should be given to those that are easy to clean
- Use pneumatic conveying systems wherever possible
- Establish optimum depth of production conveyors to maximize wash water efficiency

8.3.3 Cleaning Practices

- Sweep and shovel solid materials from the floor instead of using hoses
- Provide an adequate number of receptacles for collecting solids. Empty the receptacles often to prevent odour and insect problems
- Inventory all of the plant's cleaning equipment (such as hoses):
    - number and types of units provided
    - frequency of operation
- Check all cleaning chemicals used in the plant to determine whether they are being used correctly
- Use a broom to clean paths, driveways, loading docks, and parking lots instead of hosing down. Consider using mobile sweepers
- Control belt sprays with a timer to allow for intermittent disinfection

8.4 Car Washes

8.4.1 Self-Service Car Washes

- Reduce nozzle size and water pressure
- Check for and repair water leaks as soon as possible
- Replace brass or plastic nozzles with stainless steel nozzles. Plastic and brass nozzles wear away faster, increasing the nozzle size and allowing more water out
- Turn off spot-free rinse or recycle reject water
- Discontinue bay/lot wash down
- Install a temperature-controlled weep management system
- For reverse-osmosis systems there must be an optional feature to turn off the spot-free rinse feature or to recycle reject water

8.4.2 In-Bay Automatic & Conveyor Systems

- In-bay or conveyor car washes that have a reclaim system with filtration will be certified. Existing car washes may qualify for Denver Water's Commercial and Industrial Incentive Program to help pay for a new reclaim system with filtration
- If the car wash doesn't have a reclaim system, it must reduce water use by 30 percent per vehicle
- To reduce water use for in-bay systems, reduce nozzle sizes and water pressure, increase the cycle-time speed, use only one soap pass and turn off the spot-free rinse cycle
- To reduce water use in conveyor systems, reduce nozzle sizes and water pressure, increase the conveyor speed, shorten cycle times, adjust sensor

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

settings, turn off certain wash and rinse arches and discontinue the spot-free rinse cycle

8.4.3 Restrooms

- Keep toilets in good working order
- Periodically inspect and replace valves and ballcocks in cisterns
- Test for leaks
- Adjust flush valve
- Retrofit cistern toilets by:
    - installing a commercial displacement device in the tank
    - replacing or amending the flush valve in the tank with an early closure device that uses less water while maintaining the original pressure and flush force
    - installing a dual-flush adapter

8.5 Amenities

8.5.1 Toilets

- For single flush toilets, cost-effectively reduce flush volumes by modifying the float arm or installing a displacement device that can reduce the cistern volume from 11 to nine litres per flush.
- Replace single flush units with a 4.5/3 litre dual flush model
- Replace high use toilets first to gain the fastest payback
- Know your sewer infrastructure and match the type of toilet to your waste water piping and water pressure
- Use qualified, licensed plumbers
- Plan for the legal disposal of old toilets by consulting with your local solid waste authority for recycling options and requirements.

8.5.2 Urinals

- Waterless urinals are currently best practice – however care with installation and ongoing maintenance is required
- Install automatic individual sensor flush units for each stall, as these are the most efficient. Alternatively, sensor units controlling up to three stalls will still save water and money

8.5.3 Showers/Baths/Spas

- Encourage users to take three-minute 'power showers'. Stickers and timers are useful
- Encourage users or employees to inform maintenance personnel if they notice a leak
- Install flow restrictors
- Adjust water pressure to minimise water flow from showerheads

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

- Replace showerheads with 3-star rated models that use 9 litres of water or less per minute
- Note that modern high-efficiency showerheads are mainly designed for storage hot water systems. Their lower flow rate may not activate instantaneous hot water systems, an important consideration when mixed hot and cold water is being used in showers
- Water efficient showerheads may also be prone to blockage in hard water areas, leading to increased maintenance. If this is the case, flow restrictors within the tap may be preferable
- Install fixed flow taps that deliver a set quantity of water when operated (e.g. push button)
- Ensure spa jets are located low in the spa bath so that it can operate properly with minimal water

	Best practice	Typical existing usage	Savings per person		Water saving opportunity	Example
	Litres/ min	Litres/ min	Litres/ year	$/year		
Showers	7	15	12,000	15.85	Replace showerheads with water efficient showerheads and reduce showers to 4 minutes.	Ten four-minute showers with a water efficient showerhead saves 120,000 litres per year, or at least $155 per year..
Toilets	6/3 dual flush (average 3.5 litres per flush)	11 litres/ flush	11,000	14.55	New pan and cistern. Assumes the average person uses the toilet 4 times during the day	If the toilet is used 40 times a day water savings will be 110,000 litres per year, or at least $145 per year.
Basin	4.2	12	14,000	18.50	Flow control in spout or in taps. Assumes 5 minutes use per person per day.	If a wash basin is used 10 times for an average of 5 minutes each day the water savings will be 140,000 litres per year, or at least $185 per year.

