

ReWater

Water recycling in Australia

SUMMER 2010

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About ReWater

ReWater is a newsletter designed to make information relevant to recycled water use in horticulture more accessible to horticulturalists (growers/farmers), primary producers, members of the water industry and other interested people. It is part of the service provided by the Australian Coordinator for Recycled Water Use in Horticulture, funded by Horticulture Australia Limited.

Back issues and instructions for subscribing to receive ReWater electronically quarterly can be accessed at www.recycledwater.com.au/rewater

Your Feedback and Contributions

We would appreciate your feedback and are always looking for suggestions and contributions. Please email rewater@arris.com.au or contact us on 03 9640 0221.

www.recycledwater.com.au



The delivery of research and development outcomes from this project to the horticultural industry is made possible by the Commonwealth Government's 50% investment in all Horticulture Australia's research and development initiatives.

Know-how for Horticulture™

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ROSDI was found to be suitable for cultivating tomato plants on brackish water.

Reverse osmosis pipe for drip irrigation

"The right to food is not negotiable."

"Between now and 2030, the world's population is expected to grow by two billion people. Feeding this growing population and reducing hunger will only be possible if agricultural yields can be increased significantly – and sustainably. With so much of the Earth's water being used for agriculture¹, it is clear that an improvement in the management of agricultural water becomes key to the achievement of global food security.²

"Instead of using a high applied pressure on the saline side of the membrane to "push" water through the membrane, the new system uses a water tension on the soil side of the membrane to "pull" water through the membrane."

Water tension on the soil side "pulls" water through the membrane

In many agricultural precincts there are large numbers of existing groundwater bores that access aquifers containing brackish water containing levels of dissolved salts generally in excess of 2000 mg/L total dissolved salt (TDS), or 3000 $\mu\text{S/cm}$ when expressed as an electrical conductivity (EC). As a general rule, groundwater bores with salinity in excess of 2000 mg/L are unsafe to use for sustained irrigation³. A Reverse Osmosis capable Sub-surface Drip Irrigation (ROSDI) was developed to allow farmers to use this brackish water.

The idea

The development of ROSDI was originally inspired by drought conditions in food production areas of south east Australia, where reduced annual average precipitation, along

with lower surface water run-off in this area, has restricted farmers' access to surface water for irrigation. Although brackish groundwater is available, prolonged irrigation with 3,500 to 5,000 mg/L TDS water gradually damages the soil structure. Current technologies used to remove salt from water, such as reverse osmosis, are both capital and energy intensive and cannot viably be used in these applications. The research began with a simple research question; "if a reverse osmosis membrane could be incorporated

into a drip irrigation line, would the suction in the root zone of a plant provide sufficient energy to extract water for plant growth while preventing the movement of salt into the soil?" If so, a simple irrigation system with these properties would allow farmers to use saline water, not only in times of protracted drought, but also as an alternative to increasingly restricted fresh water supplies, to produce a crop while managing the potentially adverse impacts of salt accumulation in the soil.

Research

Experiments performed by Greg Leslie of the University of New South Wales and Bruce Sutton of the University of Sydney demonstrated that a subsurface drip irrigation line manufactured from a commercially available reverse osmosis membrane is capable of providing sufficient water for the cultivation of tomato plants on brackish water with an electrical conductivity of 4000 to 5000 $\mu\text{S/cm}$, while preventing the accumulation of salts in the soil. These preliminary experiments

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demonstrated that brackish and saline water that would normally be unsuitable for use in irrigation systems (e.g. groundwater or some water recycled from sewage effluent) for the cultivation of food crops, can be used to grow plants, such as tomatoes without allowing the build-up of salts in the soil. In normal operation, transpiration water loss by plants causes a water suction pressure (properly referred to as a low water potential) to appear at the root surface. This acts to draw water from the soil to the root. As the soil near the root is dried, it too displays a suction pressure that draws water from further away. Typical values of this pressure are within the range -0.1 bar (field capacity) to -15 bars (permanent wilting point). So, instead of using a high applied pressure on the saline side of the membrane to "push" water through the membrane, the ROSDI system uses a water tension on the soil side of the membrane to "pull" water through the membrane. Leslie & Sutton also found that by increasing the water holding properties of the soil by varying the amount of loam, sand and clay it was possible to increase the rate of transport of water across the membrane.

Practicalities

The ROSDI operates at constant low flow at low pressure (e.g. with a ring-main approach to reticulation). The researchers have demonstrated that saline water with an EC of 4000 $\mu\text{S}/\text{cm}$ can be drawn across an RO membrane in soil with a root water potential of less than -2 bar at an initial flux of 1.5 $\text{L}/\text{m}^2/\text{h}$ with an average salt rejection of 50%. They have observed that the flux rises and falls

¹Seventy to eighty percent of the fresh water harvested by humans is used for agriculture, producing about half the world's food.

²FAO (2009). Water at a glance. The relationship between water, agriculture, food security and poverty.

³Gill, H.S. and Joseph, S. (2001). Quality of Deep Groundwater of the NSW Murray Irrigation Districts. 7th National PUR&L conference.

