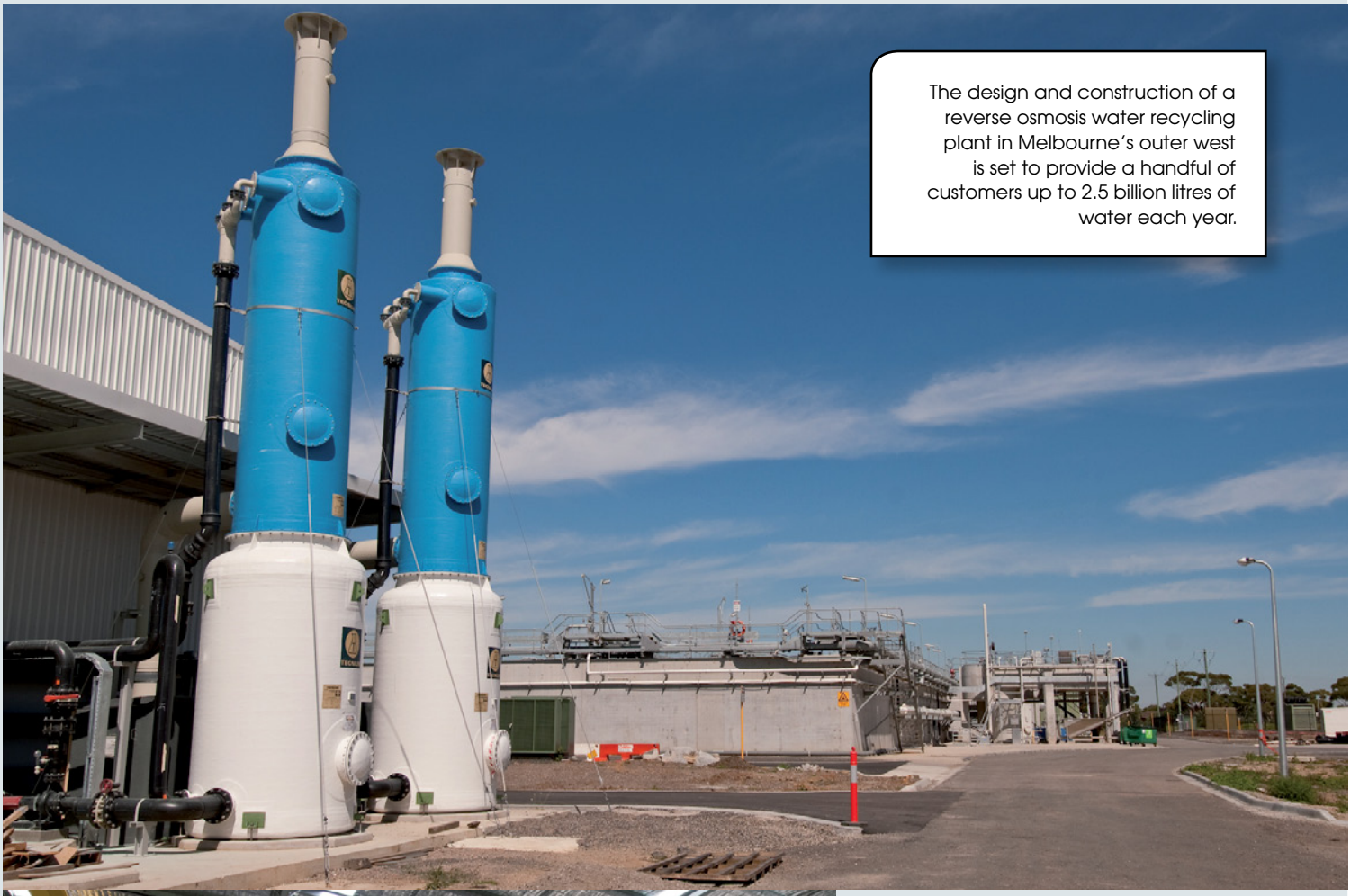
Water Recycling the Solution for City West Water



The design and construction of a reverse osmosis water recycling plant in Melbourne's outer west is set to provide a handful of customers up to 2.5 billion litres of water each year.

The Altona Recycled Water Project at City West Water's Altona Wastewater Treatment Plant in Melbourne's outer west is arguably one of Australia's most complex recycling projects.

The project comprises the planning and construction of an ultrafiltration and reverse osmosis plant to produce two grades of recycled water from the secondary treated wastewater produced at the Altona Treatment Plant. The 2.5 billion litres of recycled water will be used by a large-scale plastics and chemical manufacturer, two nearby golf courses and nearby public recreation areas.

