SUBMISSION TO THE PRODUCTIVITY COMMISSION

INQUIRY INTO AUSTRALIA'S URBAN WATER SECTOR

This Submission is presented by Waterwise Systems Pty Ltd for the Productivity Commission's Inquiry into Australia's Urban Water Sector in response to the Draft Report.

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INTRODUCTION - A DIFFERING PERSPECTIVE

The Founders of Waterwise Systems ('the Founders') thank the Productivity Commissioners for this opportunity to comment before the Productivity Commission in relation to the Draft Report into Australia's Urban Water Sector.

After reviewing the Productivity Commission's Draft Report, the Founder's consider that this is a forward looking document. We note, however, with some concern that a total of only 35 people attended the Public Hearings[1].

This comment on the Draft Report broadly addresses the terms of reference, along with comments on some of the other submissions to the Productivity Commission that have gained publicity over recent weeks. This submission is primarily intended to comment on household urban water use in densely populated regions. The focus of this brief comment on the Draft Report to the Commissioners includes:

- garden water use, its role in creating water stress and recommendations to delay the need for future additional desalination plants;
- current and future direction of water pricing now desalination is a reality, and alternative water conservation opportunities to delay the commissioning of additional desalination plants to cater for population growth; and
- the social issues that surround this area and the long term implications of the foundations set out in the Productivity Commission Draft report.

Further, in this comment on the Draft Report, the Founders will propose an alternative water billing model for the Commissioners to those proposed in the Draft.

In urban Australia, our forefathers laid down catchments that urban populations have largely depended on to this day, for a reliable and affordable supply of pure, lightly treated, natural water. The community now looks to the Productivity Commissioners to provide vital guidance to water authorities on behalf of current and future generations of Australians.

The social implications of increases in the price of water have already contributed to an increase in hardship in the most vulnerable sections of the community. In its submission to the Productivity Commissioners, Sydney Water noted that over the past two years they have experienced a 20% increase in the number of customers experiencing hardship in relation to paying their water bills. The Productivity Commission has already found that low income households use a considerably higher percentage of their income to pay for water than other less vulnerable sections of the community.

[1] Productivity Commission 2011, *Australia's Urban Water Sector*, Draft Report, Canberra.

While the Founders are not privy to the high level confidential reports circulating in relation to urban water, we will do our best to provide an evidence-based and balanced viewpoint from the water conservation industry sector, as well as report to the Commissioners the views of unheard voices in the community with whom we have worked closely over the past decade.

WHO ARE THE FOUNDERS OF WATERWISE SYSTEMS?

The Founders of Waterwise Systems (WWS) - Fiona Noble, Robert Guerin and Peter (Shepherd) Wilson - began their work in the community in 2002.

Their vision was to provide the community with an alternative to consuming vast amounts of drinking water to maintain urban gardens. Together they developed a completely unique system that eliminates the need to use potable water on gardens. Where this is not achievable, the products and services they invented have been proven to reduce outdoor water consumption by an average of 80%.[2]

The Founders of Waterwise Systems have carried out face to face communications with many tens of thousands of Australians in relation to urban water issues over the past 9 years. Through this work they gained an in depth knowledge of the communities thoughts and opinions in the area of urban water.

With the support of the NSW Government's Climate Change Fund, the Founders of Waterwise Systems have just completed a three year study at 58 average homes in Greater Sydney. Each participating household averaged savings of 110,810 litres of water per year. The majority of participants reported that their gardens looked better than before they began to participate, with the rest noting their gardens looked at least as good as they did previously.

Additional information about Waterwise Systems is attached to this submission for the Commissioners in Annex 1.

A summary of the outcomes of the community demonstration project is attached to this submission for the Commissioners in Annex 2.

A cost benefit analysis of the permanent greywater system developed by the founders is attached to this submission for the Commissioners in Annex 3.

GREYWATER GARDENS: A COMMUNITY DEMONSTRATION PROJECT:

Waterwise Systems was provided with funding under the NSW Government's 'Climate Change Fund' from 2006-2009 to analyse water savings and conduct a community demonstration project promoting the benefits of safe greywater use. During the project, Waterwise Systems monitored and evaluated water savings from the installation of the Greywater Gardener 230 in the homes of 58 Sydney residents. The project showcased the water savings and benefits of greywater reuse, post-greywater system installation, to the wider community through a range of promotional activities. In exchange for participation in the project, householders received a $1000 rebate for their greywater system purchase. Results from the project demonstrated average potable water savings of 2,125 litres per week per household (110,810 litres p.a).

[2] This is based on results from a NSW government funded project conducted by WWS.

PREAMBLE: MARKET FORCES IN AUSTRALIAN URBAN WATER

The Founders are aware that urban water pricing is a global issue, for example:

- The World Bank meet in New York in April 2010 in regards to Urban Water Pricing and Cost Recovery.
- Three reports were released by OECD in relation to Urban Water and Cost Recovery in April 2010.
- That big business has increased its lobbying and participation in the provision of urban water substantially over the past two decades.

Household water use today has a profound impact on future generations. If, as populations continue to grow, garden water use continues at current levels, shared natural water sources, such as rivers and aquifers, will continue to be depleted. Every kilolitre (kL) of natural, pure water used today is a kL of the natural resource that future generations will not have available, and in the event of, for instance , a power outage due to a natural disaster, the dependence on desalinated water may have costs beyond most people's comprehension.

In Australia, the cycle of drought, combined with population growth and high per capita water use, has placed natural water supplies under stress. As detailed in the Draft Report, during the past decade a frightening reduction in the volume of water flowing into catchments occurred right across urban Australia. This created a situation in which water planners faced urgent and pressing water shortages that held very real potential to adversely affect growth and quality of life in urban areas of Australia.

In this environment, well-resourced lobbyists and their Public Relations firms began talking of Water Security with an uncertain climate ahead. A conservative estimate of the combined desalination lobbying/PR/Educational budgets across Australia is $100,000,000[3] since 2002. An example of this is ACG 2007, *Saying Goodbye to Permanent Water Restrictions in Australia's Cities: Key Priorities for Achieving Water Security*, Report to Infrastructure Partnerships Australia, that is referenced numerous times in the Draft Report. A number of other documents submitted to the Commissioners and referred to in the Draft may have also been partially or fully funded by the lobby. Money well invested when you consider for a moment these groups have secured around, and we write 'around' because nobody knows or is saying how much Wonthaggi is costing, $10,000,000,000 worth of desalination plant business across Australia and the ongoing revenue to run and maintain the plants:

Capital Costs of Desalination Plants:

PLANT	CAPITAL COST	SOURCE
Kurnell Syd	$1 800 000 000	NSW Government/Sydney Water
Tugan Gold Coast	$1 200 000 000	Qld Government
Kwinana Perth	$ 387 000 000	WA Government/Watercorp
Perth Bunbury	$ 955 000 000	WA Government/Watercorp
Adelaide Port Stephens	$1 800 000 000	SA Government/Media Release
Wonthaggi	$3 700 000 000 – $5,700,000,000	???????

[3] 2009 Global budget "Water projects" 55.1 Million Euro www.veoliawater.com
In 1998 large public companies invested an average of 5.5% of revenues on marketing.
Schonfield and Associates; Advertising Ratios and Budgets.
Companies tendering for service and equipment supply contracts for Sydney Water will typically invest 3-5% of the contract value in order to secure the contract. Waterwise Systems in its research into an acquisition of a services company supplying services to a Water Provider. 2007
"You must spend money to make money" Titus Maccius Plautus

The lobby's expenditure has changed the face of the Australian water industry. The onus of unsustainable water use in some sections of the community, where some small progress was being made early in the drought, was placed back into the hands of Water Authorities. The Founders of WWS believe that this resulted in disengagement by the community as a whole and increased cynicism at the motives of government in some niches.

This belief is evidenced by the fact that an average of less than 6 people attended each of the Public Hearings held across Australia by the Productivity Commission. In 2004, when the Melbourne water retailers held public consultations hundreds of people attended, eager to have their say and participate in the future of their city's water management. Commissioners, those same people today feel disempowered, big business has taken over and a priceless opportunity of engagement and community participation has been squandered.

Reports such as those produced by the ACG for the Desalination Lobby were dismissive and demeaning of any effort from within the community to take control of their own water use. Indeed the Draft Report references this:

> "Restrictions can result in perverse incentives for deliberate excessive use of drinking-quality water through showers, baths and water tanks to generate additional 'greywater' for use on lawns and gardens (ACG 2009)."

The Founders of WWS strongly believe that this is incorrect and not based on fact when indeed householders invest in quality, permanent systems accompanied by ultra-efficient irrigation systems that require less than 20% of the water needed by alternative reticulation methods to maintain gardens.

DESALINATION – AFTER THE RAINS

Fortunately it has begun to rain again in the Eastern States, for an uncertain period until the next drought, and catchments received a much needed boost. This has made the desalination plants an easy target for political and ideological opponents and sections of the media.

Yet Brisbane in fact did come chillingly close to running out of water, and the next serious drought could occur at any time. The Productivity Commission need only refer to the escalating water situation in Perth - where astonishingly, household gardens continue to consume around 33% of the city's water - to illustrate what may have happened had the timely rain not arrived, first in Brisbane's catchments and more recently in NSW and Victoria.

Waterwise Systems place before the Commissioners the theory that the long term commitments made to Public Private Partnerships (PPP) desalination projects may exceed that of the National Broadband Network, however this is impossible to quantify due to the veil of confidentiality that is widely quoted in the community. Under current billing arrangements that cost will be shared equally across the entire community.

Ongoing Costs of Desalination Vs $1 Billion p.a. Lost Through Water Restrictions

Unlike the already depreciated passive water infrastructure laid down by our forefathers more than 50 years ago, desalination has high ongoing economic and environmental costs. Legitimate concerns about the Public Private Partnerships (PPP), undisclosed arrangements and costs are significant in some niches of the community, i.e.:

> *SA Water won't reveal desal standby costs*: "…SA Water says the operating costs are about $130 million a year, but revealing the ongoing fixed costs is "commercial in confidence"…."[4]

[4] SARAH MARTIN *The Advertiser* September 25, 2010 12:01AM

But given the high undepreciated capital costs of desalination plants operating under PPP arrangements, mothballing is not a viable option for most states except for Queensland. The water produced must therefore be marketed and sold to the community like any other manufactured product. To illustrate this for the Commissioners, in the middle of last year irrigation retailers began speaking to trade customers with real excitement about selling sprinkler systems.

The transparency of the deeply flawed handover process at Tugan, due to its public ownership structure, has left the well intentioned Queensland Government - who did not enter into onerous compulsory purchase or pay agreement under a PPP - exposed to criticism. This adverse media coverage of the Tugan plant may well serve as a disincentive to hold future water assets and liabilities in publicly transparent ownership structures.

For example, recommissioning of the plant when the next water shortages occur may be another PR nightmare for a future Queensland Government that may turn the asset over to Private Ownership in order to avoid media criticism of the costs.

The Productivity Commission estimated that recent water restrictions have cost consumers more than $1 billion per year. Interest on the capital cost, which will have to be paid by the community for the PPP plants, is likely to be over $1 billion per annum for the next 20 years before a litre of water is produced. Given the global scarcity of capital at the time some of the PPP raisings took place, actual interest costs may be considerably more than $1 billion, but confidentiality clauses do not permit disclosure.

As noted in the Draft Report inefficient investment has been made in desalination - how inefficient these arrangements are is purely a matter for conjecture as a wall of secrecy surrounds most of the desalination arrangements.

For example:

Before the Victorian Government's Standing Committee on Finance and Public Administration Inquiry into the Business Case for Water Infrastructure**,** on 17 June 2010, in response to the question from the Chair, Chloe Munro the Chair of the National Water Commission and Chair of Aquasure, answered as follows:

> **Chair –** Yes, on Page 16. Can you outline how shared risk works?
>
> **Ms Munro –** I am afraid I can say no more than is disclosed there. I think the important aspect of this is that there is a recognition that the project was being financed in an extraordinarily difficult time in the financial markets…."

RECOMMENDATIONS: FUTURE DESALINATION PLANTS AND CURRENT ARRANGEMENTS

The Founders recommend:

1) **That any future proposed desalination plant, that is to be paid for by the community, must be subject to completely transparent arrangements, and that the current arrangements must be disclosed to the public within 3 years;**
2) **That proponents of new desalination plants, with the exception of Perth, must put before the community a business case for the proposed plant, and that experts review the business case and submit to the community their opinions as individuals as to whether the desalination plant should or should not be commissioned;**
3) **That any mining industry, or other high water usage industry, contribute to the capital cost and running costs of desalination plants, such as the proposed Whyalla plant, in line with the commercial benefit they receive.**

Public Request to the Funders of the Desalination Lobby:

The Founders of Waterwise Systems ask that you desist Public Relations and other activities discouraging the community in their efforts to conserve water in their own homes and at work.

AN ALTERNATIVE - WATER CONSERVATION

Against the resource rich desalination juggernaut was a group of entrepreneurs putting their own money on the line, working with little or no pay for years. Well-intentioned and largely wanting to make a positive contribution to their communities, with the distant hope of one day actually making a living wage, a wave of water saving products began to emerge in 2004.