⁴Reverse Osmosis Irrigation, (2009) PCT P76976.AU

The rate of water movement across the membrane into the root zone varies according to the needs of the plant

between 0.25 $\text{L}/\text{m}^2/\text{h}$ and 1.5 $\text{L}/\text{m}^2/\text{h}$ as the height and leaf count of the plant changes as part of the plants growth pattern. Clearly the rate of water movement across the membrane into the root zone varies according to the needs of the plant. Moreover, unlike conventional reverse osmosis, the transport of water across the membrane is not driven by a high energy pump that produces water at a rate of 20 $\text{L}/\text{m}^2/\text{h}$ at pressures of 10-15 atmospheres but by the matric potential in the soil as governed by the evaporative losses through the plants' stomata.

The irrigation tube diameter is sufficiently large (2-5 cm) to allow the flow of water without the usual problems of internal fouling of the membrane by silts, clays and suspended solids that are common in conventional RO systems. The losses from the system are only associated with the water requirements



of the plant. This avoids the problem of excessive abstraction from the water source.

The residual salts stream is about the same EC as highly saline water which can be impounded and used for other applications such as the inland cultivation of bream and brine shrimp.

Leslie & Sutton have successfully filed for a patent for this technology and are currently conducting research on the use of biodegradable cellulose-based membranes for the drip irrigation lines.

Source: Greg Leslie, Associate Professor, UNSW, Deputy Director, UNESCO Centre for Membrane Science and Technology. All images courtesy of Greg Leslie.

Breaking news!

The Groundwater Replenishment Trial in Perth is now fully operational and recycled water was first recharged into groundwater on Wednesday 10 November 2010.

The advanced water recycling plant has been operational since late 2009 and has been producing water that meets all the required standards. The WA Department of Health gave approval for the Water Corporation to commence recharge in early November 2010.

In addition, the Water Corporation has also completed construction of an interactive Visitor Centre at the advanced water recycling plant and public tours of the facility will commence early next year.

For more information:

www.watercorporation.com.au/gwr

The latest fact sheets are also available at www.watercorporation.com.au

16 EVENTS diary dates

Australia

International Conference on Integrated Water Management

2 - 5 February 2011, Environmental Technology Centre Murdoch University, Perth WA

The conference will discuss and explore new and innovative methods of treatment, better understanding and assessment of resources and their supporting ecosystems, proper management for conservation and approaches to achieve the dual aim of economic development and ecological sustainability. The focus is the necessary infrastructure to provide good quality water, in sufficient quantity, in the most sustainable manner.

For more information:

www.etc.murdoch.edu.au/pages/conf1.html

AWA Water Education, Water efficiency and WICD conferences

1-3 March 2011, Sebel Hotel Albert Park Melbourne - Call for papers open

Following their success in 2008, AWA will again run three specialty conferences in parallel - 4th National Water Efficiency, 4th National Water Education, and 2nd Water Industry Capacity Development (WICD). This provides excellent opportunities for delegates to attend presentations of interest in their own and other disciplines, to share knowledge and network. Full papers are due by 4 Feb 2011.

For more information: AWA Events

www.awa.asn.au

or download the program flyer

www.awa.asn.au

ozwater'11

OzWater'11

9-11 May 2011. Adelaide SA

Ozwater is an event like no other, organised by the industry for the industry where the issues that drive the industry are discussed and future directions decided. Ozwater '11 will address the wide ranging issues that face the water industry today. These include major national water reforms, climate change and its impacts, technological advances and the challenges of human resources to name a few.

For more information: OzWater'11

www.ozwater11.com.au



EVENTS diary dates



The IDA World Congress 2011 on Desalination and Water Reuse

4-9 September 2011. Perth, Western Australia - Call for papers now open.

The International Desalination Association is pleased to present the Call for Papers for the IDA World Congress 2011 on Desalination and Water Reuse. This biennial event will be held from 4 - 9 September at the Perth Convention and Exhibition Centre, Perth Australia. Themed, "Desalination: Sustainable Solutions for a Thirsty Planet" the Congress is the premier global event on desalination and water reuse. Printed copies of the Call for Papers are being mailed to all current IDA members.

For more information: IDA www.idadesal.org

9th IWA Specialist Conference on Waste Stabilisation Ponds

Stamford Grand Adelaide, Glenelg Adelaide 1-3 August 2011

The aim of this conference on waste water management in rural and urban areas is to provide a forum for the exchange of the most recent ideas, techniques and experience in

all areas of system management that could contribute to more efficient and sustainable use of waste water. This conference will focus on techniques for the delivery of the maximum volumes of clean, environmentally safe, treated waste water for amenity and agricultural purposes, using minimal energy inputs and having low maintenance requirements.

For more information: IWA www.iwawsp11.com

International



Nutrient Recovery and Management 2011: Inside and Outside the Fence

9-12 January 2011. Miami, Florida USA

The Water Environment Federation and the International Water Association, in cooperation with the Florida Water Environment Association and the Water Environment Research Federation, are pleased to announce a Conference covering the latest research and experience in all the management aspects of nutrient removal.

For more information: IWA www.iwahq.org



15th Annual Water Reuse & Desalination Research Conference

Las Vegas, Nevada May 16-17, 2011 Abstracts open until 13 December 2010

The WaterReuse Research Foundation's Research Conference provides an opportunity for the water reuse and desalination communities to hear and see presentations by researchers on the latest results of ongoing research. The conference provides a forum for water reuse and desalination research professionals to interact, network, and discuss current and future research needs and trends. This is the conference you need to attend to learn about technologies that will become mainstream in 5-10 years.

