



EASY BLUE WATER SAVINGS PROGRAM



Water Audit and Water Savings Action Plan: Wangaratta Livestock Exchange

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1 EXECUTIVE SUMMARY

The Wangaratta Livestock Exchange was selected to participate in the Easy Blue program, an initiative run by the North East Greenhouse Alliance, on behalf of City of Wodonga, Rural City of Wangaratta, Alpine, Indigo and Towong Shires, and in partnership with the North East Catchment Management Authority, North East Water and Goulburn Murray Water. The program is intended to help businesses in North East Victoria understand and reduce their water use, and through that adapt to a low water future.

The Wangaratta Livestock Exchange is located on Shanley St, Wangaratta. It consists of two principle businesses: A café and a saleyards. This report is a result of the Wangaratta Livestock Exchange's participation in the program. It uses a methodology of estimating water use values for various areas of consumption around the site based on information gathered during the site visit, and calibrating it against total water consumption as per site water bills. This allows the estimation of the effectiveness of water savings measures.

This process has led to the following conclusions:

- On average the facility uses 3,340kL/yr of water at a cost of approximately \$7,350/yr at current water rates
- 2% of the facility's total potable water usage could be saved by undertaking the simple steps of installing flow restrictors in amenity hand washing taps and replacing the site's showerheads with low flow models
- This would lead to expected annual water savings of 69kL/year
- The estimated cost to implement the savings measures is \$1,100
- The payback period for these measures is 5.2 years, with ongoing annual savings of \$213 per year.
- Much larger water savings are possible, principally through the site going ahead with its plan to install a roof over the cattle pens. This is the key way to deliver not only large scale water savings for the site, but also significant other benefits in terms of cattle well-being and labour cost reductions.



Document Control

Project Name: Water Audit and Water Savings Action Plan Wangaratta Livestock Exchange

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2 FACILITY WATER CONSUMPTION

2.1 Water Consumption Levels and Water Pricing

The Wangaratta Livestock Exchange provided details of their water consumption for previous years. The data provided suggested that annual water consumption is approximately 3,339kL/year, a figure which has been used as the baseline water consumption at the site for the purposes of this report.

Water is supplied to the site by North East Water. The current (2011-2012 financial year) cost of water for the site is \$2.20/kL, making for annual water consumption charges of \$7,347/year.

2.2 Specific Water Consumption (KPI)

The Wangaratta Livestock Exchange consists of saleyards in which livestock are sold & exchanged, and a café/amenity area. The vast majority of water is used in the saleyard area. The best business activity indicator to determine a specific water consumption KPI is the number of cattle sold. This equates to around 40,000 head per year, meaning the specific water consumption of the site is 83L per head of cattle sold per year.

2.3 Water Metering Information

The site is supplied principally by two water meters located at the front boundary of the property. The site does not have a smart metering system in place.



3 WATER BALANCE

3.1 Site Visit

A site visit was conducted on December 13th, 2011. Data gathered during this visit included:

- Number of staff working at the site
- Number of visitors to the site and the level of activity there
- Location of site water meter(s)
- Number and flow rates of amenity and other hand basin taps
- Number, flush volumes and types of toilets and urinals (where applicable)
- Site water use patterns for processes such as washdowns
- General site water management practices and water conservation behaviour observed, or their lack thereof

The site visit also demonstrated that many water savings measures have already been put in place, for example dual flush toilets and high pressure nozzles for washing down the saleyards area. The Wangaratta Livestock Exchange should be commended for having already taken these steps.



3.2 Water Balance

From the findings of the preliminary site visit and the supplied overall consumption information, the Water Balance for the facility has been prepared.



Figure 1: Water Balance for the Wangaratta Livestock Exchange (in kL and % of total)

As Figure 1 shows, the major water consumers at the site are the hosedowns in the saleyards (38%), and the cattle troughs (31%).



3.3 Water Use Single Line Diagram

The following single line diagram describes how water is supplied to, is used within, and is disposed from the site:



Figure 2: Single Line Diagram for the Wangaratta Livestock Exchange

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4 **POSSIBLE WATER SAVINGS**

During the preliminary site visit, flow rates and volumes of representative fittings were measured where possible. Other areas, such as the water used for the hosedown activity were observed to facilitate the estimation of their water consumption and the possibility for water savings. The water savings below are split up into two groups – Tier 1 measures, which have reasonable payback periods meaning that it makes good business sense to implement them straight away; and Tier 2 measures, which push the payback out to levels which should be considered in any expanded water conservation program.