Together, with some established companies they made up the Australian water conservation niche, with products and services that had varying levels of reliability, efficiency and effectiveness at saving water. In mid-2007, hope of at least a return of capital was close.

By late 2007 Australia had a clear lead on the rest of the world in the area of domestic water conservation. However, in 2008, this rapidly changed.

First to hit was the GFC, which resulted in a drop in discretionary spending by households who see an increase in water bills even when they do use less water. For this and other reasons a series of small and large manufacturers collapsed.

In Victoria, where the industry was most advanced, over the following 18 months retailers who sold plastic water tanks as agents for companies under administration faced up to the reality of consumer affairs laws. This meant that they were liable for the increasing number of product failures of liquidated tank manufacturers who had provided guarantees (often of a minimum of 10 years) on their products. With a new unknown liability on their balance sheet, and sales slowing to a trickle, many simply shut up shop.

This was followed by the devastating withdrawal, without notice, of the Federal Green Loans programs that had given much hope to the water entrepreneurs who had somehow managed to stay afloat through the first and second waves of closures. Overnight, order books shrank and an increasingly cynical community again asked what is going on?

More recently, floods across Eastern Australia delivered another equally telling blow with a third round of closures, restructures and forced sales taking place.

Then last week, the Federal Government withdrew the $500 rainwater tank and greywater rebates:

The Australian Government's National Rainwater and Greywater Initiative household rebates are no longer available for rainwater tanks or greywater systems purchased after 10 May 2011 and the scheme will cease altogether in November.[5]

PERMANENT GREYWATER DIVERSION AND IRRIGATION SYSTEMS – A COST-EFFECTIVE, EFFICIENT ALTERNATIVE

Most homes require a minimum tank size of 50 000 litres to reduce potable consumption on gardens by 80%, according to experts like Martin Semken owner of Semken Landscaping. But most homes are not able accommodate a tank of this size.

However greywater does offer a very real opportunity to permanently reduce outdoor water consumption in urban Australia to sustainable levels.

Greywater Systems come in three basic variations:

- **Treatment systems** that allow greywater to be stored and used to flush toilets and water gardens. Normal installed cost is $18,000-$24,000 without an irrigation system. Maintenance costs are generally $800-$1,200 per year with regular inspections by a plumber and councils required.
- **Permanent Diversion Systems** that immediately divert water to the garden or down the drain during wet periods. Permanent systems will generally cost $3,600-$8,500 installed with an irrigation system, depending on the size of the garden to be irrigated and the complexity of the plumbing. Annual costs of maintenance range from $15-$240 depending on how much the householder wants to do themselves.
- **Temporary diversion systems** costing around $400-$1,000 with most being illegally installed by a householder, which can lead to plumbing problems and have an expected product life of 6-18 months.

Rebates do play an important part in householders making the decision to install a permanent greywater system, with 97% of participants in Waterwise Systems' three year study agreeing that, considering the cost of installing a quality durable water saving product and service, governments should be offering a rebate. 75% of participants said it should be $1,000+ and 22% said it should be $2,000+.

Importantly, 90% said the $1000 government rebate (offered to project participants) played a role in their purchasing decision, with 65% stating that it played a major role and that they would not have made the positive decision without the rebate. Only one participant said the rebate had not played a role in their decision to invest in a permanent greywater system for their garden.

[5] SENATOR THE HON DON FARRELL, Parliamentary Secretary for Sustainability and Urban Water, Media Release, *Rainwater and greywater rebates to conclude*, 10 May 2011

Therefore, Waterwise Systems puts before the Commissioners that if additional desalination plants are to be avoided or deferred in the face of population growth, the water conservation entrepreneurs who are prepared to put it all on the line everyday should receive some support.

The Greywater Gardener 230 – a cost-effective alternative:

WWS notes the following paragraph in the Draft Report (Overview p. xxxiii):

> Some mandated approaches to integrated water cycle management are inefficient, because it is assumed, without examining the full costs and benefits, that greater recycling, reuse and conservation are in the community's interests. A better approach is to remove impediments to contestability, thereby creating incentives and opportunities for recycling, reuse and conservation technologies, where they are economically worthwhile and preferred by customers.

WWS believes that incentives should be created for those purchasing greywater systems, such as the Greywater Gardener 230, that are proven to reduce outdoor water consumption by an average of 80%, but that also are cost-effective for consumers, with an appropriate return on investment. Based on the results from the NSW government funded project, the Greywater Gardener 230 has a payback period of approximately 14 years for the average household. This is in comparison with a rainwater tank, which can have a considerably higher pay back period (approximately 95 years). The Greywater Gardener 230 is also a cost-effective alternative when compared to the price of desalinated water per kL. Please refer to the cost-benefit analysis in Annex 3 for more information.

RECOMMENDATIONS:

The Founders recommend:

1) **That Government Rebates of up to 50% of the cost of installing any permanent product that has proven it reduces potable water consumption by 25% or more (up to a cap of $2,000).**
2) **That garden assessments at a cost of $165 be subsidised by the government for professional visits to any home consuming more than 400,000 litres per year, in order to provide the householder with a water saving plan.**
3) **Funding of up to $100,000 per organisation for promotion of these water saving visits.**

The Founders recommend that the funding for the above can come from:

- **State Governments through the deferral of profit payments received from their wholly owned water providers;**
- **Federal Government loans to held as a pool of funds by the Water Providers;**
- **Or the increased revenues of water providers with say 5% of any revenue increase being made available for interest free loans.**

WATER SUPPLY MONOPOLIES – THE EFFECT ON ALTERNATIVE WATER CONSERVATION

The Founders believe that a water supply monopoly exists whereby consumers are only able to obtain water from one regional supplier, who has a vested interest in supplying more water, not less. Competition for competitions sake would serve no useful purpose, as the efficiencies of scale achieved under the current arrangements would be difficult to replicate.

Indeed it is highly likely that competition at a retail level would actually increase costs to consumers. By and large the Australian water providers are leading the world in many areas such as; level of efficiency, good corporate governance and transparent public reporting. The current water supply system is of the highest standard and the responsiveness of the providers in repairing leaks and addressing customer needs are at least equal to that of best global practice.

However it is the job of water providers to ensure that when a customer turns on a tap water comes out and this task is far more complex and costly than many in the community might believe. Therefore for the water providers to provide water conservation services and meaningful advice to their millions of customers would take valuable human and cash assets away from areas that are essential for their fundamental role of making sure water flows from taps. Indeed to tell customers to use less water would be a conflict and would be akin to asking a supermarket chain to sell less groceries to their customers. In view of their other priorities the water providers have done a good job of managing customer demand within their available resources. It is also the job of water providers to produce a profit which in turn is returned to the public purse through dividends with the exception of Adelaide and the ACT.

While the monopoly situation is a Market Failure the community has largely benefited from this failure.

In practice water supply monopolies have generally not espoused the involvement of households proactively managing their own water use. The inducement to increase the volume of water sales will accelerate further if the move to volumetric charging for water is adopted as set out in the Commissions Draft Report

The Founders note that there has been a variety of government supported water conservation programs throughout the last decade. However, rather than mandating or fully compensating householders for installing onsite water supply options (such as greywater systems), many governments have chosen to invest in desalination, which provides a water supply that is not dependent on rainfall, but must still be purchased from water suppliers by consumers.

The Founders believe that, in order to achieve a holistic approach to sustainable and long-term water management, the Government must consider all alternative options, not just the options in which Government remains sole water supplier.

Another concern for the Founders relates to the highest domestic water consumers. For the most part, those demographics most associated with above average levels of water consumption are generally detached from the water supply chain, and often the comparative value of their water bills is not a significant enough driver to trigger action. Coupled with the absence of information, and indeed alternatives, from their water authority, most high-consumption households are completely oblivious to the conservation options that are readily available.

The Founders believe that this disconnection in relation to water consumption is similar to the level of detachment that is experienced by well off Australians who simply drop their car at the mechanics. The mechanic is to busy to making sure that their cars are safe to verbally inform the customers that if they update a part of the fuel system they can cut their petrol use by half and the customer did not read or understand the letter the mechanic sent to them about it.

However, the shared resource of water is vital to all life and the Founders are concerned about the dangerous level of detachment occurring in the highest 35% of water consuming households. Uncontrolled demand by the top 35% high use households may have played a significant role in the implementation of high cost alternative water sources, such as desalination, rather than reducing demand by re-use or sustainable sources. Unfortunately, the commodification of water penalises all users equally, even those that take great efforts to reduce consumption. The Founders consider that this, in effect, creates a disincentive to conserve shared water resources by those who use the most water.

The viability of breaking monopolies is not high, nor would the community benefit from a break-up of monopolies, due in large part to the difficulty in transporting water and the cost of infrastructure as noted in the Draft Report, and the small population of Australia compared to other nations. In Sydney, the consortium that lobbied for an extended period for the right to compete with Sydney Water was successful. At considerable expense to the community, the NSW Government embraced the consortium's proposal and amended the required legislation to allow for competition. The Founders note that five years on, the previously very vocal consortium has not recycled one litre of wastewater.

The Founders believe that, with the exception of those charged with demand management reduction, the general view of Water Providers is that they are in competition with the Alternative Water Conservation providers, and through the very nature of any monopoly power in the provision of essential services, water providers are overall inclined towards excluding other players entering their markets.

Many water providers have made positive efforts to involve the water conservation niche but lack the resources to follow through with these good efforts. In Victoria for example, savewater.com acts as portal through which water retailers partner with the water conservation niche.

Overall, it is the view of the Founders that the current water supply arrangements are failure in the market requiring government intervention in water conservation to assist in creating a semblance of a level playing field for the Water Conservation providers. However the Founders note that the water providers in Australia are very good at what they do.

Recommendation

The Founders recommend that water providers be provided with cash resources to establish new independent conservation arms that are dedicated to working with the water conservation industry to target high water usage households with efficient and effective products to reduce water wastage.

THE VALUE OF GARDENS

Gardens do much to enhance quality of life, and as noted in the Draft Report gardens improve real estate values. They provide a favourite pastime for millions of Australians and are increasingly a place where fresh food for the household is grown.

Furthermore, gardens assist in the cooling of homes and provide a retreat from the world and its problems for householders. For these, and many more reasons, gardens are an important part of urban Australia.

Unfortunately however, gardens need water and the inefficiencies of current watering practices in Australia are so high that the Productivity Commission should intervene in this area, as the Founders believe that a clear market failure has occurred.

The Problem with Garden Water Use

The key concern that the Founders have with garden water use is that once this water is used, it is gone and cannot be returned to the water cycle. Unlike indoor water use and trade waste it cannot be recovered, treated and returned to the pool of available water, either immediately or at a later date through aquifer recharge.

> *A relatively high proportion of household water is used outdoors. Productivity Commission Draft Report (Schott, Wilson and Walkom 2008).*

An unpopular and unspoken reality is that an enormous quantity of pure drinking water continues to be consumed on household gardens. More excessive water use generally only occurs at a household level when a swimming pool is leaking or an unknown water leak occurs on the householder's property.

The Founders of Waterwise Systems have carried out 9 years of face to face communications within the community about outdoor water conservation along with its work installing water conservation systems that cut garden consumption by 80% or more.

This work has uncovered valuable insights, including that a significant percentage of households consume very large amounts of water on their gardens. Our nearest estimation without being provided to access to actual consumption data, is that approximately 20% of households use a completely disproportionate amount of water on their gardens.

Wasteful over-consumption of water in a minority of households has, for more than two decades, completely distorted the water demand projections for urban Australia. This minority is the cause of water bill increases for the bottom 20% of water users who do everything within their power to reduce their use of water.

This high water consuming group is typically very difficult to reach through media or other face to face or community based activities. They normally have properties valued at in excess of twice the medium home price in their city and have above average incomes. Waterwise Systems cite the following references to support this as a reality:

> "20% of Sydney gardens use as much as 500,000 litres per year on their gardens." **NSW Government's 2006 Metropolitan Water Plan "Water For Life"**

> "The top water consumers use 918,000 litres per dwelling per year, with the majority of this water directed to gardens. Generally houses with land value over $800,000 use over 418,000 litres per year per dwelling.
> **www.sydneywater.com.au - Household Water Use (Breakdown May 2008)**

Example of Market Failure:[6]

The Sydney region contains around 4.2 million people	4,200,000
Average Number of people per dwelling 2.65	Divide by 2.65 people
Number of dwellings	1,584,907
Less 20% not supplied by Sydney water	1,267,925
Percentage of homes owned or being purchased 63.6%[7]	x 0.636
Number of freestanding dwellings with a garden	806,400
Top 20% of water consumption households x0.2	161,280
Amount of water used by the top 20 households annually on gardens	**80,640ML**

So, of the 91GL added to Sydney's available water each year via the desalination plant, 80.64GL will be consumed by gardens at the top 20 households. The rest will be absorbed and lost in the more moderate garden water consumption category, whose irrigation systems only consume 110,000-250,000 litres of water per year. This group can be described as the top 65-79% of household water users.