For more information: www.watereuse.org

Biogas power fuelled from water recycling plant

San Antonio Water System (SAWS) and Ameresco, Inc. have opened their new biogas facility at the Dos Rios Water Recycling Center.

The biogas project is the first sustainable project of its kind in the US, capturing biogas generated during the sewage treatment process and selling it through a commercial gas pipeline.

"SAWS is constantly improving its operations to become more sustainable, and this project is a sound investment for our environment and our community," said Robert R. Puente, SAWS President/CEO. "By reusing biogas instead of burning it off, we are helping protect the city's air quality and developing a renewable energy resource."

With the addition of the biogas facility, SAWS is recycling and reusing almost all of the waste

coming into Dos Rios through its "recycling trifecta." Biosolids are also reused to generate compost, which is used in landscaping, gardening and agriculture to improve soil quality. Finally, the third part of the trifecta is recycled water. About 115 million gallons a day of high-quality recycled water are used for the Riverwalk, golf courses, parks, and commercial and industrial customers as well as in the upper San Antonio River and Salado Creek.

Source: San Antonio Water System and Market Watch 19/10/2010 www.marketwatch.com



San Antonio's riverwalk is one of many public spaces sustained through use of recycled water.

Stormwater harvesting and reuse schemes receive federal funding

Water sensitive urban design and integrated water management become paramount to the sustainability of our cities

Recent funding announcements see stormwater harvesting and reuse schemes getting the go ahead, as water sensitive urban design and integrated water management becomes paramount to the sustainability of our cities.

The City of Hobsons Bay Water Security Project in Victoria and Apex Oval/East Dubbo Sporting Complex Stormwater Harvesting Scheme in regional NSW are both projects receiving funding under the final round of the Australian Government's National Urban Water and Desalination Plan, aiming to help Australia's cities and towns prepare for a future with less water due to the emerging effects of climate change and drought.

The City of Hobsons Bay in western Melbourne is set to benefit from \$3.1 million in Australian Government funding to help secure future water supplies through five innovative water efficient stormwater projects.

"Five stormwater harvesting schemes will be constructed in the City of Hobsons Bay, supplying an estimated 147 million litres of water a year to irrigate sports grounds across seven reserves in the suburbs of Altona Meadows, Newport, Williamstown and Williamstown North," MP Member for Gellibrand Ms Nicola Roxon said.

The five schemes are located at Laverton Recreational Reserve, the Newport Park Precinct, J.T. Gray Reserve, Robertson Reserve and Williamstown Cricket Ground.



Williamstown Cricket Ground is one of several projects set to benefit from the stormwater reuse scheme.

"Funding these projects allows communities to make better use of their sportsgrounds, gardens, parks and reserves throughout the year as well as benefit local waterways and reduce pollutants flowing into Port Phillip Bay," said Senator Farrell, Parliamentary Secretary for Sustainability and Urban Water.

The schemes will use a variety of wetland and biofiltration treatments and above and below-ground storage methods. Construction is expected to be completed by June 2013. The project is being developed in partnership with City West Water.

Water supplies in the City of Dubbo, NSW will also become more sustainable with the Federal Government committing \$4.5 million for an innovative and water efficient stormwater harvesting scheme. Parliamentary Secretary for Sustainability and Urban Water, Senator Don Farrell announced the Apex Oval/East Dubbo Sporting Complex Stormwater Harvesting Scheme in October, which will significantly reduce the sporting facility's demand on Dubbo's potable water supplies.

"This stormwater harvesting scheme will supply about 42 million litres of treated stormwater a year, meeting half of the irrigation demands of the East Dubbo Sporting Complex, which is a major regional sporting facility," Senator

Farrell said. "It will also reduce the town's reliance on water from the Macquarie River for urban irrigation purposes, helping to protect the river's health.

"Captured stormwater will be treated and stored in an underground modular reservoir to be constructed beneath the playing fields at the sporting complex.

"I would like to commend Dubbo City Council for initiating this cost-effective stormwater harvesting scheme which will benefit their community and the environment."

"These facilities will be irrigated with stormwater that has been captured, treated and stored during high rainfall periods for use during drier months. Some

of these projects will also provide water for other uses, particularly in public facilities."

Funding for the second round of grants projects finalises the commitment made by the Australian Government in 2009 to invest \$200 million in stormwater harvesting and reuse projects as part of the National Urban Water and Desalination Plan, a key component of the Water for the Future initiative.

Sources: Minister for Environment Press Release 11/10/2010, and Media Release Senator the Hon Don Farrell Parliamentary Secretary for Sustainability and Urban Water Nicola Roxon MP Member for Gellibrand 15/10/2010



Using treated stormwater in Dubbo will help protect the health of the Macquarie River.

"I would like to commend the City of Hobsons Bay for initiating cost-effective stormwater projects to benefit their community and the environment. These projects will contribute significantly to reducing demand for potable water supplies through harnessing stormwater," Ms Roxon said.

Rainwater harvesting replenishes cave network

Hydrology recovery project ensures survival of rare stygofauna.

Officials in Western Australia have begun pumping harvested rainwater into the South-West's intricate network of caves in a desperate bid to save its rare inhabitants following the driest winter on record. More than 150 caves sit beneath the karri forests from Yallingup to Margaret River and Augusta, some of them accessible to visitors who come to gaze at the complex stone formations and intricate stalagmites.