Like many projects of this level of complexity, the project faced numerous challenges throughout its development, including cost constraints, a tight deadline and the quality of source water.

Supply from the Altona Wastewater Treatment Plant

City West Water owns and operates the Altona Wastewater Treatment Plant which services just over 20,000 residential and commercial properties in the local area. With a high concentration of commercial and industrial operations in the area, Altona is home to a number of industrial and business customers, many of whom use large volumes of water for industrial purposes such as cleaning, cooling and irrigation.

The Altona Recycled Water Project aims to reduce the drinking water used by some of these customers through use of recycled water. The project, costing $46 million, will supply billions of litres of high quality recycled water each year.

The project was devised after detailed investigation revealed significant industrial water consumption from the drinking supply system could be replaced with high quality recycled water.

The plant now supplies nearby plastics manufacturer Qenos, the Sanctuary Lakes and Kooringal Golf Clubs, as well as Hobsons Bay City Council's Altona Green Reserve, distributing recycled water through a purpose built pipeline. Other Hobsons Bay City Council open space sites are also scheduled to access the recycled water supply through a stand pipe that will be built to provide recycled water for streetscape purposes, such as tree watering.

"As Melbourne's water supply came under increased pressure during 13 years of drought, City West Water dedicated substantial resources to developing our alternative water capabilities," explains City West Water Managing Director, Anne Barker.

"Over recent years, these resources resulted in a raft of projects that capture, recycle and reuse water. Many of our customers are now using the alternative water projects such as the Altona Recycled Water Project as a secure source of water for non-drinking purposes."

Two different grades of recycled water

Until the plant was built, up to 14 million litres of secondary treated wastewater from the Altona Wastewater Treatment Plant was discharged to Port Phillip Bay each day.

During peak demand periods, the project is capable of recovering up to 70 per cent of the available wastewater from the plant to produce two grades of recycled water for irrigation and industrial use.

Mariano Sola, Project Manager at TEDRA, the Spanish contractor that constructed the recycled water treatment plant, said the production of two grades of recycled water has provided an extra layer of complexity.

"The Altona Recycled Water Project is complex because of the two qualities of water required – it is not common practice to have to produce multiple qualities of recycled water out of the one plant," Sola said.

The recycled water treatment plant utilises ultrafiltration and reverse osmosis, to remove excess salt from the treated wastewater.

Production of recycled water for irrigation (the golf clubs and Council open spaces) requires demineralisation through a single pass reverse osmosis system, while production of industrial grade recycled water (for Qenos) requires treatment through a two pass reverse osmosis system.

Development of the project required careful management of customer expectations for water quality and availability, integration with the existing Altona Wastewater Treatment Plant operation and the implementation of modelling, monitoring and dispersion measures to minimise the impact of the discharge on the environment.

Customer management

At the project investigation stage, City West Water entered into detailed discussions with potential customers for the recycled water to gauge interest in the concept. Effectively, this removed much of the demand risk for the project by allowing it to proceed on the basis of signed customer supply agreements. These agreements included detailed specifications of the price and the required quantity, quality and reliability of the recycled water to be supplied.

The customers are required to prepare health and environment management plans to ensure the health and environmental risks are understood and appropriately managed. Training programs were conducted to the employees of the customers to ensure safe and proper use of the recycled water.

A Tight Deadline

Due to the severe drought being experienced in south eastern Australia and previous undertakings given to potential customers for recycled water, a deadline was set to supply the first recycled water from the Altona Recycled Water Project to customers as quickly as possible.

Such a requirement meant that the various scoping, approval, design, construction and procurement processes had to be executed in parallel.

Varied quality of source water

During the project monitoring period, it was observed that the quality of the sewage into the Altona Recycled Water Project could vary significantly in some parameters over short periods of time.

This phenomenon was discovered to be the result of discharges into the sewerage system upstream of the Altona Treatment Plant that pass through the wastewater treatment process and into the plant wastewater.

One outcome from these observations was that there would be times during the plant's operations when the feedwater would be outside normal specification for quality and/or quantity. This essential information was factored into the system and operational design of the plant to ensure recycled water output was of the required quality at all times during the operation of the plant.

Commissioning and plant operation

Heavier than normal spring and summer rainfall has resulted in the two golf club customers not yet requiring recycled water for irrigation. Supply to Qenos, which will take the bulk of the recycled water produced from the plant, has been delayed by a maintenance upgrade of the site.