Before and after water bills provided to the Founders of Waterwise Systems evidence that this type of water usage is not as uncommon as we might like to think. Households reporting reduced water consumption of over 600,000 litres per year when they install a Greywater Gardener 230 in their garden have been commonplace. Typical outcomes are 70,000 to 300,000 litres conserved per year. However, there has been a tendency for more conservative users to fit quality, permanent greywater systems based on their water ideology, with the difficult-to-reach high water consumers only representing about 3% of our customers. Please refer to Annex 3 WWS' cost-benefit analysis (attached) for further research on water savings from the Greywater Gardener 230.

Garden Water Use

In Perth, where severe drought continues Water Corporation advised WWS that one third of the water supplied to Perth annually was being consumed on gardens.

> 'Implementing Waterwise gardening initiatives can achieve massive water savings as watering of plants and lawns can account for up to 80% of total domestic water use on some accounts". **Water Corporation Media Releases' 14 May 2003/24 November 2003/20 October 2004**

Further, gardens consume a substantial proportion of all water consumed in all other urban areas. Other than the widely flouted complete outdoor water ban that occurred briefly in South East Queensland, draconian Stage 3A water restrictions in Victoria only reduced garden water consumption from 35% to 25% of total household use.

> 25% used on the garden. (under stage 3a water restrictions) **www.citywestwater.com.au Melbourne (May 2008)**

[6] 2004 population and household data from www.metrostrategy.nsw.gov.au

[7] *ABS Special Request Matrix, Census of Population and Housing,* 1986 and 1996

> "Households in Queensland, South Australia, Western Australia and the Australian Capital Territory all reported using over 50% of the household water outdoors. In New South Wales 25% of household water was used for outdoor purposes and 35% was used outdoors in Victoria." **1350.0 - Australian Economic Indicators, Australia, Jul 2005 Australian Bureau of Statistics (ABS)**

In Sydney, the complete relaxation of water restrictions occurred on 21st June 2009, seven months before the Kurnell Desalination plant was officially commissioned on the 28th of January 2010. A reasonable argument can be made to say that this was an effort to create a market for the new source of water.

From 21st June 2009, the NSW Government allowed the use of the most wasteful way possible of watering gardens, the sprinkler, albeit not between 10am and 4pm each day. However, it is worthy to note that throughout the drought, Sydney Water's best estimate of the amount of household water being consumed by gardens held steady at 25%. The Draft Report refers to 30% of household water being consumed on gardens in Sydney (Schott, Wilson and Walkom 2008).

In August 2010, when the city's dams were at 40%, the Victorian Government announced that Melbourne water restrictions were to be relaxed to stage 2 restrictions, and WWS believes that, based on the Sydney experience, water restrictions will be completely relaxed 6 months or more prior to the completion of the desalination plant.

In the 2009/2010 financial year, water wholesaler Melbourne Water supplied 361GL of billable water to its five retailer customers. The retailers estimate that only 20-25% of water supplied to households (66.6% of Billable Consumption) was being used on gardens under 3A restrictions, one step short of a total irrigation and watering ban. The approximately 47GL-65.4GL consumed by Melbourne backyard gardens was more than the 42GL that was supplied to Canberra by ACTEW in 2010, or enough to supply the city with essential water for home and work for two months.

If 50% of the water currently used on gardens can be saved by employing new known ultra-efficient irrigation technologies, an enormous amount of water can be made available, and stored in catchments, for population growth and productive uses over the next decade.

Melbourne Example –an extrapolation:

Greater Melbourne Water Consumption Source: www.environment.gov.au/soe/2006/publications/drs/indicator/335/index.html	**479 215ML**
Multiply by .6 or 60% that is residential use Source: Melbourne Water (30% industrial, 60% Residential, 10% non billable)	**287 529ML**
Multiply by .35 or 35% used outdoors prior to severe restrictions "Households in …and 35% was used outdoors in Victoria." **1350.0 - Australian Economic Indicators, Australia, Jul 2005 Australian Bureau of Statistics (ABS)**	**100 635.ML**
Production Capacity of Desalination Plant Source: Victorian Government	**150 000ML**
Net New Water Available to the City of Melbourne for Essential uses and Population Growth After Outdoor Use Returns to 2002 Levels Source: Waterwise Systems	**49 365ML**

Why Do Gardens Use So Much Water?

The answer is, in most cases, set and forget automatic irrigation systems combined with inefficient watering methods. The Founders of Waterwise Systems are happy to provide additional information for the Commissioners to further illustrate the Market's Failure in this area.

When restrictions were first introduced, the use of sprinklers was banned. The community was informed that the preferred method of irrigation system was drip irrigation. In response, the community made the transition to drip irrigation, yet the amount of water consumed by gardens remained static.

Drip irrigation was developed 45 years ago for agricultural purposes. At the time this represented a major conservation breakthrough when compared to agricultural sprinkler systems or flood irrigation along absorption channels.

Manufacturers recognised an opportunity in the Australian urban markets and marketed their products as water saving solutions. However, when installed with a set and forget program, an average backyard has half a kilometre or more of irrigation line attached to a tap. Manufacturers claim that this line is designed to leak water at a rate at a set number of litres per dripper per hour. However in practice this leak rate is often governed by mains water pressure when a reliable pressure reduction value is not used.

Customers monitoring their garden water use for the first time are amazed to see how quickly 3,500 litres of water disappears into their gardens.

If used for more than 10 minutes at a time, twice a week, a moisture trail in the soil rapidly feeds this water down below the uppermost biologically active 300mm of soil that plants drink from. Any water deeper than 300mm from the surface is wasted as even large trees drink their water from the top 300mm of the soil.

GARDEN WATER USE: SUMMARY OF RECOMMENDATIONS

The use of water on gardens is for a minority of households (estimated at approximately 20%) an abuse of a critical shared resource, and as such represents a market failure requiring government intervention. Gardens are too valuable to be lost, however the inefficiencies and waste are currently so great that a profound failure in the market has occurred. This failure has been so great that governments have entered into contracts and commitments of many billions of dollars that must be repaid from water revenues over the next two decades.

The WWS Founders recommend:

1) **That where households gardens consume an excessive amount of water the consumer be given six months to prepare a water conservation plan; and**
2) **Starting with the top 5% of water users and working down through the approximately 20% of urban households that consume a disproportionately large slice of Urban Water, begin installations of a second water meter connected to their irrigation systems, garden taps and swimming pools.**
3) **The water consumed outdoors to be billed on an increasing tiered charges system starting at $9.48 cents per kL, the charge that Water Corporation levies on households consuming above 950 kL of consumption per year.**

4) **Where financial hardship would be experienced by a householder under this arrangement and the garden is, or could be, of future significance to the area then an affordable interest free loan should be provided to the householder to fit water conservation products to their garden with a pay by water savings repayment option available through their Water Authority (with loan funds to be provided by the Federal Government if required).**

5) **Where affordability is not an issue, the cost of fitting the meter should be paid in full by the property owner.**

6) **Water users in the top 65-79% of consumers, except where children or adults with a disability reside at the property, should pay $5.90 per KL for all use over 400KL per year. For each additional person over 4 residing in the home an allowance of an additional 65kL per annum should be made.**

7) As under this proposal the cost for expensive infrastructure will be paid by high water users and therefore low water consumers such as people renting a flat or a home with no garden, or a socially responsible person only using tank or grey water on their garden should immediately cease subsidising the garden water use of the top 35% of water users. This can be achieved through a reduction in the blanket charges that currently apply to all consumers prior to any water being consumed.

OTHER KEY RECOMMENDATIONS

The WWS Founders recommend:

RECOMMENDATIONS TO SUPPORT WATER CONSERVATION

1) Due to the Market Failure that has occurred a benchmark of acceptable urban garden water use be set at 30,000 litres per year in any region suffering water stress so as to provide the community with some guidance. Any water consumed on a garden above this level be viewed as primarily benefitting the landowner's real estate value. A region should be viewed as water stressed when desalinated water is required to supplement natural water.

2) That households with productive food (vegetable) gardens (private/domestic properties) be able to receive a **water efficiency grant of up to $500** to allow the household to make the investment required to bring their water consumption to down to sustainable levels. Evidence of a productive garden can easily be provided by nearmaps.com or any similar website.

3) That automatic irrigation systems be inspected and checked every 6 months for leaks/faulty solenoids and that recommended maximum run times of 10 minutes per irrigation zone are adopted.

GOVERNMENT SUPPORT FOR WATER CONSERVATION

1) That governments support the water conservation niche where products can be proven to reduce household water consumption by 20% or more.

2) That a carrot and stick approach be embraced and that Governments provide serious support to any proven water saving product or initiative that is durable, maintainable and reduces consumption by more than 20%.

REBATES AND INDUSTRY SUPPORT

1) That Government Rebates of up to 50% of the cost of installing any permanent product that has proven it holds the potential to reduce potable water consumption by 30% or more (up to a cap of $2,000).

2) That garden assessments at a cost of $165 be subsidised by the government for professional visits to any home consuming more than 400,000 litres per year so that a water saving plan can be drawn up.

3) Funding of up to $100,000 per organisation for promotion of these water saving visits.

ELECTRICITY GENERATION

That electricity generators using vast amounts of water in water stressed regions in cooling towers pay a reasonable cost of lost water to cities when they oppose or decline to use recycled water for the cooling towers. That a framework designed to encourage water conservation in the creation of electricity be drawn and adopted.

Waterwise Systems cites Victorian example where natural water could be diverted from the lower Thompson River, lightly treated and pumped to Cardinia for potable use. Essentially this water could have served the same function Shoalhaven did for Sydney where extremely low dam levels were averted through extraordinary extractions from the Shoalhaven throughout the drought.

PRIVATISATION AND CONSOLIDATION OF WATER AUTHORITIES

That State Governments be prohibited from privatising public water assets to retire debt to any desalination plant operator as could be proposed through the Desalination Lobby under economies of scale arrangements.

ALL NEW DETACHED HOMES

That the Building Code of Australia be amended to provide that all new detached dwellings are to be plumbed with at least one of its showers and baths waste pipes easily accessible at a depth of no more than 450mm below finished surface level.

In the case of two story homes, that at least one upstairs shower be run down in an external stack and returned to sewer so that future residents can make use of gravity to use their greywater.

This will ensure that future residents will have access to at least some greywater for reuse on site, the most economically feasible way of reusing water. While water has been relatively affordable to date, we should not make the mistake of assuming that this will always be the case.

GARDEN BORES

That the area of garden bores be examined by governments. Unrestricted use of garden bores and unsustainable drawings from ground water should be examined as future generations may need this water and it could indeed be the only water source available to them for essential purposes.

REGIONS NOT UNDER WATER STRESS

That regions not suffering water stress only be charged a fair and reasonable cost for their water with a maximum multiplier of 3 x actual cost of water delivery.

GREYWATER REGULATION/LEGISLATION

1) That all state governments adopt the Victorian and NSW model in regards to households wanting to reuse greywater. The council permit requirement adds an expensive and time consuming bureaucratic barrier to the uptake of safe permanent water conservation solutions by citizens wanting to conserve water, while maintaining the aesthetic appeal and value of their homes.

2) Implement Random Audits to ensure the relaxation of the permit requirement is not abused and the plumbing meets sanitary requirements can be carried out by installers having to register installations with the local council or plumbing inspector for a fee that allows for cost recovery.

   In all states where permits are required the actual effect has been people improvising or buying low quality temporary diversion systems then doing do it yourself plumbing. This creates sanitation and public health issues that would not occur if a licensed plumber had of carried out the installation.

3) Water authorities should inform suppliers of reasons for any no go zones with greywater diversion for environmental or pooled recycling plants that require as much greywater as possible to function effectively.

RECOMMENDATIONS THAT APPEAR ELSEWHERE IN THIS COMMENT ON THE DRAFT REPORT

WATER BILLING & COST TO HOUSEHOLDERS OF DISCRETIONARY OUTDOOR WATER USE

A clear market failure has occurred in the area of outdoor water use at a significant number of households. As stated earlier in this response to the Draft Report, WWS Founders believe that there are only three reasons for high domestic water use: swimming pool leaks, other unknown household water leaks and gardens. We believe gardens are important and should be encouraged, however efficiencies in garden watering should be paramount at a time when the urban populations are increasing and water is a shared community resource.

Rather than the structure of offering the community 3-5 options wrapped up in marketable terms in regards to their use and water billing arrangements the Founders propose to the Commissioners they be called low/medium/high/extreme. That a transparent arrangement whereby high and extremely high water users pay for all their water at full rates for cost recovery at the desalination plant rate over a baseline of supply of 200 litres per resident per day.

A transitional phase should commence ASAP in which high water consumption households are asked to submit a water conservation action plan.

The use of water in this area is for a minority of households (estimated at approximately 20%) represents an abuse of a shared resource and as such represents a market failure requiring government intervention. Gardens are too valuable to be lost however the inefficiencies are so great that a failure in the market has occurred.