But the driest winter on record in the South-West combined with a parched start to spring has forced the Augusta-Margaret River Tourism Association to launch a "hydrology recovery project" for Lake Cave, one of the most popular underground sites. A rain harvesting and irrigation system will pump water into the cave to ensure the survival of tiny, cave-dwelling invertebrates called stygofauna.

Caves House at Yallingup as well as Caves Rd, the popular scenic drive linking Yallingup with Augusta, were both named after the caves that have formed along the spine of the Leeuwin Naturaliste Ridge.

"Halting the decline of the water level aims to protect the critically endangered stygofauna that inhabit Lake Cave," the tourism bureau's attractions manager Jayme Hatcher said.

"This system will buy us time while further research is being undertaken into the reasons for the declining water levels." Ms Hatcher said the project would ensure the preservation of one of the South-West's most iconic tourist attractions.

She said harvested rainwater would be streamed into the chamber for an hour a day, and the chemical properties in the water have been tested to ensure that they mirror the existing water quality within Lake Cave.

"It will be a very slow process with only 150 litres per day trickling into the cave for an initial period of eighteen months" Ms Hatcher said.

Agriculture Minister Terry Redman said it was the first time the irrigation technology had been used to preserve a cave ecosystem. A State Government grant made the project possible, paying for a team of hydro-geologists, biologists and officers from the Department of Environment and Conservation.

Ms Hatcher said the next stage of the project is to install bores to better understand the Lake Cave catchment area and water sources.

Source: Reproduced with permission from the editor. Perth Now 12/10/2011



Recycled water key to supply security

Industry survey results

Recycling is the key to Australia meeting its future water needs, according to a survey of more than 1000 people who work with the increasingly valuable resource. Governments need to lift their game if the country is to secure reliable supplies in the coming decades, the State of the Water Sector 2010-15 survey suggests.

Less than 30 per cent of the water sector feels sustainability is being well managed, while only 43 per cent believe water scarcity is being handled properly.

55 per cent feel water security is being addressed well.

Overwhelmingly, those who responded to the survey - conducted by the Australian Water Association (AWA) and consultancy firm Deloitte - said recycling was the way forward.

37 per cent said recycling, including the use of stormwater, was the most important thing that could be done to help Australia meet its future water needs.

The next biggest responses were "raise the price of water to reflect its scarcity" and "curb demand through education". Each answer was nominated by 12 per cent of respondents.

On the recycling front, the survey found a quarter of people thought community resistance was the main barrier to increased recycling. A similar number thought politics was to blame while a further 21 per cent cited cost.

AWA chief executive Tom Mollenkopf said the survey found clear support for adding recycled water into water supplies and using stormwater as a source of supply. "Recycled drinking water is an effective solution to Australia's water demands and the water

sector strongly supports this supply option," he said in a statement.

"The sector has an important role in educating communities and building confidence about recycled water."

Current water trading arrangements - a hot topic with the federal government considering buying back up to 4000 gigalitres a year for the Murray-Darling Basin - didn't receive a ringing endorsement from the sector.

Some 42 per cent of respondents said water markets weren't functioning well in their state or territory.

Just 27 per cent of people said they were working while 31 per cent couldn't say. But the future is brighter.

Of those surveyed, 59 per cent think a fully functioning market would reduce over-allocation over time. Only 33 per cent disagreed.

Further, 72 per cent think a fully-functioning market will improve the efficiency of water use.

Source: Sydney Morning Herald <http://news.smb.com.au>



GOOD READS and website links

Evolution of water recycling in Australian cities since 2003.

Water Science and Technology vol. 62, no4, pp. 792-802

Radcliffe, J.C. (2010)
Available from www.iwapoline.com

Environmental Impact Assessment of Recycled Wastes on Surface and Ground Waters: Concepts; Methodology and Chemical Analysis

Edited by Tarek A. Kassim and Kenneth J. Williamson (November 2010)

This 3-volume reference presents the latest findings in impact assessment of recycled hazardous waste materials on surface and ground waters. Topics covered include chemodynamics, toxicology, modeling and information systems. The book serves as a practical guide for the monitoring, design, management, or conduct of environmental impact assessment.

Available from Amazon www.amazon.com

Solid Waste Management and Environmental Remediation

Edited by By Johann Herzog and Timo Faerber (USA: August 2010)

The authors of this book take a deeper look at the contaminated soils and waters which pose major environmental, agricultural and human health problems world-wide. Alternatives for sewage sludge final disposal from wastewater treatment are also assessed from a life cycle assessment (LCA) point of view in order to identify the best environmental alternative.

Available on Fishpond www.fishpond.com.au

Water Infrastructure for Sustainable Communities: China and the World

By Xiaodi Hao, Vladimir Novotny, Valerie Nelson (UK: September 2010)

A new model for water management is emerging worldwide in response to water shortages, polluted waterways, climate change, and loss of biodiversity. This book focuses on decentralized concepts of potable water, stormwater, and wastewater management that would provide clean water. It results in water management systems that would be resilient to extreme events such as excessive flows due to extreme meteorological events, severe droughts, and deteriorated water and urban ecosystem quality.

