

# INNOVATIVE RECYCLING AND TREATMENT AT THE GIPPSLAND WATER FACTORY

VICTORIA, AUSTRALIA

The Gippsland Water Factory (GWF) will be an innovative wastewater treatment and recycling system located in the Gippsland region of Victoria, Australia. Over 43 miles (70 km) of transfer system and eight lift stations are used to convey wastewater to a new water factory. The GWF will treat about 9.3 mgd (35 ML/d) of domestic and industrial wastewater. When the project's first stage is complete, the GWF will produce 2-3 mgd (8-12 ML/d) of high-quality recycled water for use by local industry. The remainder will be discharged to the existing Regional Outfall Sewer (ROS), which currently handles raw wastewater. When GWF is operational, the ROS will convey only treated effluent to the ocean, 90 km (56 miles) southeast of the facility.

The GWF project alliance includes a principal sponsor, Gippsland Water, and a consortium of three specialized companies providing design and construction services including CH2M HILL, Transfield Services, and Parsons Brinckerhoff.

## GROUNDBREAKING SUSTAINABILITY PROJECT

The GWF will be the first of its kind in Australia, highlighting Gippsland as a leader in sustainability and innovation and delivering a range of benefits for the Gippsland region, including addressing the odor currently created by the open channel section of the ROS. The recycled water will benefit local industry, the environment, and the community. An interpretive centre is also being constructed as part of the GWF to showcase the wastewater treatment technology and serve as an education resource for the community.

The GWF will use cutting-edge technology to treat industrial and domestic wastewater, including biological treatment, membrane filtration, and reverse osmosis. Industrial wastewater (along with biological sludge streams) will be treated through an anaerobic process before it flows through a membrane bioreactor system.

## COGENERATION COMPONENT

The project will use co-generation (330 KW) from the biogas generated by anaerobic treatment, as well as a

### Client

Gippsland Water

### Project Status

Started January 2006; anticipated finish date January 2011 (after 2 years of operations)

### Role and Contract Value

Alliance Commercial Lead; Engineering Cost A\$16 million; Construction Cost A\$180 million

### Staff Contacts

Kim Fries/CGY - Chief Engineer

Glen Daigger/DEN - Senior Technical Advisor

Peter Burrowes/KWO – Senior Technical Advisor

Jay Witherspoon/SYD – Odor Management

### Key Project Elements

- Evaluates treatment options
- Explores opportunities to incorporate green engineering principles through the design
- Uses innovative treatment technologies such as biological treatment, membrane filtration, and reverse osmosis
- Will raise community awareness about water conservation and sustainable water management



*Maryvale Treatment Plant under construction (2008)*

MicroHydro station (340 kW) to capture energy from a large clean water stream that feeds into the clean water reservoir.

This electricity will be used to power operational activities and minimize environmental impacts. Opportunities to incorporate green engineering principles through design have been explored.

## MINIMIZING THE ECOLOGICAL FOOTPRINT

Steps have been taken at the plant and in the transfer system to reduce the impact on natural flora and fauna. In many areas where high-quality flora was located along the transfer system route, directional drilling was used for main installation. About 30 percent of the GWF site has been dedicated to natural grassland/wetland, and the site stormwater system has been designed to restrict offsite flows to less than development levels. Every effort has been made to reduce energy use and greenhouse gas generation to meet one of the project's key performance criteria.

## MINIMIZING IMPACT ON THE SURROUNDINGS

One of the key project drivers is the elimination of odor problems in the 40-km-long, open channel section of the ROS. In addressing this odor problem, it was critically important that a new one was not created. Therefore, an extremely high level of odor mitigation (collection and treatment) has been incorporated into all of the new facilities—both the treatment plant and the lift stations that provide raw sewage feed. To the maximum extent possible, this odor treatment has been based on biological process to ensure the commitment to green engineering is met and the possibility for sewage odors to be replaced with chemical odors is eliminated.

Although the GWF is located in a relatively remote location (surrounded on three sides by native bush or a paper plantation), a commitment has been made to maintaining off-site noise at current background levels. A community facility has also been incorporated into the factory; not only have impacts on the surroundings been minimized, but it makes the GWF a welcoming location for visitors.

## MAXIMIZING RESOURCE RECOVERY/REUSE

The project is fundamentally delivering new wastewater infrastructure to address the obsolescence of a 50-year-old sewerage asset – the Regional Outfall Sewer. However, it is a unique solution in that it is based on recovering usable water from the wastes generated by 70,000 people and local industry—both as a part of the initial project and as foundation infrastructure for future water management initiatives. The project also incorporates co-generation to use biogas from the GWF's anaerobic process, even though the co-generation component is relatively small in size. Finally, the biosolids produced by the facility will be incorporated into Gippsland Water's Soil Organics and Recycling Facility—a broad-based initiative to use a range of solid waste streams to produce a reusable product through composting.

## ENSURING ECONOMIC VIABILITY

The project is being managed as an Alliance, a method of D-B-O project delivery that ensures triple bottom line accountability through a series of key performance indicators that reflect economic, social, and environmental goals and objectives. Meeting these goals is linked to payment on the project and has motivated the project team to work toward economic viability within a broader context.