4.1 Description of Possible Savings – Tier 1

4.1.1 Amenity Taps

There is a set of amenities located adjacent to the site's café area. These are quite heavily used, since approximately 300 individuals use the site for an extended period of time on sale days - the vast majority eating onsite also. These taps have a very high flow rate at around 14L/min. The Water Efficiency and Labelling Standards Scheme (WELS), operated by the Australian Government provides an independent source of information about the water efficiency of devices such as showerheads, toilets, urinals, taps and dishwashers. The WELS scheme states that a flow rate of 4L/min is sufficient for amenity use.

The installation of in-line flow restrictors could bring the flow rates down with no loss of effectiveness. End of spout aerator style restrictors cannot be fitted to the site's tapware. A total of eight amenity basins at the site (four in the male; four in the female bathrooms) require flow restriction. Unfortunately, due to the nature of the basin troughs installed, it will be a more complex and expensive installation process than simply fitting a restrictor, since the trough itself will have to be removed to access the pipework behind it.





Figure 3: Example of an Amenity Tap at the Wangaratta Livestock Exchange

4.1.2 Showers

The showers in the amenity blocks at the site are used occasionally, principally by truck drivers. However, the existing showerheads are understood not to be low flow models. The savings achieved by replacing showerheads are particularly important because they include both water and energy savings, from reduced water heating requirements. We recommend that showerheads which use 9L/min or less are installed at the site.

4.2 Description of Possible Savings – Tier 2

The water savings measures described above are simple, very cost effective measures - but do not deliver very large water savings. To achieve larger water savings at the site, more complex measures are required. Some of these are discussed below.



4.2.1 Hosedowns

The largest user of water at the site is the hosing down of the cattle pens. During the summer months, the cattle pens are covered in woodchips, which avoids the need for them to be hosed down. However, during the winter months higher rainfall and lower evaporation mean that the chips quickly break down and they cannot be used. Thus hosedown activity at the site can be broken into two distinct types:

- Weekly winter hosedowns: At the end of each week, the cattle manure accumulated during the sales is hosed from the pen floors
- Post summer hosedown: At the end of each summer season, the mix of degraded woodchips and cattle manure is cleared off the pen floors, again by hosing them down.

The equipment used to hose down the pens was examined during the site visit. It was found to be of an excellent level of water efficiency, using pressure nozzles with adjustable flows and providing the ability to turn off flows at the nozzle saving potentially wasted water.



Figure 4: Hosedown Nozzle at the Wangaratta Livestock Exchange



Other means of removing the woodchips/manure were also considered, such as a mechanical method - from simple brooms to street sweepers, etc. However, none of these seem viable – brooms would simply take too long to complete the task; and the layout of the pens is such that sweepers and the like cannot access them properly (modern saleyards are designed so that this is not so much of a problem).

It therefore seems that the most viable means of saving hosedown water is to install roofing over the whole site. This would mean that woodchips can be used throughout the year, since they would not get too wet in winter. Such roofing has a number of significant benefits, namely:

- Protecting cattle health, since the year round use of woodchips would prevent cattle from having to stand on hard concrete floors for long periods of time
- Significant water savings due to lower hosedown requirements (some hosing would be necessary on perhaps a biannual basis, to remove crushed woodchips and manure)
- Significant labour savings due to lower hosedown requirements

New roofing would also present an excellent opportunity to install a large scale rainwater harvesting and reuse system at the site – to be used for hosedown and to feed the cattle troughs. We strongly recommend that this integrated into the design of any new roof.

We understand that investigations into installing roofing are already underway. We recommend that the Livestock Exchange pursue the installation of a roof, and take advantaged of the benefits as described above.

It is understood that the installation of such a roof would cost in the order of \$4,000,000.

4.2.2 Café – Food Preparation

Water savings can be achieved in the site's kitchen with the installation of a pre-rinse spray nozzle into its washing up station. The site's washing up station is shown in Figure 5, and an image of a pre-rinse spray nozzle is shown in Figure 6.





Figure 5. Washing Up Station at the Wangaratta Livestock Exchange (left) Figure 6: Pre Rinse Spray Nozzle in Use (right)

These nozzles are used in commercial kitchens across Australia. Users often report that in addition to delivering water savings, they are quicker and easier to use than standard tapware.



4.2.3 Rainwater Harvesting

The installation of a rainwater harvesting and reuse system using a small existing roof area is also a possibility for the site. A representation of the recommended rainwater harvesting system for the site is show in Figure 7:



Figure 7: Possible Rainwater Harvesting Layout at the Wangaratta Livestock Exchange



Two downpipe cut-ins would be required for the system, with the tank located adjacent to the site's small roofed cattle pens. Overflows from the tank would be directed back into the existing stormwater system, located nearby. A standard pump would be used to supply the network of cattle trough filling pipework in the pens. An automatic changeover switch (for example, a Rainbank) would be used to ensure that potable water was always available as a backup when the rainwater tank is empty.