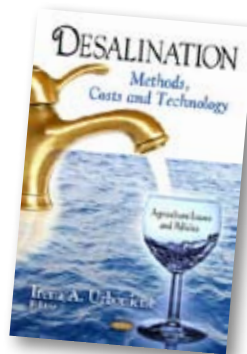
Available on Fishpond www.fishpond.com.au

Desalination: Methods, Costs & Technology

Edited by Irena A Urboniene (USA: November 2010)

This book reviews research in the field of desalination including the growth of scientific and commercial interest to cogenerative and hybrid technologies for desalination and power generation; Membrane Distillation (MD) process as a new membrane technology used for desalination and recycling; and, two alternative systems for conventional reverse osmosis desalination plants by incorporating the use of gravitational potential energy and others.

Available on Fishpond www.fishpond.com.au



Urban Drainage

By David Butler and John Davies (UK: July 2010)

The drainage of rainwater and wastewater from areas of human development has both environmental and engineering aspects. This book is a useful reference for drainage design and operation engineers in the water industry and local authorities, and for consulting engineers.

Available on Fishpond www.fishpond.com.au

Performance of Various Tree Species as Irrigated by Urban Wastewater

By Dr Muhammad Ayyoub Tanvir, Dr Muhammad T. Siddiqui (USA: September 2010)

The present study was undertaken to observe the effects of domestic as well as municipal effluent on the growth and production of various tree species in context of their response to various heavy metals and to assess the ability of the selected tree species to absorb heavy metals from the effluent water.

Available on Fishpond www.fishpond.com.au

Treated Wastewater in Agriculture

Edited by Guy Levy, P. Fine and A. Bart-Tal (For release Dec 2010)

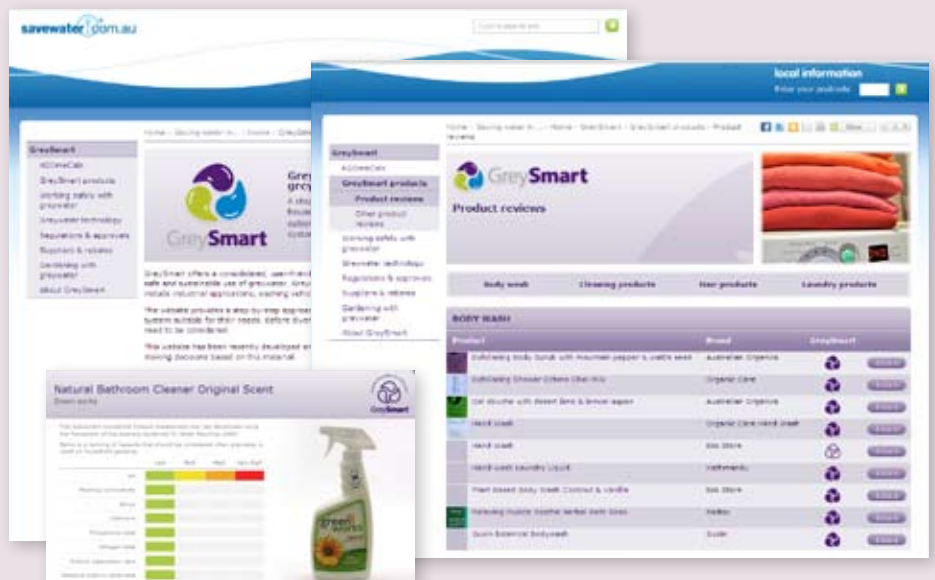
This important new book addresses in detail the use of treated wastewater in agricultural situations, its impact on crops and the soil environment. Coverage includes the composition and treatment of wastewater, health considerations, regulations and economic aspects. Major sections of the book also concentrate on crop management and the soil environment.

Available from Amazon www.amazon.com

New website launched

The GreySmart project was funded by the Victorian Smart Water Fund. The Smart Water Fund is a joint initiative of Melbourne's water businesses – City West Water, South East Water, Yarra Valley Water and Melbourne Water – together with the Victorian Government. Hosted by the savewater!@Alliance this newly launched website provides a range of resources to householders to help them make decisions about greywater use, system installation and household cleaning products. It also helps home owners to decide if rainwater could also be considered a useful alternative water supply.

www.GreySmart.com.au





Melbourne Cricket Ground.

Yarra Park water project plans revealed

The long-term environmental future of Melbourne’s iconic Yarra Park – the gateway to the MCG - has received a boost, with proposed plans for a multi-million dollar water recycling facility revealed for the first time today.

Premier John Brumby joined MCG Trustee Pat McNamara, Melbourne Cricket Club CEO Stephen Gough and City West Water Managing Director Anne Barker to unveil artistic impressions of the facility, which will significantly enhance the health of trees, soil and grass in Yarra Park.

“Yarra Park is an icon of Melbourne and this important water recycling facility goes a long way to ensure its long term future in the face of drought for generations to come,” Mr Brumby said.

“The works will ensure it remains a valuable community asset and continues to support major sporting events like the AFL Grand Final, Boxing Day Test and the Australian Open.



Parklands surrounding the MCG.

“This is a major project initiative designed to support Yarra Park, especially the trees, and to ensure that the community continues to enjoy access to this space under far better conditions than during the recent drought years.”

The \$22 million project, comprising \$16m from the MCC and \$6m from the Victorian Government, will include the installation of an underground water recycling facility, which will distribute non-potable water to drought-proof the trees and reduce the MCG’s potable water use by almost 50%.

