

Demonstration of decentralised wastewater recycling in urban villages



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A Premier's Water Foundation Project

The Project: Complete a waste water recycling trial by June 2009 at 3 sites within the Metropolitan and Peel Regions to demonstrate and evaluate the performance, reliability and attributes of decentralised wastewater recycling.

What is wastewater?

Wastewater is all the water that you flush or drain away from your house once it has been used for something (like washing your clothes, bathing, flushing the toilet and so forth). Wastewater from the toilet is called 'black water' while all the other wastewater is called 'grey water'. Many golf courses and playing fields in WA use treated wastewater for irrigation. Industry too uses treated wastewater for industrial processes that do not require drinking quality water. The Water Corporation has recently prepared guidelines for land developers on use of non-drinking water in urban developments.

Can we re-use wastewater in a local setting?

Yes. We can all safely use grey water to water the garden. There are now a number of systems available that are approved by the WA Department of Health. In many other parts of the world and Australia there are well established wastewater reuse schemes in urban developments. There is now great interest by communities, land developers and government in WA to reuse wastewater in Perth urban developments as a means of conserving drinking water and groundwater.

What is a centralised wastewater management system?

A big city may have one (sometimes several) treatment plants to take all the city's wastewater, treat it and then dispose of it. Large networks of sewer pipes transport the wastewater across the city to a central treatment plant. Once treated it can be disposed of in rivers or the ocean or it can be transported, by another network of pipes, to users such as industry. Most large western cities have centralised wastewater treatment systems. They are slow to respond to changes in either demand or technological improvement or innovation. Perth discharges about 350 million litres of treated wastewater from 400,000 homes via 11,000km of sewer into the ocean each day from three main plants with two more planned for Alkimos and East Rockingham.

What is a decentralised wastewater management system?

An alternative to having a city-wide network of pipes and a huge treatment plant is to use smaller local treatment plants or alternative technologies to treat wastewater locally and then reuse it locally. This can mean a substantial saving to developers, local government authorities and residents on headwork charges, set-up costs and irrigation costs. Using a small site-specific wastewater treatment system to service a small urban village or a single suburb allows a local management option. A village can increase the amount of water available for gardens and parklands and even flushing toilets by reusing treated wastewater locally.



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Department of Water
Government of Western Australia

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The Premier's Water Foundation was created in response to the State Water Strategy released in February 2003 by the Western Australian Government. The Foundation's programs support research and development projects that challenge boundaries and investigate innovative new ways of conserving water and maximising reuse of wastewater.

The project "Demonstration of Decentralised Wastewater Recycling in Urban Villages" will establish, monitor and evaluate three demonstration projects in Perth urban villages. The research will occur in collaboration with National Lifestyle Villages Pty Ltd, Peel Waters Pty Ltd, Infratech Pty Ltd and other developers with support from the Department of Health (DoH), Department of Water (DoW), local government and Water Corporation.

Project Sites

Year 1 (2006)	Year 2 (2007)	Year 3 (2008)
Household-scale greywater recycling	Village-scale greywater recycling	Village-scale wastewater recycling
<p>During the first year the project installed a "Greyflow" greywater reuse system on each of 380 homes at the Bridgewater Lifestyle Village (National Lifestyle Villages Pty Ltd) in Erskine, Mandurah. Some houses will also be fitted with a constructed wetland to control nutrients. The systems are maintained by the Village Grey Maintenance Team funded by the amenities fees charged to all householders. Researchers are now monitoring these systems at the site.</p>	<p>At the Timbers Edge Village (Peel Waters Pty Ltd) in Dawesville, Mandurah 260 houses will discharge their greywater into a large constructed wetland that in turn will provide treated water for irrigation of public open space around the village. As well as the technical aspects of re-using greywater the project will address residents awareness and participation, developer concerns over strata management and sub-contractor maintenance of such systems. Monitoring has also commenced at this site.</p>	<p>All wastewater from the 170 residences at the Banksia Tourist and Caravan Village, Hazelmere will be pumped to a village scale Moving Bed Bio Reactor (MBBR) wastewater treatment plant on a trial basis. The treated wastewater will be periodically dosed to a confined irrigation area in order to monitor nutrients and flow rates. Again issues of management, operation and maintenance as well as community education will be investigated.</p>

Integrated urban water management research projects at the ETC

Development of a Wastewater Technology Selection Tool: Technical Elements Model
(Hons – Shaun Jamieson, scholarship by NLV – complete);

New code of practice for urban village effluent recycling schemes
(Hons – Beth Strang, scholarship by NLV – complete);

Measuring the Water Efficiency of Urban Developments
(Hons – John Hunt, scholarship by NLV – complete);

Monitoring of nutrients from wastewater recycling in soil and groundwater
(Hons – Jay Dhillon, scholarship by Peel Waters – complete);

Development of a Wastewater Technology Selection Tool: An Assessment Method for Nutrient Management and Energy Efficiency
(Hons – Emma Tomren, scholarship by DEC – underway);

Sustainable Urban Landscape with Greywater
(PhD – Joshua Byrne, scholarship by Multiplex – underway);

Operation and Maintenance of WWTP and Community Involvement
(PhD – Beth Strang, scholarship by Murdoch Univ and PWF – underway);

Integrated urban water modelling
(PhD - John Hunt, scholarship by Murdoch Univ and PWF – underway).

Nutrient Leaching from Greywater Irrigation
(PhD – Radin Maya Saphira Radin Mohamed, scholarship by MOHE, Malaysia – underway)

Zero Emissions Nutrient Cycling in Urban Village WWTP
(Post doctoral research – Dr Stewart Dallas – underway)

Nutrient Management in WWTP
(Proposed PhD – Thu Ngoc Le)

Water Use Assessment in Urban Villages
(Proposed Hons – Ceri Evans)

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