1) Starting with the top 5% of water users and working down through the approximately 20% of urban households that consume a disproportionately large slice of Urban Water begin installations of a second water meter connected to their irrigation systems, garden taps and swimming pools.

2) The water consumed outdoors to be billed on an increasing tiered charges system starting at $9.48 cents per kL, the charge that Water Corporation levies on households consuming above 950,kL per year

3) Where financial hardship would be experienced by a householder under this arrangement and the garden is or could be of future significance to the area then an affordable interest free loan should be provided to the householder to fit water conservation products to their garden, with a pay by water savings repayment option available through their Water Authority.

4) Where affordability is not an issue the cost of fitting the meter should be paid in full by the property owner.

5) Water users in the top 65-79% of consumers, except where children or adults with a disability reside at the property, should pay $5.90 per KL for all use over 400KL per year. For each additional person over 4 residing in the home an allowance of an additional 65kL per annum should be made.

6) As under this proposal the cost for expensive infrastructure will be paid by high water users and therefore low water consumers such as people renting flats, or a home with no garden, or a socially responsible person only using tank or grey water on their garden should immediately cease subsidising the garden water use of the top 35% of water users. This can be achieved through a reduction in the blanket charges that currently apply to all consumers prior to any water being consumed.

FUTURE DESALINATION PLANTS

1) That, any proposed Desalination plant to be paid for by the community must be subject to completely transparent arrangements and that the current arrangements must be disclosed to the public within 3 years.

2) With the exception of Perth, proponents of new desalination plants must put before the community a business case for the proposed plant and that experts review the business case and submit to the community their opinions as individuals as to whether the desalination plant should or should not be commissioned

3) Any mining industry or other high water usage industry contribute to the capital cost and running costs of desalination plants such as the proposed Whyalla plant in line with the commercial benefit they receive.

CONCLUSION:

The community highly values gardens and the Founders, along with most other Australians, believe they should not be sacrificed. However a Market Failure has occurred. The inefficiencies of high consumption household gardens must be addressed if Australia is to step into the future without the 'drag back' constraint of having to build costly additional water manufacturing capacity to supply additional water for the population, an essential element of in the growth and future prosperity of urban Australia.

The unprecedented drought of the last decade that occurred in every urban area of Australia gave us fair warning of an uncertain climate ahead. However this was not the first drought that urban areas have experienced and in hindsight steps could and should have been taken 30 years ago to 'bank' some of the many thousands of GL of drinking water that was used on urban household gardens over the last three decades for the drought that occurred. It is now time to look ahead and ensure the Market Failures of the past do not continue, and that we protect and conserve as much natural water as possible and utilise the new capacities created via desalination plants in the most efficient way possible, while putting in place steps to protect the most vulnerable sections of the community.

What the Founders and others in the water conservation area lack in resources, when compared to the desalination lobby, we make up for in passion and good intentions. The cost and difficulty of bringing effective and innovative new products before the Australian people is challenge enough, but given that we compete with monopoly water providers and resource rich lobby groups who want to sell more water to the community, urgent and immediate government intervention and assistance is required for the water conservation businesses that have been able to withstand the challenges of the last few years, outlined in detail earlier in this comment on the Draft Report.

The author of this comment document on behalf of the other Founders of Waterwise Systems, Peter (Shepherd) Wilson, is happy to appear before the Productivity Commissioners at the Public Hearings stage of this Inquiry into Urban Water, should they at their pleasure require any additional information or elaboration on the matters raised in this document in response to their Draft Report.

Peter Shepherd Wilson

16 of May 2011

Annexure 1: Information and History

Waterwise Systems
May 2011

Waterwise Systems Pty Ltd

ABN: 79 131 150 859 ACN: 131 150 859

Administration / Showroom:
Balwyn North, Victoria 3104 Australia
Post: *PO Box 1001 Greythorn, Victoria 3104 Australia*
National Freecall: *1300 133 354*
Phone: *(03) 9857 7493*
Email: *info@waterwisesystems.com*
Web*: www.waterwisesystems.com*

waterwisesystems®
WOW...look at our garden now!

Background, Motivation and Purpose

Background of Waterwise Systems®:

In 2002, founders Fiona Noble, Peter (Shepherd) Wilson and Robert Guerin began the Research & Development process with a completely unknown outcome. This R & D led to the invention of an engineered, safe, simple to use, easily maintainable gravity greywater and water saving irrigation system that waters every plant in urban gardens with recycled shower, bath and washing machine water.

Between 2004-2011 the number of households using the Greywater Gardener 230™ in conjunction with its superior Water Saving Irrigation rapidly increased from a few hundred to 2,000 with absolutely no product failures or insurance claims.

Motivation:

Urban population growth results in more people drawing on static or shrinking natural water supplies. Australian homeowners' prize their gardens which often consume more than 50% of all water supplied to their home.

"Households in Queensland, South Australia, Western Australia and the Australian Capital Territory all reported using over 50% of the household water outdoors. In New South Wales 25% of household water was used for outdoor purposes and 35% was used outdoors in Victoria."
1350.0 - Australian Economic Indicators, Australia, Jul 2005
Australian Bureau of Statistics (ABS)

Purpose:

The Founders set out on a mission to provide a permanent alternative to using pure drinking water to maintain urban gardens. In an area where there has been much talk, the Founders have quietly gone about demonstrating that greywater can, when used with the right products and know how, eliminate the need to use drinking water on gardens.

Educate the community about the need to conserve water for future generations and how to use greywater safely

Empower members of the community to take control of their water use at home with an easy to use greywater management system

Eliminate the guilt felt by the community as they water their gardens

Outcomes

As a result of a sustained, grass roots, community based campaign thousands of Australian households have reduced their water consumption by over 100,000 litres of water per year while maintaining lush healthy gardens. This has been achieved by replacing the drinking water which was being consumed in the garden with shower, bath and washing machine water.

Households installing the products and service developed by Waterwise Systems regularly report water savings of more than 500,000 litres of tap water per year.

Audited Validation of Outcomes

In a three year study, supported by the **NSW Government Climate Change Fund**, 58 households demonstrated the effectiveness of the products and know how developed by Waterwise Systems. Water savings were calculated using before and after analysis of water bills provided by Sydney Water and behavioral surveys.

Average water savings of 110,810 litres per home, per year, were achieved over the three year duration of the project.

Participants filled in anonymous feedback forms so outcomes could be gauged. Overwhelmingly participants stated their gardens health and appearance had improved. The rest of participants noted that their gardens looked as good as they did prior to the installation of their Waterwise System. All felt they were making a positive contribution to sustainable water consumption.

Given this study was carried out in NSW, the state with the lowest household outdoor water consumption, (25% ABS), larger water savings can reasonably be expected in other states of Australia. More than 70% of the homes in the study only connected their washing machine to the system which means the results were often achieved with only 8,000 to 40,000 litres of greywater passing through the system.

Scope

Waterwise Systems' objective is to, where possible completely eliminate the use of drinking water to maintain household gardens. This achievement has already been replicated across thousands of gardens across Australia.

Shower Bath Wash in your Garden

Ongoing Significance:

Once in place, the water savings created by the product become passive and create conservative average water savings 100,000 litres (100KL) per year. In 60% of installations no pump is used and these savings are produced at no additional cost to the household.

In the 40% of cases where a 6000 hour lifespan pump is required, run times of up to 3 minutes per day are typical and this equates to less 15KW hours per year, with a typical Australian home consuming approximately 6000KWh of electricity per year. Other greywater products typically consume 140-300KWh per year.

The Waterwise System is more than 20 times more energy efficient than best practice desalination. Desalination, the water resort of last choice, is a reality for Australian cities and a substantial proportion of desalinated water will be consumed on urban gardens. Desalination best practice electricity use is 3.3 to 5.5 KWh per 1,000 litres of water produced or 330-550KWh to produce 100,000 litres of manufactured water, plus the energy required to pump desalinated water into the water supply network. Wholesale cost of production is quoted by the WA and QLD Governments at $2.40 per 1000 litres, plus pumping costs.

As more members of the community begin to use the Waterwise System on their gardens the need for additional desalination plants will be deferred- a major win for the community and the environment.

The Waterwise System also substantially reduces the amount of sewerage wastewater produced by households which has ongoing significance to the aging sewerage infrastructure in urban areas and reduced sewerage pumping costs for water providers.

Is it Replicable:

The Founders have already replicated the model in 2,000+ average suburban gardens. Householders have found their garden thrives and their total water use shrinks, on average, by more than 33%. The achievements of the first 2,000 householders who have installed the system can be replicated in areas or regions where gardens consume a substantial amount of the water used by households, using the safe, engineered simplicity of the Waterwise System.

How is it Unique?

The Greywater Gardener 230™:
The durable ingenious solution engineered by the Founders is completely unique. The gravity reticulation system waters gardens 100mm below the surface horizontally through patented trickle irrigation points. These irrigation points spread water for up to 1200mm just below the surface of the soil while aerating the soil. Other components of the system such as the surge capsule have been designed to ensure that smells do not occur due to the storage of even small amounts of greywater.

Horticultural Outcomes

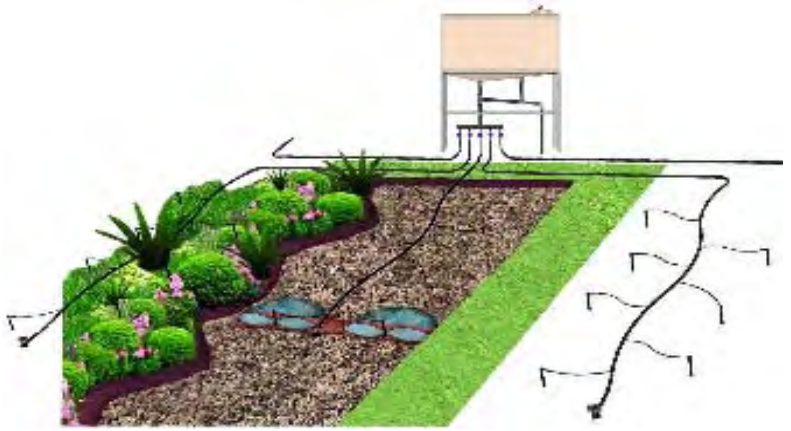
- Delivers water in such a way as to create healthy soil, prevent anaerobic soil conditions
- Slows the flow of water to moist soil and increases flows in drier soil
- Reticulation system aerates soil prior to delivering water

Effective

- Easy to use and simple to maintain
- Manages the water to create even distribution throughout entire gardens
- No pump is used in 60% of installations and where required the pump only runs for 3 minutes per day

Efficiency

- Uses gravity powered reticulation system to deliver water to natural feed zones of plants
- Uses less raw material than a 1,000 litre water tank while saving more than 100,000 litres per year
- Most cost and energy efficient solution to providing sustainable water to urban gardens



From Home to Garden
Permanent Greywater Diversion System
The innovative sub-surface trickla water saving irrigation system
connected to your Greywater Gardener 230™

Innovation

Innovation by Necessity
The challenge was to create an easily serviceable greywater reticulation system that evenly distributes water to plants without blocking.

Research and Development (R&D) work identified that while the concept of greywater substitution for tap water on gardens was a great idea, in practice using greywater to water gardens through normal irrigation products is similar to putting diesel fuel in a petrol motor. Components clog and within a relatively short period become unserviceable. Due to the variable amounts of greywater, i.e. a 30 litre shower over 3 minutes followed by a 17 litre surge from a front loading washing machine in 45 seconds, parts of the garden would receive to much water while other parts would receive none.

The other alternative, blanche drains, do not create positive horticultural and water saving outcomes as the water simply drains into the soil beyond the uppermost, biologically active 300mm of the soil that plants drink from. In addition most of the water ends up in one or two small parts of the garden which leads to other problems such as saturated (anaerobic) soil.

Three years of R&D refined the design brief and identified the problems that needed to be resolved through innovative design. These problems included: utilising greywater as it is created; preventing suspended matter in greywater from blocking the irrigation components; delivering water in such a way as to create healthy soil and prevent anaerobic soil conditions; slow the flow of water to moist soil and increase flow in drier soil; and provide an easy to use means to manage the water to create even distribution throughout entire gardens

From a design perspective the greywater irrigation system would need to respond to the capillary action of water and moisture as it moves through soil and reduce the flow of water to soil that holds sufficient moisture for optimal plant health and growth. The irrigation would also need to maximise horticultural outcomes while minimising the amount of water needed to achieve this.

The design brief presented some unique challenges which required ground breaking and inventive solutions.

The Innovation

In June 2004 the Founders lodged their patent and within three months began installing the first Greywater Gardener 230 systems in Melbourne and Sydney. The result of the Founders work is a greywater system that waters every plant in the house-holders garden through gravity. The gardens irrigated since 2004 look stunning today.

The use of gravity through patented directional irrigation trickla's, means that when soil is moist it expands around the dripper and water gets sent to drier areas of the garden. Thus a moist shaded area of the garden may only receive 2 litres of water while a drier area may receive 20 litres of water per day.

Waterwise Systems has acquired very valuable practical experience that will assist the community to make the transition to sustainable water use while maintaining the value and appearance of their gardens and real estate.