WaterGroup's rainwater harvesting modelling indicates that this system could save 135kL/year of water (see appendix for modelling outputs).

4.3 Other Areas of Water Consumption

The following other areas of water consumption were noted during the site visit, but are not amenable to water savings measures:

- Toilet and Urinal Flushing at the site is already of a good standard of water efficiency
- The truck wash requires that truck drivers bring their own hoses to wash down their vehicles (previous hoses were regularly stolen). The pay-as-you use system currently in place means that it is in the users' interest to minimise the amount of water they use.
- Incidental cleaning and garden watering contributes very little to overall water use, and the efficiency with which it is carried out is acceptable.



5 WATER SAVINGS ACTION PLAN

The recommendations in this report provide a clear action plan to achieve water savings at the Wangaratta Livestock Exchange. As per the above listing of possible water savings measures, this action plan can be broken down into Tier 1 and Tier 2 actions. We recommend that Tier 1 actions are undertaken as soon as possible, while Tier 2 actions are programmed for future implementation.

Tier 1 Actions:

- Install in-line flow restrictors for the site's amenity hand basin taps
- Replace showerheads with low flow models

Tier 2 Actions:

- Install a pre-rinse spray nozzle into the Kitchen washing up station
- Install rainwater harvesting to feed cattle troughs
- Proceed with the plan to install roofing over the entire site

Note that in Table 1, the cost savings given are for water savings only. This includes savings from not having to undertake the weekly winter hosedowns, assumes that a rainwater system for the cattle troughs would be included and also acknowledges that more regular, large scale cleanings such as is currently done at the end of summer would have to occur.

Note that the very high paybacks given for measures such as installing the roof over the site consider only cost reductions to the site's water bill. As mentioned previously, roofing the complex has many other benefits, such as reductions in labour costs and improved cattle health.

Table 1 summarizes these water savings measures. It presents the total potential savings that could be realised at the site, the investment required to achieve them, and the resulting payback periods. According to Table 1:

- By implementing Tier 1 measures, for an outlay of \$1,100the facility can save 2% of its total water consumption or 69kL/year,
- By implementing Tier 2 measures, for an outlay of just over \$4,000,000the facility can save a further 60% of its total water consumption or just over 2,000kL/year.



Table 1. Potential Water Savings at the Wangaratta Livestock Exchange

Possible Wate	er Savings, Costings & Payback				
Project:	Wangaratta Livestock Exchange				
Water Consumption kL/yr		3,339			
Cost of Water and Sewer \$/kL		\$2.20			
Cost of Warm Water \$/kL		\$2.50			
ltem	Measure	Water Savings kL/yr	Total Savings \$/yr	Budget Cost	Payback yrs
Amenity Taps	Install flow restrictors on amenity hand basin taps	62	\$184	\$1,000	5.4
Showers	Replace high flow showerheads with low flow models	7	\$29	\$100	3.4
Total for Tier	1 Measures	69	\$213	\$1,100	5.2
Rainwater Harvesting	Install rainwater harvesting system to supply some cattle troughs	135	\$297	\$12,500	42.1
Café	Replace tap with pre-rinse gun assembly	12	\$37	\$1,500	40.5
Installation of Roof	Install roof over cattle pens, include rainwater harvesting system for cattle troughs	1,887	\$4,152	\$4,000,000	960
Total for Tier 2 Measures		2,034	\$4,486	\$4,014,000	890
Total for All N	leasures	2,103	\$4,699	\$4,015,100	850



6 APPENDIX: RAINWATER MODELLING OUTPUTS

Model Input		Comments	Model Output - average for 1988 to 2007		Comments
Reference rainfall station	Wangaratta	avg annual rainfall: 625mm	Avg Available rainwater kL/yr	224	94% of demand
Rainfall collection area m2	432	1988 to 2007	Avg Water demand kL/yr	238	
Runoff coefficient	0.9	Roof Surface	Avg Overflow volume kL/yr	89	
Initial loss mm	1		Avg Top up water kL/yr	101	
Price of Water \$/kL	\$2.20		Avg Potable water savings kL/yr	135	
Rainwater used for	Cattle Trough	S	Avg % Potable water saved	58%	
Typical consumption & pattern	980kL/year		Avg % Available rainwater utilised	63%	
Tank Size kL	10	23 mm of rain to fill empty tank	Avg Cost Savings \$/yr	\$297	



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