The water recycling facility will have the capacity to produce up to 180 megalitres of water per year, of which Yarra Park will require approximately 110 megalitres. The MCG will utilise approximately 50 megalitres and a further 10-12 megalitres will go to Richmond Football Club Oval.

Plans for the park also incorporate re-establishment of avenues of trees and the introduction of tree protection measures, selected tree planting and additional mulching, new garden beds, lawn upgrades, playground improvements and pedestrian paths.

“This project is an important environmental initiative for the MCC as we seek to reduce our reliance on potable water,” said MCC President David Meiklejohn.

“It is also a significant financial contribution from a private club towards improving the

long-term health of public parkland at the MCG’s doorstep.”

MCG Trust chairman John Wylie declared the proposed works an excellent outcome for all users of Yarra Park.

“Yarra Park has always been an integral part of Melbourne’s wonderful parks and gardens landscape which defines the city,” Mr Wylie said.

“It holds a natural and special significance, in particular for community users. It also plays an important supporting role for the MCG and surrounding sports and entertainment precinct, as well as providing an attractive and peaceful setting for the stadium itself.”

City West Water Managing Director, Anne Barker, said the Yarra Park water recycling project is an example of the capabilities of water

recycling as just one solution to our future water needs.

“With efficiency being the key driver of water use in the future, this project demonstrates the benefits of recycled water to maintain an essential community asset, and importantly, help to conserve our precious drinking water for the future and reduce the amount of treated effluent being discharged into Port Phillip Bay,” Ms Barker said.

Source: www.mcg.org.au

A significant financial contribution from a private club towards improving the long-term health of public parkland at the MCG’s doorstep

Hawkesbury river replenished with \$209 million recycled water plant

Up to 50 million litres of recycled water a day maintaining the river's flow

Up to 50 million litres of recycled water a day will flow into the Hawkesbury-Nepean River at Penrith – with one of Australia's largest water recycling projects maintaining the river's flow.

Following the successful commissioning period of the \$209 million St Mary's plant, supplies of up to 18 billion litres of recycled water a year – 3.6 per cent of the needs of Sydney, are able to be provided to the Illawarra and the Blue Mountains.

The project takes wastewater from three plants at Quakers Hill, St Marys and Penrith and treats it using reverse osmosis, which involves pushing already treated wastewater through extremely fine filters to trap nutrients, minerals and chemicals.

The very high quality recycled water – which is similar in quality to distilled water – will be released into the Hawkesbury-Nepean River to maintain flows in the iconic river. This will both reduce the amount of drinking water released from Warragamba Dam for river flows and contribute to the health of the Hawkesbury-Nepean River system by reducing the volume of nutrients entering the river.

"The St Marys Water Recycling Plant is a pioneer in its field – nowhere else in the world is such high quality recycled water being used for the environment," NSW Premier, Ms Kennally said.

"Recycling is one of four ways the NSW Government's Metropolitan Water Plan will secure water supply for Sydney, the Illawarra and the Blue Mountain's until at least 2025 – that's alongside dams, water efficiency and desalination. By 2015, we will recycle 70 billion litres a year, or about 12 per cent of greater Sydney's water needs."

The project has injected millions of dollars into Western Sydney, creating hundreds of local jobs.

Since 2008:

- 1,840 construction staff have worked over 725,000 hours;
- 27,500 tones of concrete have been poured;
- More than 50 kilometres of pipework have been laid;
- 7 pumping stations have been built; and
- 3,696 state-of-the-art reverse osmosis membrane filters have been installed.

"Next month, an education centre will be opened at the site to enable high school, TAFE, university students and industry groups to learn more about recycled water and view



St Mary's Water Recycling Plant.

Background Facts on Operation and Infrastructure

Deerubbin WaterFutures, a consortium including United Group Infrastructure, McConnell Dowell Constructors (Aust) and GE Water & Process Technologies, worked with Sydney Water to deliver the St Marys Recycled Water Plant

Deerubbin WaterFutures will operate and maintain the plant.

The project links the Penrith, St Marys and Quakers Hill water recycling plants to a new water recycling plant at St Marys.

Fifty-two kilometres of pipelines have been built to connect the plants and to transport the wastewater, recycled water and waste from the water recycling plant.

About 3,500 reverse osmosis filters have been installed by hand at the water recycling plant and they form the final part of the filtering process to extract any remaining impurities from the water that has already undergone biological treatment, sand filtration and ultrafiltration.

The reverse osmosis filters are able to capture particles as small as 0.0005 microns. A micron is a millionth of a metre.

To put this into perspective, human hair is about 75 microns in diameter, the smallest bacteria is about 0.22 microns, while a virus is even smaller at 0.001 microns.

some of the technology used in the water recycling process," Member for Londonderry, Mr Shearan said. "The education centre has been designed to be a flexible space. When group tours aren't booked, the centre can be used for workshops, meetings, conferences and industry events."

NSW Water Minister, Mr Costa said: "Using recycled water is a great way of saving our valuable drinking water from everyday use and making quality water available for people and the environment. Improving water efficiency through installing devices such as

Water Recycling at Sydney Water

Sydney Water treats recycled water to NSW Health standards so that it is suitable and safe for its intended use.

The wastewater that arrives at the St Marys Water Recycling Plant has already gone through many treatment steps. This includes filtering to remove nearly all biodegradable organic material and nutrients. It has also been disinfected.