Innovation Description

An easy to use diverter is connected directly to the washing machine hose to enable the user to turn a switch and send the wastewater down the drain when it is raining or if a garden unfriendly cleaning product is being used.

Shower, bath and washwater water is directed into a slimline surge capsule and through a lint trap that aerates the water and removes large particles. The surge capsule momentarily holds the water as it is being fed to the garden through the zoned reticulation system via gravity. The surge capsule has been designed to immediately completely drain. Because it completely drains, no smells occur. An internal overflow device sends any water surplus to the garden requirements back to the sewerage system.

From the surge capsule the water is either directed to the garden or back to the sewerage system via a second diverter switch.

When the garden is being watered the force of gravity directs the water through a zoned irrigation system that distributes the water horizontally to the natural feed zones of plants. Just prior to receiving the water soil is aerated by air being displaced by the water feeding through the irrigation system. The irrigation system responds to the capillary action of moisture in the soil as it expands and contracts and delivers more water to the driest parts of the garden.

Highest level horticultural and water conservation outcomes of any greywater products

- Complimenting the greywater unit is the water saving irrigation system that evenly distributes the greywater to the feed zone of every plant in the garden through subsurface trickla's.
- Unique ultra efficient irrigation technology developed to ensure greywater going to the garden nurtures the garden.
- Gardens are zoned giving the user the ability to easily water only parts of the garden or the whole garden depending on plants water needs.
- The result is a healthy garden using less water and no evaporation or runoff
- Plants are watered directly into their natural feed zone where they need it most, and to ensure safety and water efficiency.
- The sophisticated gravity irrigation system can water large acreage blocks and sloping blocks.
- No smells

Suitable for all types of gardens, building and agricultural projects such as

- **Easily fitted to established Homes**
- **New Housing and building projects**
- **Rural Properties**

The water efficient irrigation can be used with tap or tank water to achieve water conservation outcomes in:

- **Community Gardens**
- **Vegetable Patches and Orchards**
- **Agricultural Projects**

Engaging key stake holders

In the Community – the Critical Connections
Waterwise Systems has taken a unique approach and carried out 8 years of sustained, on the ground communication and work with individual members of the community. In return, households opting to be involved in the project have used the services and products invented by the founders to take control of their water use.

The level of engagement felt by participating householders has created awareness that water is not just something that comes from a tap. At the grass roots the organisation has partnered with more than 2,000 householders in Melbourne, Sydney and Brisbane and has commenced work in Perth

The valuable feedback and communication with householders has created a wealth of knowledge about the needs and desires of the community in regards to their water use. As population growth fuels increased water use the knowledge forged over time will be of great value to the wider community who will seek to maintain their property values with green healthy gardens.

NSW Government – Independent Analysis of Performance
The NSW Governments Office of Environment and Heritage Climate Change Fund has been an important partner. The Fund supported the 58 home project in Sydney where the water savings, horticultural outcomes and attitudes to water use were monitored over a 3 year period.

Water Boards
Water Boards such as Sydney Water, Melbourne Water, Barwon Water have assisted with the promotion of the initiative.

Municipal Collaborations
Waterwise Systems also has collaborated with and received support from numerous municipal councils. Councils have assisted the project emailing their databases, inviting founders to speak at council functions and participate in community events. Councils supporting the initiative include Banyule, Darebin,, Nilumbuk, Knox, Stonnington, Mornington Peninsula, Manningham, Casey, Lane Cove, Hornsby, Mosman, Ku-Ring-Gai, Marrickville, Wyndham and numerous others.

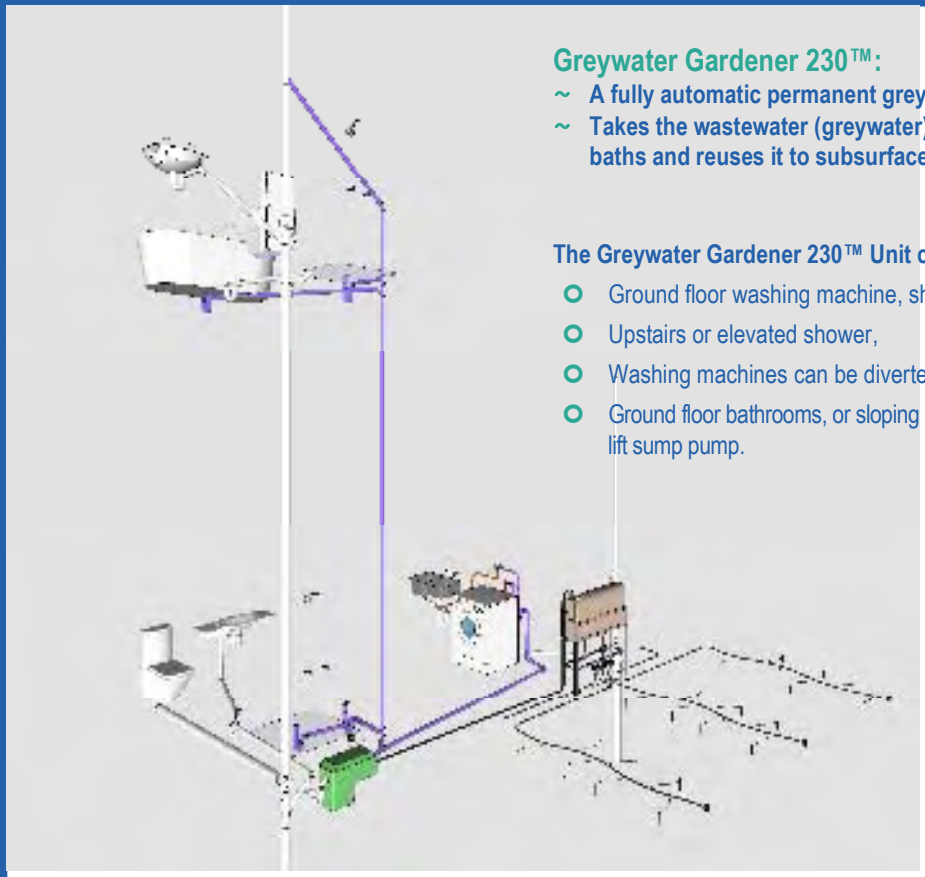
Industry
Key industry figures in the building and landscaping industry are recognising that the way we use water in gardens is not sustainable. The Founders are currently working with some major landscaping firms to incorporate the product into each of their clients gardens.

Next Steps:

The product and service have been resolved and the next step is commercialisation and scaling of the water savings achieved to date. The Founders are achieving success with builders and are already working with one major land developer that is recommending that every homebuyer on a Melbourne infill development install the product. Every home on the development must be built to at least allow for future fitting of the product.

The products and know how can be applied globally in any urban or regional areas where gardens are prized and water demand needs to be managed due to population growth or low rainfall.

Greywater Gardener 230™



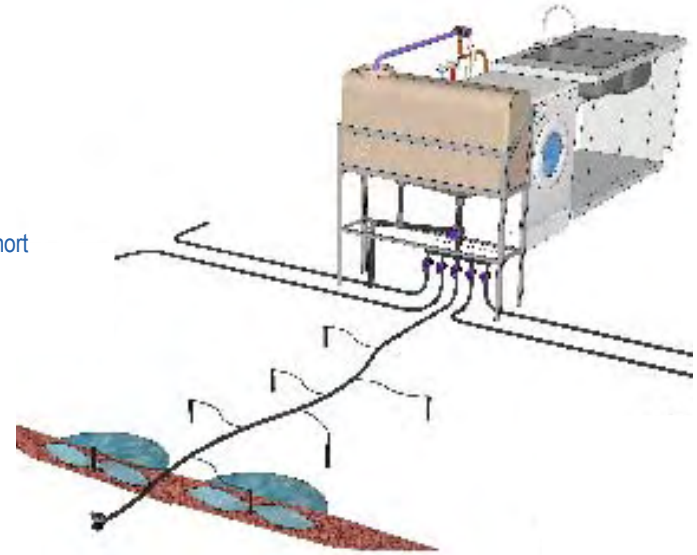
Greywater Gardener 230™:

~ A fully automatic permanent greywater and irrigation diversion system

~ Takes the wastewater (greywater) from washing machine, showers and baths and reuses it to subsurface irrigate entire gardens.

The Greywater Gardener 230™ Unit can be connected to your

- Ground floor washing machine, shower / bath and or;
- Upstairs or elevated shower,
- Washing machines can be diverted using gravity only.
- Ground floor bathrooms, or sloping blocks may need to add a short lift sump pump.



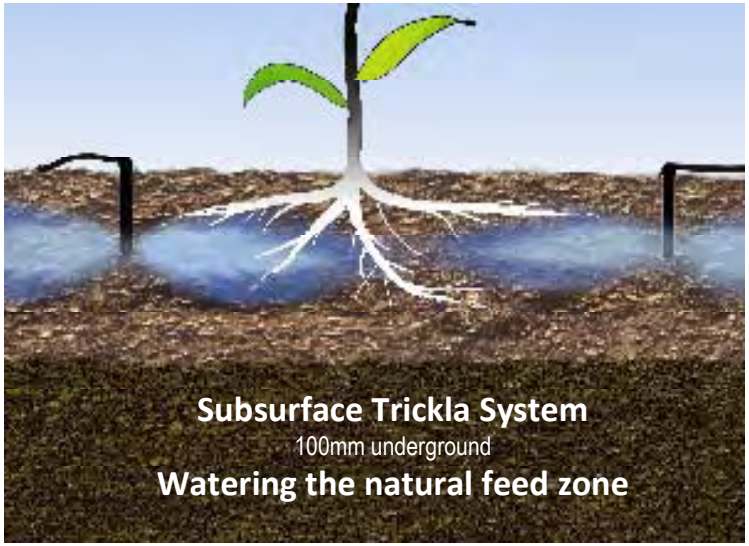
Divert to Waste Management

~ Just click the diverter switch to manage your greywater to garden or waste

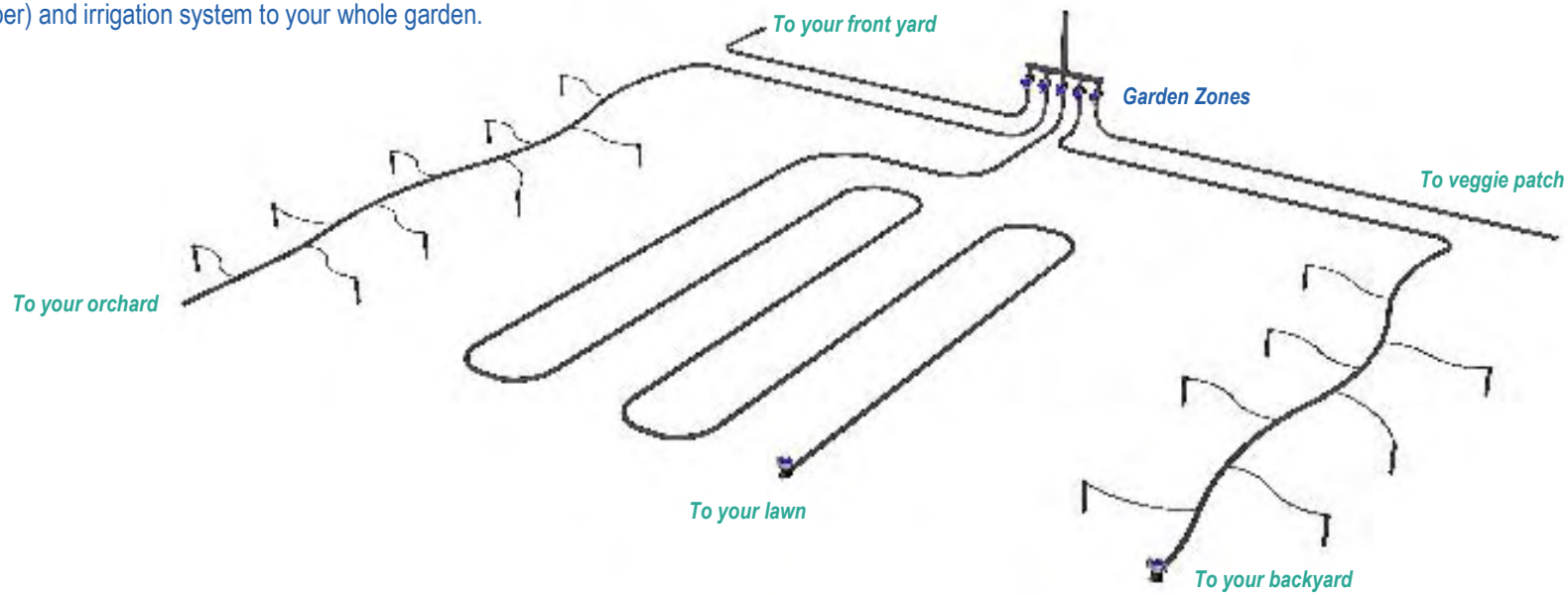
WaterMark
Spec 002
Lic WMKT21219
SAI Global

Smart Approved WaterMark

Directional Irrigation “Trickla Watering System”



Automatically waters your plants roots zone via subsurface patented greywater trickla (dripper) and irrigation system to your whole garden.