Barker said the Altona Recycled Water Project will provide tangible benefits to its customers.

"The recycled water being produced at Altona presents an exciting opportunity for City West Water to replace precious drinking water in applications such as cooling and irrigation.

"With the climatic variability forecast to impact traditional water supplies across the country, alternative water will continue to emerge as a vital component of the provision of water to the community."

The Future for the Project

The Altona area is home to the highest concentration of heavy industry in Melbourne, and City West Water is currently working to expand the scheme to provide recycled water to other industrial customers in the Altona Industrial Precinct.

It is estimated that up to 5 billon litres of additional recycled alternative water can be supplied to these industries saving an equivalent amount of drinking water per year.

Based on City West Water research, there is the potential to replace more than 7 billion litres of drinking water per year with recycled water in the Altona Industrial Precinct – this is precisely what the Altona Recycled Water Project (stages one and two) aims to deliver.

Currently in the functional design phase – a process that gives City West Water relevant data and information to formulate a business case – stage two would involve the construction of another recycled water salt reduction plant and pipeline to the Altona area.

This plant will have the capacity to deliver up to an additional 4.7 billion litres of recycled water per year.

Altona Recycled Water Project Customers

Qenos

Qenos is a multinational manufacturer of plastics and rubber raw materials. The Altona Chemical Complex began production in the early 1960s and is the largest production centre for petrochemicals and plastics in Australia today.

Qenos will receive approximately six million litres of recycled water each day. The recycled water will replace drinking water currently used in boilers and cooling towers.

Kooringal Golf Course

Korringal Golf Club is an 18-hole par 71 parkland Championship Course with many trees and a varied and challenging layout. Kooringal is an Aboriginal word meaning 'by the water'. The course adjoins Altona's western beach and has held a number of events at the course, including a regional qualifying round for the Australia Open. Recycled water will be used for irrigation purposes.

Sanctuary Lakes Golf Course and Resort

The Sanctuary Lakes Golf Club is an exclusive member's only club, featuring a championship standard Greg Norman designed 18-hole course. With world class fairways and greens, Sanctuary Lakes is the home of the Men's Victorian PGA Championship. The course is located within the Sanctuary Lakes Residential Resort. Recycled water will be used for irrigation of the golf course, as well as irrigation of the Resort's street trees and open spaces.

Hobsons Bay Council

Hobsons Bay Council will use recycled water in their ovals located in Victoria Street, Altona Meadows. It consists of two sports ovals that are used for turf cricket and football and accessed by a local primary school. Both ovals will be irrigated with recycled water. The Council also proposes to construct a stand pipe at HD Graham Reserve to enable water carting for street landscaping.

TEDRA Australia

completes design and construction of 9 MLD recycled water treatment plant

In August 2009, Tedra Australia was awarded City West Water's contract to design and construct a 9 MLD Recycled Water Treatment Plant (RWTP) at City West Water's Altona Treatment Plant in the western suburbs of Melbourne. Tedra also won the contract to operate and maintain the plant for a period of five years following completion of the plant's construction.

Tedra Australia is a joint venture between Tedagua S.A. and Drace Medioambiente, which in turn are wholly-owned subsidiaries of the ACS Group, one of the largest and most successful infrastructure development conglomerates in the world. Expansion into Australia has become a major strategic priority for the ACS Group and, with this in mind, the Group has developed important links with the Leighton Group of companies.

Tedagua and Drace have more than 250 water plant reference sites throughout the world involving all types of water treatment from large-scale seawater and brackish water desalination to wastewater treatment and recycling.

Construction and commissioning of the Altona RWTP is now complete and the plant is performing with a high level of efficiency. The plant is designed to produce two flows of water quality: 6 MLD for local industrial customers of City West Water, and 3 MLD for the irrigation requirements of local parks, gardens and golf courses.

Tedra Australia designed the Altona RWTP to be robust and reliable with a high degree of operability. Its design utilises the extensive experience of Tedra's Spanish parent companies with ultrafiltration and reverse osmosis systems in ways that make the Altona RWTP a leading edge water treatment facility.

Each of the plant's main equipment components (including UF and RO) has at least one unit in reserve. This ensures high-level plant operability even when, for example, a UF train is out of service for cleaning or scheduled maintenance.

In addition, an intermediate tank between UF and RO processes has been included, which guarantees feedwater to RO processes – feedwater to RO membranes is not dependent on instantaneous flow from the UF membranes.

The Altona RWTP is a first-class water treatment installation, with a standard of finish that sets a new benchmark in Australia for excellence in the field.