The water recycling plant then uses some of the most advanced treatment processes available (ultrafiltration and reverse osmosis) to produce up to 50 million litres of very high quality recycled water a day (18 billion litres a year).

This recycled water is pumped to Penrith where it is released into Boundary Creek, which flows into the Hawkesbury-Nepean River below Penrith Weir.

When wastewater is treated, a series of physical, chemical and biological processes are used to clean it before it can be used again. The level of treatment depends on how the water will be used.

Secondary treated wastewater can be used for restricted irrigation of golf courses and racecourses.

Tertiary treated wastewater can be used in manufacturing, for toilet flushing, dust suppression, fire fighting and washing cars. Highly treated recycled water is required for specialised uses, like cooling towers, boilers and supporting environmental health.

water efficient taps, showerheads and washing machines, active leak detection and repair and Water Wise Rules will save up to 24 per cent of greater Sydney's water needs by 2015. Dams will continue to supply most of Sydney, Blue Mountains and the Illawarra's drinking water and the new desalination plant can provide up to 15 per cent of Sydney's water needs."

Source: NSW Government Media Release 5/10/2010 <http://premier.nsw.gov.au>
For more information on Sydney Water's recycling projects visit www.sydneypwater.com.au



Irrigation is vital for agriculture in the United States mid west.

Integrated water management vital for US horticulture

Managing the United States' vital yet increasingly fragile supply of high-quality water might be easier with more collaboration across jurisdictions, according to Jonathan R. Pawlow, counsel for the water resources and environment subcommittee of the U.S. House Committee on Transportation and Infrastructure.

Pawlow was the recent Distinguished Lecturer for the eighth Ellison Chair in International Floriculture Distinguished Lecture Series at Texas A&M University.

"We need to eliminate the current adversarial approach to dealing with our nation's water quantity and quality issues," he said. "We

need to establish a more holistic, integrated, sustainable planning and management approach." Speaking to an audience of horticulture faculty, students and commercial nursery operators, Pawlow said water is "a key component to achieving prosperity and wealth in our economy."

Though the nursery/landscape industries are high users of the water, some 49 percent, is used for thermoelectric power, Pawlow said. Since 1990, recycled water use has increased by 36 percent in the US and is still rising. This plus conservation, increased efficiency and productivity, and new technology have helped partially offset the increasing demand for water.

But water needs are expected to increase, especially in areas with the least capacity to handle more, he said. "As we enter the 21st Century, we have tremendous competition between different water users for the same water," Pawlow said. Because of this, he added, conflicts and disputes over water are cropping up nationwide -- even in the traditionally water-rich East. "Fights about water are in great part about economic development and sustainability," he said.

Pawlow called for more research to find new technology and approaches for water supply and use. And, he said, better planning is needed to assure water quality and supply for the future. The agriculture and horticulture sectors, he said, are likely to be faced with helping maintain water quality by controlling or reducing nutrients in the environment and controlling runoff water from irrigation. He added that increased enforcement or "activism" is expected regarding water and there may be discussion on "federalizing all waters/wet areas in the nation and regulating land use there."

Source: Excerpt from Media Newswire 27/10/2010 http://media-newswire.com/release_1131118.html

NEWS innovations & information

National

Cleaning up our detergent standards

Fairfax digital has released a news story on NSW Australian of the Year, John Dee, who is launching a nationwide campaign calling upon detergent manufacturers to clean up their act and reduce pollutants in detergents. They report that, "Australian supermarkets are selling laundry powders and dishwasher tablets containing phosphates that are being phased out overseas because of their disastrous effects on waterways."

Reducing the amount of hazards in detergents not only improves greywater, making it safer for plants and gardens but also reduces the burden on our wastewater treatment plants.

For more information SMH 7/11/2010 www.smh.com.au or visit <http://dosomething.net.au>

South Australia

Salisbury residents to drink treated stormwater?

A push to turn Salisbury Council's recycled stormwater into drinking water and pump it into homes will be investigated as part of a new \$1 million study. The SA Government approved the three-year study to see if water from the Adelaide council's extensive wetlands could be filtered to safe drinking standards on a mass scale.

To read the full article visit [MWE Environmental Management News](http://www.environmentalmanagementnews.com) 5/11/2010 <http://environmentalmanagementnews.net>

Taskforce for SA's stormwater recycling schemes

A high-level taskforce has been formed to help ensure South Australia achieves its ambitious targets for stormwater harvesting and recycling. Minister for Water Paul Caica said

while South Australia is already a national leader in stormwater harvesting and reuse, the Stormwater Taskforce will provide a collaborative approach to improving stormwater management and developing a stormwater master plan.

"This Government is well on the way to exceeding its short-term target for Adelaide of harvesting 20 gigalitres of water a year for non-drinking purposes by 2013," Mr Caica says.

"Our longer-term targets are even more ambitious with Water for Good setting us the task of producing up to 60 GL a year of recycled stormwater for non-drinking purposes in Greater Adelaide by 2050."

Source: Water Minister's News Release, Hon Paul Caica, SA Government 30/9/2010 www.premier.sa.gov.au

Victoria

Bacchus Marsh upgrade

To service the growing population of Bacchus Marsh, upgrade works to the Recycled Water Plant, including a new aerated lagoon are set to commence in early 2011, the local water corporation Western Water recently announced.