Outcomes and External Validation - Milestones and Achievements:

1993: Product conceived by founders to reduce demand on urban water supplies

2002: Founders commenced Research and Development

2003: Waterwise Systems Trademark granted, prototype products sold in Melbourne

2003: $500 rebate approved in Victoria.

2004: Patent lodged June and product sales begin shortly after in Melbourne and Sydney

2004: Finalist for product of the Year in the Victorian Savewater! Awards.

2004: Smart Approved Watermark Accredited.

2004: Watermark Accredited: (Level 2) License number WMKT21219.

2005: BASIX targets for new buildings in NSW.

2005: Highly Commended; NSW Government's Green Globe Awards for Water Conservation, Reuse and Recycling.

2006: $500 rebate approved in QLD.

2006: NSW Government Climate Change Fund 3 year public demonstration of Greywater Gardener 230™ commences

2006 – 2009: Government grant documentation to support water savings average for the Greywater Gardener 230™, 110,000 litres per year.

2007 and 2008: AWA Water conference and seminar presenters.

2007: Finalist in the Victorian Premiers Sustainability Awards 2007 for Product of Year.

2008: Invited to brief Federal Government Department of the Environment, Water, Heritage and the Arts about our greywater experience on June 11th 2008.

2009: Finalist Gaia Awards, United Arab Emirates.

2010: City Build Awards Abu Dhabi; Winner Best Product – Water Technology: *Waterwise Systems*

2010: The Company wins major development with every home being prepared for the Greywater Gardener

2011: Over 2,000 installations

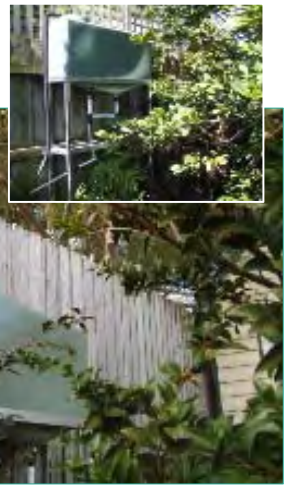
Approvals: State Government approved in VIC, NSW, ACT and QLD. Exceeds all regulatory requirements in other states.

Photo Page

Trickla Irrigation

Queenslander

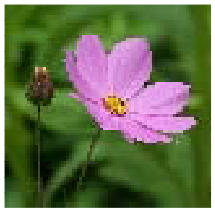
For all types of properties



High ground

Hidden away

Customised Stand



From the laundry

Wall bracket

Tucked away

Laundry Unit

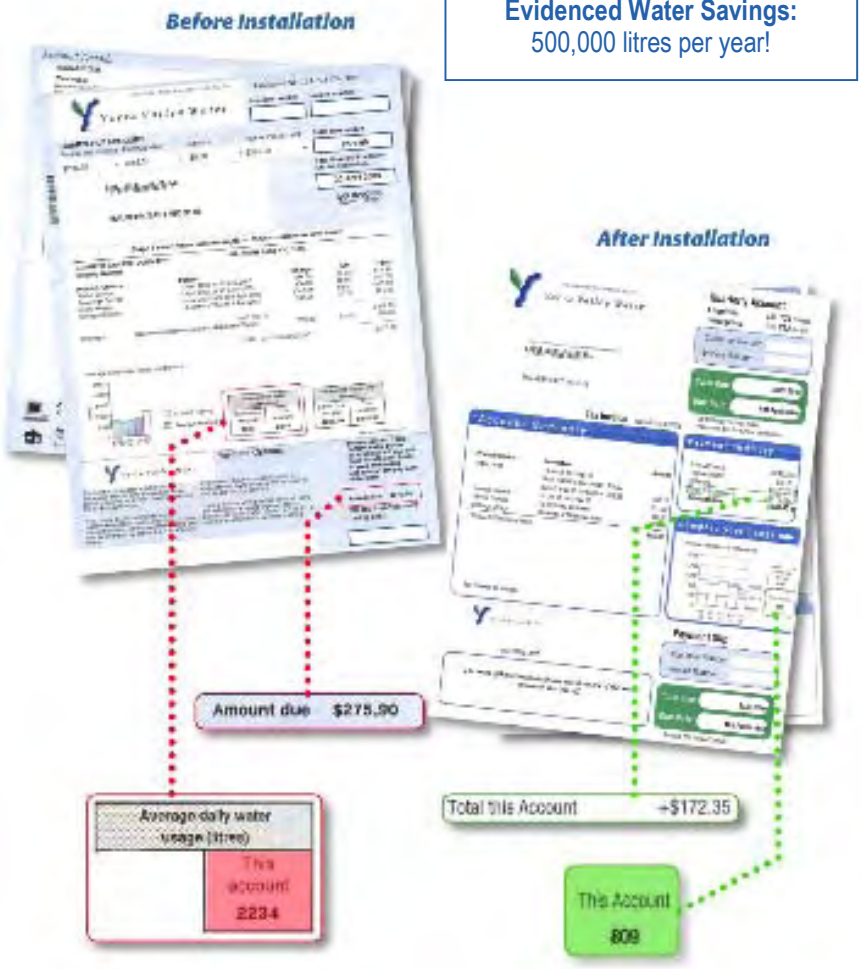
Propriety Pit & Pump

With Pump

Water Saving Results (1&2)

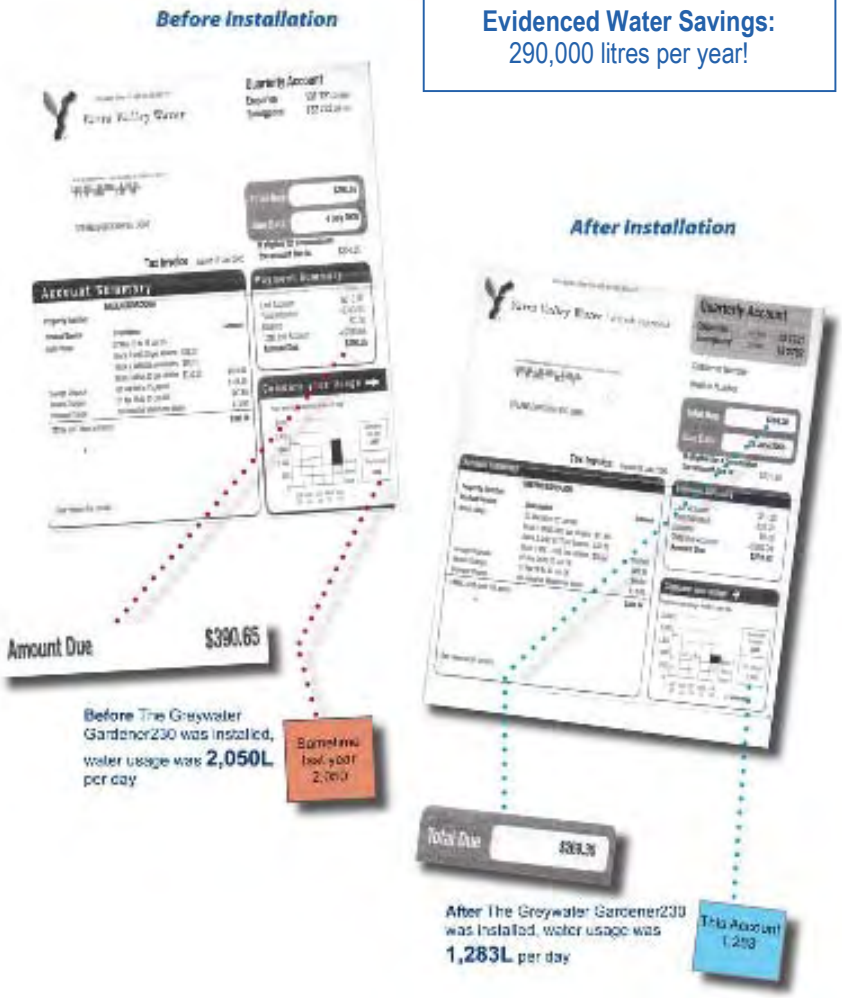
Case Study – MALVERN

Evidenced Water Savings:
500,000 litres per year!



Case Study – BRIAR HILL

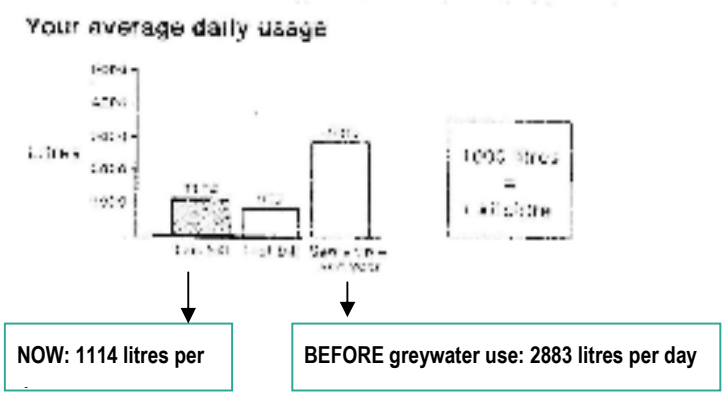
Evidenced Water Savings:
290,000 litres per year!

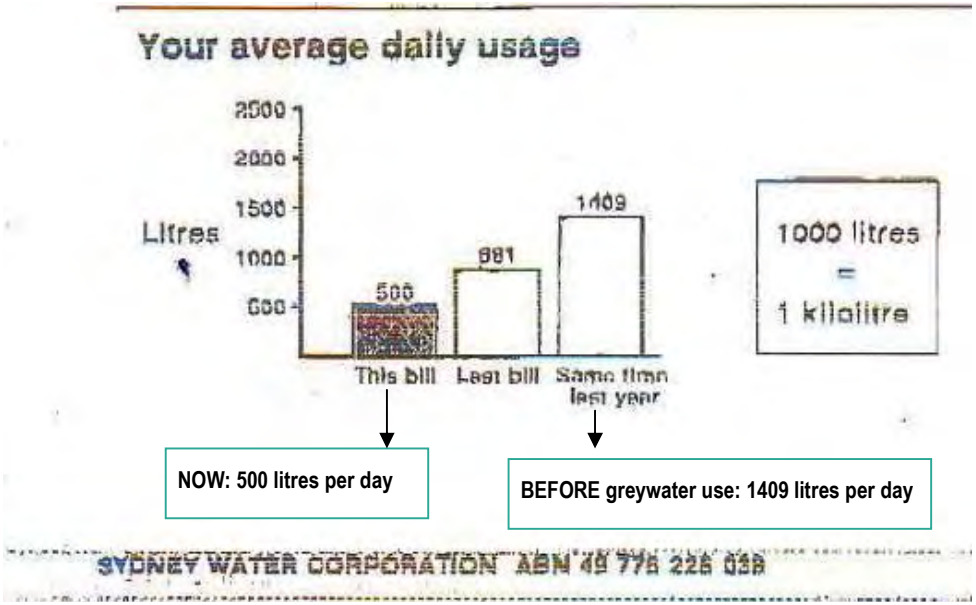


Water Saving Results (3&4)

Case Study - Sydney:
Evidenced Water Savings: 12,000 litres per week

Significantly reduced water consumption! My last water bill was cut by half.
It cuts consumption, and it's good for gardeners.
I have had very good plant growth.
Now we just feel so much better about the water we use."





Case Study - Sydney:
Evidenced Water Savings: 6,750 litres per week
Demonstrated water savings of more than 300,000 litres per year:

The first project participant has had their Greywater Gardener 230™ installed for 20 months. Before installing the system, the household used 1,409 litres of water per day. After installation, daily water usage is now 500 litres per day, a saving of 909 litres per day, or 331,785 litres per year. Both figures compare the same time of year with no major household or water use changes, except for the greywater installation.

Your Garden Water Solution

Water Saving Innovators – Greywater Specialist

NEVER waste WATER again

Greywater Laundry Unit

PROFESSIONAL DO-IT-YOURSELF
Greywater Kits or Full Installation Service

Greywater 1st Floor Bathroom Unit

greywater gardener 230™

waterwise systems

For technical support:
Phone: (03) 9857 7493
Waterwise Systems Pty Ltd
ABN 29 131 150 859

Connection to all your Greywater

Permanent Greywater Diversion From: Washing Machine, Shower and Bath

- Saves you time, money, water and worry
- Your garden will look better than ever
- You feel great every time you water your garden

General Principles

Greywater Laundry Bathroom Unit with Pump

info@waterwisesystems.com | 1300 133 354 | www.waterwisesystems.com

How it will work for you in your Garden

Directional Irrigation
a water saving innovation

Is your Garden . . .