Figure 9. Excerpt from Western Water Amenity Water Savings Guide

8.5.4 Taps/Hand Wash Basins

- Encourage people to turn taps off when they are not in use
- Use stickers or posters to inform people about the amount of water they are wasting when they leave a tap running
- Encourage people to inform maintenance personnel if they notice a leak
- Adjust flow valves or install flow control regulators to reduce water flow where appropriate
- Use aerators on existing taps to maximise flow efficiency by increasing airflow in the stream
- Install pedal-operated tap controllers to ensure valves are closed when the basin is not in use
- Replace taps with those with a minimum 3-star rating. Quarter turn taps with ceramic seats give greater flow control and are less prone to leaks
- Install fixed flow taps that deliver a set quantity of water when operated, such as push button taps
- Install spring-loaded taps that shut off immediately after use
- Install small hand basins with a pop-up plug that closes the drain until a lever or button is pressed. This discourages users from leaving taps running

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

9 APPENDICES

The following pages contain the following documentation from the program:

- Memorandum of Understanding

A copy of the Program Flyer is provided as a separate document.

The following Water Audit and Water Savings Action Plans for each site are provided as separate reports:

- Bright Chalet Water Audit and Water Savings Action Plan
- Burder Industries Water Audit and Water Savings Action Plan
- Wangaratta Livestock Exchange Water Audit and Water Savings Action Plan
- Myrtleford Butter Factory Water Audit and Water Savings Action Plan
- Victoria Alps Winery Water Audit and Water Savings Action Plan
- Wodonga Caravan and Cabin Park Water Audit and Water Savings Action Plan
- La Trobe University Water Audit and Water Savings Action Plan

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

The North East Greenhouse Alliance

Easy Blue Water Savings Program

Memorandum of Understanding

_____ ("The Facility") is participating in the **Easy Blue** program, a joint water savings initiative by the North East Greenhouse Alliance on behalf of City of Wodonga, Rural City of Wangaratta, Alpine, Indigo and Towong Shires, in partnership with the North East Catchment Management Authority, North East Water and Goulburn Murray Water.

Water Conservation Group ("WCG") is the technical partner for the program, providing specialist technical advice to the Facility in the form of Detailed Water Audits and Water Savings Action Plans to identify water usage, wastage, and opportunities for reducing mains water supply by efficiency or supply from alternate sources.

The North East Greenhouse Alliance and its partners **undertake to:**

- Within 4 weeks of signing this agreement, free of charge, visit your site to conduct a Detailed Site Audit to investigate possible water savings measures
- During the site visit, review the water systems and fittings of the facility, and investigate a wide range of water savings measures such as plumbing upgrades, smart metering, rainwater harvesting, process efficiency improvements, etc.
- Prepare a Detailed Water Savings Action Plan free of charge to confirm the water savings, costs and other issues within 4 weeks of the site audit.

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au

The Facility undertakes to:

- Within one week of signing this Memorandum of Understanding, provide data on facility size and occupancy, and historical information on water usage and water costs/fees
- Provide access and facilitation to undertake a detailed up to half-day audit of the facility, including all water uses and inspection of existing water fixtures and fittings
- Authorise the North East Greenhouse Alliance and its partners to share anonymous water usage data, including savings achieved, and utilise the data in industry benchmarking and the production of case studies to promote further water savings across industry.

Summary of Next Steps:

- Please provide the following information promptly so background preparations for the Detailed Site Audit can be undertaken:
    - Historical water consumption information (either copies of water bills or overall site consumption data for at least 12 months; ideally 3 years)
    - Any sub- or smart metering data available
    - Plans and Site details, such as: Numbers of employees, Site operation hours, Key process or Business activity parameters (numbers of e.g. cars washed, units produced, etc.).
    - Access to any cooling tower or fire system maintenance records or contractor contact details (if applicable)
    - Any other information you feel is pertinent to water use at the site
- Once this data is received, a representative from Water Conservation Group will contact you to arrange the site audit visit

Agreed on: _____ 2011

for The Facility	for the North East Greenhouse Alliance and its partners
By:	
_____	_____
Title	Title
_____	_____
Name	Name

WaterGroup P/L | 606/166 Wellington Pd | East Melbourne VIC 3002 | ABN79121148169
Ph 03 9486 0515 Fax 02 9499 4950 E-mail water@watergroup.com.au Web www.watergroup.com.au