Source: [Western Water Recycled Water News September 2010](#)
www.westernwater.com.au

Western Water has Class C available

Western Water is seeking applications from property owners who would like to use Class C recycled water from the Riddells Creek or Woodend Recycled Water Plant; or Class B recycled water from the Gisborne or Sunbury schemes.

Recycled Water Plants. Suitable uses for recycled water include irrigating crops, orchards and sporting grounds.

For more information, please contact the Renewable Resources Team on 03 9218 5400.
Source: [Western Water Recycled Water News September 2010](#)
www.westernwater.com.au

New South Wales

Tweed residents discuss water security

Tweed residents are being asked how they would like their drinking water, reported the ABC recently.

The Tweed Shire Council says it is time for Tweed residents to take the plunge and say what they want before the council makes a final decision. The council has released a report into how the shire should increase its water supply, with recycled water being among the options available.

Source: [ABC News Online 14/10/2010](#)
www.abc.net.au

Sydney sewer mining projects get the go ahead

The government of NSW, has awarded a water-recycling licence to Veolia Water Solutions & Technologies to build a recycled water plant at the Darling Quarter development. "Construction is under way on a recycled water treatment plant in the basement of the new development to treat wastewater for use in the building's toilets and cooling towers," NSW Water Minister Phil Costa said. "This recycled water plant will use a method known as sewer mining to access wastewater from the main sewer and recycle it onsite, replacing up to 60,000 m³/year of precious drinking water."

Source: [Desalination Biz 12/10/2010](#)
www.desalination.biz

Queensland

Bundamba's recycled water: good enough to drink?

WaterSecure has released the second Water Quality Report for the Bundamba Advanced Water Treatment Plant, with results confirming the excellent quality of the purified water it produces and proving the water is safe to add to the drinking supply. The Independent International Expert Scientific Advisory Panel reviewed the results and Panel Chair, University of Queensland Vice Chancellor Professor Paul Greenfield said the panel had "concluded the treatment process barriers are able to control any water quality hazards and produce purified recycled water suitable to augment a drinking water supply".

Source: [WaterSecure Water Quality Report December 2008 to June 2010](#)
www.watersecure.com.au

Minimising stormwater pollution, managing urban growth

Climate Change and Sustainability Minister Kate Jones has announced Queensland's State Planning Policy for Healthy Waters, stating the new planning policy would strategically help minimise pollution from urban stormwater from population growth. "For instance, it would incorporate water-sensitive urban design in larger development projects such as installing grassy swales (long ditches) and artificial wetlands to clean up and slow down stormwater flows before they are discharged to waterways." "The main focus of the policy is to ensure planning schemes contain consistent approaches and standards for managing three water-quality issues – stormwater, waste water and non-tidal artificial waterways such as urban lakes." Ms Jones said developments needed to be planned, designed, constructed and operated in ways that reflected water quality objectives.

Source: [Ministerial Media Statement, The Honorable Kate Jones 20/10/2010](#)
www.cabinet.qld.gov.au

ACT

Thinking about wastewater

The ACT government aims to increase wastewater reuse from 5 to 20% by 2013, the Territory's Minister for the Environment, Climate Change and Water, Simon Corbell recently announced. The 'Think water, act water' strategy, which is the Territory's guiding water policy, aims to reduce per capita use drinking water by 12 per cent by 2013 and 25 per cent by 2023. A progress report on the strategy indicates good progress in achieving the targets through a combination of household

programs and infrastructure investment, notably the development of urban wetlands.

Source: [Jon Stanhope, Chief Minister ACT Press Release 20/10/2010](#)
www.chiefminister.act.gov.au

International News

Recycled weather improving Californian soils

The use of recycled water has improved the salinity of soils on Pajaro Valley's farmland closest to the coast, Pajaro Valley Water Management Agency (PVWMA) consultant Belinda Platts recently told the board of directors. In addition, the use of recycled water has not increased the nitrate levels in soil and the PVWMA's recycled water is close to the highest standard for agricultural use. Platts discussed the quality of PVWMA's delivered water and issues surrounding it during a presentation on salinity and nutrient management issues with irrigation water in the Pajaro Valley during the board's regular monthly meeting.

Source: [Register Pajaronian 21/10/2010](#)
www.register-pajaronian.com

Retaining plant nutrients during water treatment

As fertiliser resources decline and more treated wastewater is being used for agriculture, it seems logical to develop methods of retaining nutrients in recycled water during the treatment process. Researchers at the Fraunhofer Institute for Interfacial Engineering and Biotechnology in Germany are devising alternative methods for recovering the nutrients from wastewater for use in agriculture.

To read the full article, see [Creamer Media's Engineering News 5/11/2010](#)
www.engineeringnews.co.za

New water storages for Negev agriculture

The Sderot Reservoir is situated some two kilometers distant from the border with the Gaza Strip. This new reservoir established with the support of the Jewish National Fund (JNF) and USA Parsons Water Fund will supply treated sewage water for irrigation use by local farmers and end pollution of the Nahal Shikma Nature Reserve, the river, the ground water and the sea. The late Natan Parsons visited the Sderot region some five years ago and immediately understood the vital need for a local reservoir for reclaimed sewage water. "Sderot Reservoir is part of Natan's vision of helping farmers, improving water quality, enhancing the environment and encouraging tourism in the Negev," said Natan's widow Amy Parsons.

Source: [The Jerusalem Post 28/10/2010](#)
www.jpost.com