FLAT, ADDS MORE LIFE AND VIGOUR

SLOPING, WATCH YOUR PLANTS THRIVE

STEEP, GET UNBELIEVABLE RESULTS IN WEEKS

Using Directional Irrigation:

- *Distributes your Water evenly throughout the Garden to each Plant.*
- *The water saving Irrigation evenly delivers water to the highest and lowest parts of the Garden.*

Exactly where your plants need it

Water Saving Irrigation
HOW IT WORKS "TRICKLER SYSTEM"

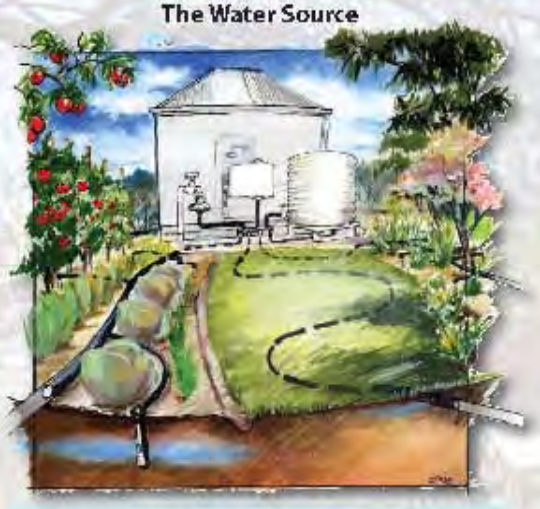
EASY TO USE

NURTURE YOUR GARDEN:

Shower | Wash | Bath in your Garden

QUENCH YOUR GARDENS THIRST FOR WATER

The Water Source



Stop worrying about your Garden every summer

You can add life to your Garden:

- Vegetable Patch
- Trees
- Garden Beds
- Even your new Lawn

Water Saving Innovators – Looking after your garden

waterwise systems
WOW...look at our gardens now!

SAVES YOU TIME, MONEY, WATER & WORRY

Feeding water to the root zone of each plant

1300 133 354

www.waterwisesystems.com

NSW Government's Climate Change Fund

November 2006 to December 2009

Name of Grant recipient: Waterwise Systems Pty Ltd

Name of Project: *Greywater Gardens – A Community Demonstration*

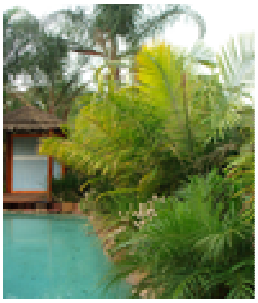
Summary – Final Evaluation Report (Final Report available on request, commercial in confidence)

Summary of Objectives:

- → To engage local champions as active agents in promoting the domestic reuse of greywater in communities across high water consuming suburbs of Sydney;
- → To accelerate the uptake of environmentally sound methods of greywater reuse across Sydney, by creating sustainable outdoor water use norms through community demonstration;
- → To reduce outdoor water consumption in participating households by 80% to 100% by substituting potable water used outdoors with water that is fit-for-purpose;
- → To demonstrate environmentally sound greywater technology;
- → To provide stakeholders and role models across Sydney's municipalities;
- → To educate the community on the benefits or reusing greywater outdoors. Data collected may allow particular areas of future education and government advertising campaigns to be targeted towards high water users;
- → To return long-term social benefits by raising community and industry awareness of good practice in greywater reuse, through education and demonstration;
- → To return measurable environmental benefits through direct potable water savings and reduced impact of cleaning products on soils, plants, animals, public health and waterways.
- → To grow the domestic consumer base for innovative water saving technology, thereby ensuring a viable platform for Australian industry-driven research, development and export of leading edge technology and international best practice;
- → To return tangible and ongoing economic benefits to individual households (domestic water consumer), a wide range of industry stakeholders, and all levels of government vested with a responsibility for water resource management and infrastructure.

Below: There was a variety of participating gardens:






Actual outcomes (potable water savings):

✓	Total direct potable water savings (life of project):[1]	**8,066 kL**
✓	Total annual (extrapolated) potable water savings for project participants:	**4,432 kL**
✓	Estimated annual total for those not yet analysed:	**3,282 kL**
✓	Annual total (estimated) potable water savings:[2]	**7,714 kL p.a**
✓	Average annual potable water savings per household (L):	**110,810 L p.a**
✓	Average weekly potable water savings per household (L):	**2,125 L p. wk**
✓	Average outdoor water use reduction per household:	**80%**
✓	Highest single site annual potable water savings (L):	**624,000 L p.a**
✓	Average annual cost savings on water bill (based on $1.87 per kL):	**$207.20 p.a**
✓	Average return on investment for participants (standard system):[3]	**14 years**
✓	Average return on investment for participants (pump system):[4]	**21 years**

Summary of Activities undertaken:

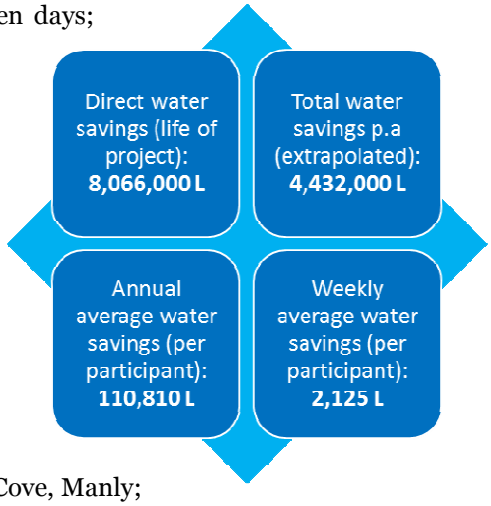
→ Marketing activities to recruit project participants (including: community and garden expos; mail box drops; shopping centre displays; open days; local council seminars);

→ Installation of 58 greywater systems in participants' homes;

→ Analysis of 58 project participants' water use and water savings (through regular behavioural surveys; water bill collection and analysis; final evaluations);

→ Promotion of water savings and other benefits, including:

- Project website: http://projects.waterwisesystems.com/
- Community and garden expos;
- Open days at participants' homes;
- Local council seminars: Marrickville, Mosman, Ryde, Lane Cove, Manly;
- Community events: Australian Conservation Foundation Green Home Workshop; Vox Bandicoot's Sustainability Street, Cottage Garden Club;
- Media: Sun Herald, Hills Shire Times, Northern District Times, Hornsby Advocate;
- Local council and community media: Mosman Climate Challenge Newsletter, Mosman council website, Randwick Eco-newsletter, Ku-Ring-Gai e-news and council website.



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[1] Based on the weekly water savings of each (40) analysed participant and the length of time they have had their greywater system installed (over the life of the project, November 2006 – December 2009)

[2] For those analysed, and the estimated annual total for those not yet analysed.

[3] 75% of project participants have a standard system (no pump). The average cost of a standard system, less the $1000 project rebate = $2,987. Average annual water savings = $207.20

[4] The average cost of a pump system, less the $1000 project rebate = $4,487.

Cost-Benefit Analysis

The Greywater Gardener 230 –
Investing in sustainability

May 2011

waterwise systems®
NEVER waste WATER again!

Waterwise Systems Pty Ltd

Cost-Benefit Analysis

Introduction:

This analysis will assess the economic, social and environmental costs and benefits of installing a greywater system, the Greywater Gardener 230, in domestic households.

The cost of purchasing a Greywater Gardener 230 will be evaluated against the benefits received by a householder from its installation. Financial benefits to a householder can be calculated by assessing the cost of water saved. Intangible costs and benefits will also be evaluated, with a subjective attempt to assess the financial value of intangible benefits, such as social and environmental benefits.

Costs generally involve a one-off, upfront payment to have the system installed. Costs, such as maintenance, can also be ongoing. As maintenance can be carried out by the householder, the Greywater Gardener 230 has negligible maintenance costs, particularly compared to other water saving technologies such as greywater treatment systems, which must be regularly tested and maintained in accordance with water quality and public health regulations.

Benefits are generally received over time, which is considered in a cost-benefit analysis through the calculation of a payback period. A payback period is the time it takes for the benefits of installing the Greywater Gardener 230 to repay its costs, or most commonly described as the return on investment.

Costs:

Upfront: The upfront costs of installing the Greywater Gardener 230 range from approximately $2,987, fully installed for a standard system (includes tank, full irrigation system, diverter and plumbing and irrigation installation); to approximately $5,487 for a fully installed system that includes a sump and pump (generally used for a ground floor bath/ shower installation).

In Victoria, the state government provides Greywater Gardener 230 customers with a $500 rebate. The NSW project participants were provided with a $1,000 rebate.

Ongoing: WWS recommends regular maintenance, however this can be completed by the householder at no cost. A maintenance program is however available on request. The lint trap in the system may need replacing (at a cost of $29.95) approximately every two years. The tank is UV stabilized. The stand is galvanized steel in order to enhance longevity. Therefore, annual costs of maintenance generally range from $15-$240.

Methodology:

This analysis is primarily based on research conducted by Waterwise Systems (WWS) in both Sydney and Melbourne.

NSW: In 2006, WWS was provided with funding from the NSW Government's 'Climate Change Fund' to conduct a three year community demonstration project promoting the benefits of safe greywater use. During the project, WWS monitored, analyzed and evaluated water savings from the Greywater Gardener 230 in the homes of 58 Sydney residents.

Victoria: In 2006, with the assistance of a Melbourne University research student, WWS sent a survey to 30% of total Greywater Gardener 230 owners in Melbourne who had had systems installed for over 12 months. The survey enquired about water usage both before and after installation of the Greywater Gardener 230 as well as evaluating the benefits of reusing greywater and general gardening practices. Almost 50% of surveys were returned. Participants were selected at random from a variety of locations, with various size gardens in order to get accurate average water savings.

The Greywater Gardener 230, permanent greywater diversion and irrigation system.

Benefits:

The installation of a domestic greywater system has numerous benefits. Reducing outdoor mains water use and reusing otherwise wasted household greywater has significant environmental and social benefits for individuals as well as government and the wider community.

WWS' research also demonstrates that installing a greywater system results in ongoing economic benefits for households through savings on their water bills.

In addition, there may be significant long-term economic benefits for government in having a safe and reliable future water supply, reduced infrastructure costs, and a decreased need for large scale, expensive engineering works such as dams and desalination plants.

Waterwise Systems Pty Ltd

Benefits:

Economic Benefits:

Installing the Greywater Gardener 230 has economic benefits for the individual householder, industry and the Government.

Based on results from Waterwise Systems' NSW Government funded project, *Greywater Gardens,* economic benefits to householders are as follows:

Average annual cost savings for project participant's on their water bill (based on Sydney Water's price of $1.87 per kL and average annual water savings, as evidenced in the project, of 110,810 L) equates to **$207.20 p.a.** The cost savings from Victorian research are similar, equating to approximately **$210 p.a.**

Return on investment:

Standard system: The average cost of a standard system, less the $1000 project rebate is $2,987. Based on the average annual cost savings ($207.20), the average return on investment for project participants with a standard system equates to **14 years**.

Pump system: The average cost of a pump system, less the $1000 project rebate is $4,487. Based on the average annual cost savings ($207.20), the average return on investment for those project participants with a pump system equates to **21 years**

	Standard System	Standard System	Sump System	Sump System
Average price: fully installed system	$3,987	$3,987	$5,487	$5,487
Government rebate applicable	$1,000	$500	$1,000	$500
Out of pocket cost to householder	$2,987	$3,487	$4,487	$4,987
Average $ saved p.a (=110.81 kL saved p.a x $1.87)	$207.20	$207.20	$207.20	$207.20
Payback period	=2987/207.20	=3487/207.20	=4487/207.20	=4987/207.20
PAYBACK PERIOD (years)	14 years	16.5 years	21.5 years	24 years

Economic benefits for industry:

There are also important economic benefits for industry. Water restrictions have resulted in significant costs to the garden and landscaping industry. In relation to costs associated with water restrictions, the Productivity Commission (2011, Draft Report, *Australia's Urban Water Sector)* stated:

Based on economic modelling undertaken by the Commission for this inquiry, the reduction in welfare to the community from stage 3a restrictions in Melbourne is estimated to be between $420 million and $1500 million over a 10 year period, depending on modelling assumptions.

A reliable, cost-effective alternative source of water will ensure gardens are watered and this industry remains healthy and experiences ongoing economic growth.

Economic benefits for government:

From a government perspective, State Governments and water authorities may save money on infrastructure costs due to less water being drawn from catchments. A reduction in sewerage flows also equates to less infrastructure maintenance. A reduction in greywater outflow, which would normally be pumped and treated once disposed by the householder may also contribute to cost savings for governments in relation to infrastructure costs.

Comparative analysis:

The Greywater Gardener 230 is a cost-effective water saving measure because it results in direct savings of $207 per year, and a return on investment, for a standard system, of approximately 14 years. This is in comparison to an average return on investment of **95 years** for that of a rain tank to toilet.

Please note that these water saving figures have been calculated using Sydney Water's rainwater tank calculator: www.sydneywater.com.au/water4life/InYourGarden/RainwaterTanks/ResidentialCalculator.cfm, based on a 2,000L rainwater tank with toilet connection, 4 person household in Ku-Ring-Gai, with an average sized home.

Installing a 2,000L rainwater tank to toilet system in an average sized home, a household of four people could use up to 90 litres of rainwater to supplement their total water usage each day. This equates to **32.85 kL p.a.**

Average annual cost savings for householders on their water bill (based on Sydney Water's price of $1.87 per kL and annual water savings of 32.85 kL) equates to **$61.43 p.a.**

Based on the annual cost savings ($61.43), and an average cost of a 2,000L rainwater tank to toilet fully installed (approximately $6,500), less Sydney Water rebate ($650), the average return on investment for those householders with a rainwater tank to toilet equates to: **95 years.**

The Productivity Commission, in their draft report, *Australia's Urban Water Sector,* also found some water conservation programs:

> *...are imposing large costs on consumers per unit of water saved that far outweigh the cost of supplying them with water. For example, Crase and Dollery (2005) examined subsidies paid in Melbourne on water-saving investments for households...the cost per megalitre of water saved ranged from $770 for AAA shower roses, to **$9069** for rainwater tanks, to $33 395 for AAA dishwashers. This compares with a price for water of between $750 and $1300 per megalitre....* ('Overview' p.xxi)

Furthermore, Victoria's Baillieu Government recently announced in a press release that if the minimum of 50 gigalitres is drawn in 2012/13, the nominal cost of the desalinated water from the Wonthaggi Desalination Plant will be **$13.58 per kilolitre**, and if the maximum of 150 gigalitres is drawn in that year, the water will cost **$5.09 per kilolitre.**

Environmental Benefits:

Conserving fresh water supplies for future use has been a fundamental environmental challenge for most Australian governments over the past decade. Subsequently, governments have identified numerous benefits associated with water recycling in Victoria:

> *Increasing use of alternative water supplies, such as recycled water, stormwater, rainwater and greywater, can have numerous benefits- improving the reliability of our water supplies, freeing up water for the environment or growth and reducing the amount of treated affluent discharged into our rivers, bays and oceans (Government of Victoria,* Securing our Water Future Together, *2004: 106).*

The reuse of greywater, and installation and use of the Greywater Gardener 230, has the following proven environmental benefits:

- **Reusing wastewater reduces the need for fresh water consumption, saving potable water and maintaining water supplies for future need.**

  In 2000, the ABS estimated that Australian gardens used between 35-50% of household water. Even in Melbourne under Stage 3a Water Restrictions, the city's water authorities claim gardens still account for 25% of total household water consumption.

  WWS' research has found that by utilising washing machine water (and bath or shower in bigger properties) on the garden through an efficient irrigation system, the need to use tap water on the garden will be significantly reduced, and in most cases completely eliminated. WWS' project participants evidenced an average outdoor water reduction of 80%.

  Based on results from the project, average household water savings as evidenced by WWS customers who have installed the Greywater Gardener 230 equate to 110,810 litres per year. Single site water bill analysis has evidenced savings of 624,000 litres of water per year. WWS has many other examples of water savings of between 200,000 and 500,000 litres per year. 75% of Greywater Gardener 230 customers have reported saving at least 40,000 litres per year (WWS Melbourne research).

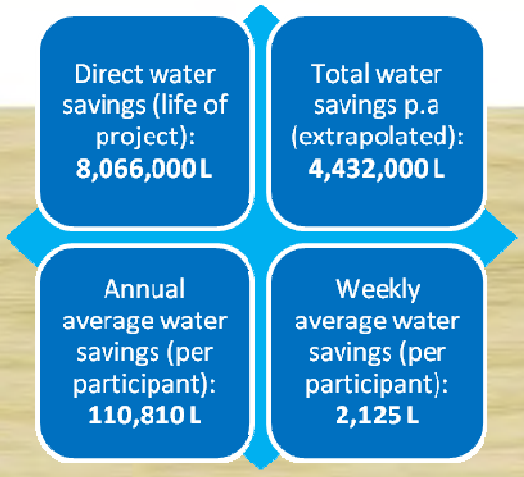


Figure 1: Water savings as evidenced in 'Greywater Gardens' Project

Environmental Benefits *(continued):*

- **Fit-for-purpose use of water:**

  Reusing greywater decreases the reliance on drinking water for garden use. Often drinking water is "used for a number of purposes that do not require drinking water quality" (Government of Victoria, 2004: 106). To address this imbalance, many governments have proposed a "fit-for-purpose" policy. For example, the Victorian Government stated in 2004:

  > *In our urban communities, we will use water that is fit-for-purpose- many uses of water do not require drinking water standards. We will use alternative water supplies for non-drinking uses where there is a net benefit to the urban community and to minimise detrimental discharges to the environment (Government of Victoria, 2004: 106).*

  Installation of the Greywater Gardener 230™ contributes to the Government's policy of "fit-for-purpose" use of water. This patented system has been designed particularly to address the need for consumption activities, such as garden watering, to utilise appropriate standards of water. The Greywater Gardener 230 substitutes outdoor mains water use with wastewater already used in the laundry and/or bathroom.

- **Reducing the amount of wastewater entering sewers or on-site treatment systems:**

  The benefits of reusing wastewater flow further into the broader community by reducing the amount of wastewater entering sewers or on-site treatment systems. This minimises negative environmental impacts in these areas, such as salinity build-up and algae blooms from cleaning products that contain sodium, phosphorus and other nutrients. Waterwise Systems educates and encourages greywater users to switch to environmentally friendly products, which also reduces these negative environmental impacts.

- **An increased reuse of wastewater will lead to less greenhouse gases used state-wide from pumping water from catchments then back to sewerage plants.** In addition, for areas that utilise desalination, reusing greywater on site will lead to less greenhouse gases from the production of desalinated water. For areas without desalination, a reduction in tap water use lessens the chances of having to build an energy and greenhouse gas intensive desalination plant in the future.

Water saving results in Victoria:

Survey results and ongoing communication with Victorian Greywater Gardener 230 owners indicate that the Greywater Gardener 230 has the potential to save households hundreds of thousands of litres of potable water per annum.

The average amount of water savings per household evidenced by the survey analysis was **138,266 L p.a.**

75% of households save at least **40,000 litres p.a.** However, single site analysis has demonstrated savings as high as 511,000 litres per year at a household in Melbourne's South East.

Social Benefits:

There are many social benefits for individuals who use greywater on their garden, as well as benefits for the wider community. Householders who have the Greywater Gardener 230 installed have reported the following benefits (as evidenced in the *Greywater Gardens* project and through word-of-mouth feedback from WWS customers):

- **Householders save time by eliminating the need to hand water the garden, or carry buckets filled with captured greywater**. Comments from WWS' customers in relation to this benefit include:
  - *"A big advantage of the system is not having to cart buckets!"*
  - *"I spend much less time watering and my garden is getting much more consistent watering."*
  - *"Time saved, most beneficial!"*
  - *"My water bill is reduced, and I spend less time watering the garden."*
- **During water restrictions, a key benefit reported is that householders are not limited to watering their gardens during specified periods of time:**
  - *"I never have to worry about designated "days" to water the garden – in fact I don't think about watering at all!"*
  - *"I don't have to worry about which day it is and garden doesn't need watering!"*
  - *"I didn't have to water the garden covered by the greywater irrigation all summer!"*
  - *"It is a very easy way to water my garden."*
  - *"I don't have to stand outside to water the garden so I save many hours a week!"*
- **Indirect benefits of greywater reuse for householders and the wider community include an elevated awareness with respect to environmental sustainability throughout all aspects of home and work life**. Indeed, WWS has found that the individual reuse of household water is a form of self-empowerment.

Case Study: HORNSBY, NSW

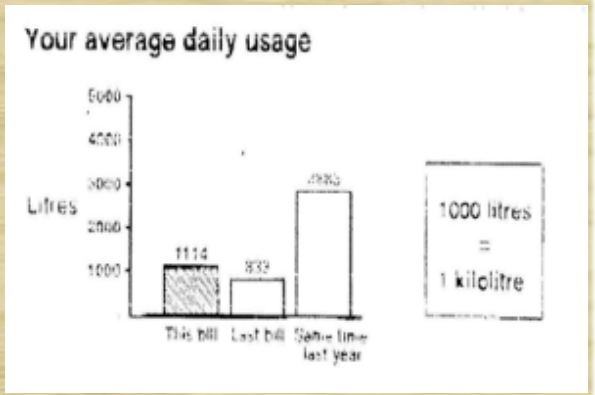
Evidenced Potable Water Savings:

12,000 litres per week (624 kL p.a.)

Water use before greywater system: **2883 litres per day**

Water use after Greywater Gardener installed: **1114 litres per day**

"My last water bill was cut by half."

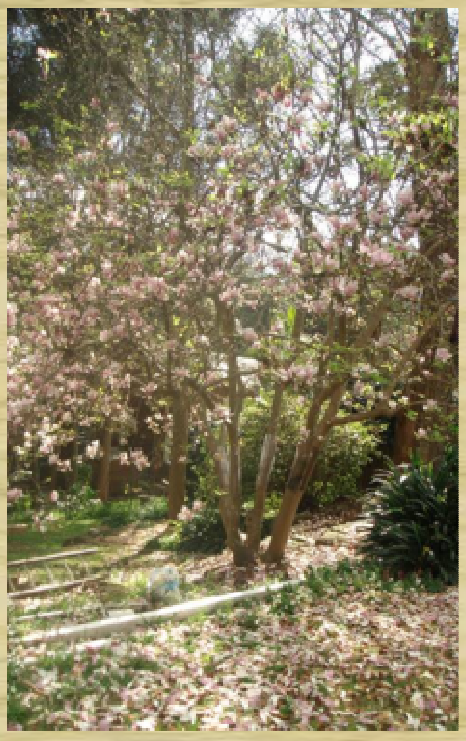


Social Benefits *(continued):*

- WWS' research has indicated that many householders had additionally reduced their indoor water consumption because having a greywater system made them generally feel more water conscious and increased their awareness of sustainability. At least 20% specifically changed their water use indoors because having a greywater system made them "more aware of water usage" and encouraged "a new focus on water conservation". Other feedback includes:
  - *"I am more aware of trying to save water."*
  - *"I feel good about reusing the water and not letting it be wasted."*
  - *"Good for the soul."*
  - *"I feel better that I'm cutting back on water usage and less guilty watering my garden..."*
- The same psychological impetus for improved water conservation also works against the modern 'Not In My Backyard' syndrome. Once householders begin to take responsibility for the water cycle, namely ending in their own backyard, interest is paid to the chemical and foreign agents put down the sink and more commonly added to the washing machine. By being aware that commercial, high salt washing powders are poisonous to their own garden, broader consciousness over domestic effluent becomes apparent.
- Socially, Australians place significant value in gardens and green environments. Water shortages, without a considered alternative water source, will affect the lifestyles of Australians and the aesthetics of our cities and homes. Gardens ensure families have a green space to relax, unwind, gather, and watch children play, all key components of an Australian lifestyle.
- Further to the human importance of gardens and green space, clear biodiversity considerations cannot be overlooked. Improved habitat encourages flora and fauna to flourish where they may have otherwise dwindled.

"My magnolia tree had not flowered in two years – it suddenly came to life with hundreds of flowers the first spring since the Greywater Gardener 230 was installed."

Project participant,
Greywater Gardens



Other benefits:

Greywater irrigation, using the Greywater Gardener 230, has been proven to increase garden growth, garden health, and reduce the need for fertilizer and wetting agents. Where water restrictions ban total outdoor water use, greywater irrigation allows householders to continue their own gardening practices, and consequently investment in the nursery, gardening and landscaping industries is maintained.

Feedback from householders throughout WWS' NSW project regarding garden growth and garden health has been significant. Plants on greywater irrigation lines are "greener", "healthier" and "more advanced in size". Participants also report that they are saving time and money, as well as enjoying the "guilt-free" watering, and not having to think about water restrictions.

50% of project participants reported that their gardens are 'thriving - healthier & greener than before I had the system installed.' The remaining surveyed participants noted their gardens looked at least as good as they did previously. In relation to garden health, WWS received the following feedback from participants:

- *Very, very happy with the outcome. Garden looks good & plants are healthy no less to type of or quantity of water.*
- *My plants are looking greener and healthier…*
- *I feel better – and have been able to plant some of my water thirsty plants! My trees look good!*
- *I haven't lost any plants to lack of water.*
- *The garden looks a lot better and I have not had to use any extra [mains] water!*
- *My front garden (which previously relied on rain only) has flourished! The rest of the garden has also really benefited from greywater!*
- *Our garden is thriving! I was digging for worms for my grand-daughter and found lots of lovely moist soil deep down (and happy worms!)*
- *I have known this lemon tree for decades and have never seen it look so healthy!*
- *The garden where the greywater is installed has plants that are healthier and more advanced in size.*
- *I have noticed much less water usage and I have a very happy garden.*

In addition, a healthy garden area around a home can increase property values by as much as 20%, through the obvious aesthetic benefits, but by moderating the moisture content of substrate soils it also ensures foundations are stabilised, helping to prevent cracking and movement.

waterwisesystems®

NEVER waste WATER again!

Waterwise Systems Pty Ltd

PO Box 1001 Greythorn, Victoria 3104 Australia | **ph** 1300 133 354

www.waterwisesystems.com | info@waterwisesystems.com