

# Burwood Beach Wastewater Treatment Plant

Hunter Water overhauls Burwood Beach plant control system in just eight weeks with Schneider Electric



## PROJECT AT A GLANCE

### Project type

Hunter Water's Burwood Beach Wastewater Treatment Plant, the largest wastewater treatment facility in the Newcastle area, required an overhaul of its legacy PLC hardware and software platforms to meet the region's growing requirements. The plant needed to run continuously throughout the eight-week upgrade, which was designed to allow Hunter Water to make best use of existing infrastructure while also taking advantage of new technologies.

### Location

- Burwood Beach, Newcastle, NSW

### Solution overview

- Quantum Programmable Logic Controllers (PLC)
- Unity Pro
- Migrate PLC software to Functional Block Diagram (FBD) format
- Collaborative Automation Partner NR&D SY/MAX Ethernet Remote Interface (SERI-T module)
- Design, engineering and commissioning services by Schneider Electric's Installed Base Services team

### CUSTOMER BENEFITS

- Project completed on time and on budget with zero downtime.
- Schneider Electric provided a single point of contact, technical expertise and competitive pricing, to deliver a tailored solution that made best use of Burwood Beach's existing infrastructure.
- Software migrated to function block diagram (FBD) format which makes it easier for engineers to control and optimise processes.
- Long-term relationship provides on-going support for Hunter Water's improvement program.



### Overview

Ageing water infrastructure and tougher environmental legislation meant Hunter Water needed to improve the efficiency of its Burwood Beach Wastewater Treatment Plant (WWTP). The enhancements involved the migration of the automation control system during a tight eight week time period, allowing no room for error or plant downtime.

Hunter Water selected Schneider Electric to manage this major migration due to its expertise in handling complex water projects and ability to leverage its global network of partners. By applying new techniques, Schneider Electric was able to deliver an effective migration within the tight timeframes specified, without causing any disruption to household service.

Schneider Electric was able to cutover the plant's PLCs within just five working days, a process which typically takes several months. The success of the project has reduced plant maintenance time, increased reliability and created a platform to monitor and measure energy consumption.

### Introduction

Hunter Water has a long and rich history, stemming from humble beginnings in the 1880s, when water was first delivered to Newcastle from a temporary pumping station on the Hunter River. Today, the state-owned corporation provides water and wastewater services to over half a million people in the lower Hunter region.

The Burwood Beach WWTP is Hunter Water's largest wastewater treatment facility, treating an average daily flow of 44 million litres and servicing approximately 180,000 people – 25 per cent of Hunter Water's customers.

### Upgrading Burwood Beach

In September 2009, Hunter Water began upgrading Burwood Beach WWTP to provide additional processing capacity and improve the reliability of equipment. The project is part of a five year program that will see approximately \$700 million invested in water and wastewater improvement projects across the Hunter and Newcastle area. These projects are designed to meet the growing requirements of customers and run plants in accordance within guidelines issued by the Office of Environment and Heritage.



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*—Mark Mills, Manager Electrical & Mechanical, Hunter Water*

As part of the project Hunter Water needed to upgrade the legacy SY/MAX PLC hardware and software platform used at Burwood Beach for the automation of electromechanical processes.

"Parts and engineers trained in our legacy PLC technology were becoming scarce, which meant the time taken to replace components was much longer than it needed to be," commented Mark Mills, Manager Electrical & Mechanical at Hunter Water. "Upgrading the legacy infrastructure was crucial if we were to keep the plant running in the most efficient way possible."

### Partnering for success

Hunter Water set a deadline of eight weeks to complete the migration to minimise disruption to plant operations and the service delivered to local residents. Hunter Water was also keen to ensure the plant ran continuously while upgrades were being made.

The decision to partner with Schneider Electric to address these requirements was threefold, as Mark Mills explained: "Our relationship with Schneider Electric is far larger than a single project and we've developed a close partnership with them over the past 20 years. The team has a detailed understanding of our organisation and the challenges it faces, which means they are well prepared to support us in complex project roll-outs and ensure we get the best possible outcomes.

"Throughout the plant upgrade, Schneider Electric was able to apply its learnings from previous projects to ensure the PLC migration ran smoothly in the fastest time possible. Finally, Schneider Electric was able to leverage its global network of partners, which meant we could minimise the time and resources involved in engaging multiple suppliers."



## A two staged approach

One of the upgrade requirements was to generate new PLC software from Ladder Logic into Functional Block Diagram (FBD) format. FBD is a programming language that performs open-loop and closed-loop control functions. This makes it easier for engineers to conduct calculations of engineering concepts, in feedback and control, to optimise processes.

Upgrading the PLC software from Ladder Logic to FBD format typically takes time that wasn't possible, given the short time frame for migration. Schneider Electric suggested an alternative staged approach, that would allow the timely upgrade of the hardware, with the development of a new functional specification and the software into FBD format to follow soon after.

"To deliver on its promises Schneider Electric called on the support of its Collaborative Automation Partner NR&D (Niobrara Research & Development)," explained Mills. "NR&D worked seamlessly with Schneider Electric to supply its SERI-T module – a SY/MAX Ethernet Remote Interface – that enabled better connectivity and information flow between different parts of the plant."

## Hardware upgrade

The old control system consisted of a SY/MAX Model 450 processor with 14 remote racks, installed in several panels throughout the plant and connected to the processor via Local Interface (LI) and Remote Interface (RI) modules. A smaller PLC, SY/MAX Model 50, was also used for the plant's odour control system.

The upgrade involved the replacement of the old processor rack and eight of the 14 remote racks, and the Model 50 PLC, with Quantum Unity PLC hardware. The other six SY/MAX racks remained, but were controlled by the new Quantum PLC by using the NR&D SERI-T module.

To ensure minimal plant disruption, installation was achieved in approximately 45 minutes. This involved installation of the SERI-T modules in each of the remote racks and the reinstatement of the plant to a working status when the processor was switched from SY/MAX to Quantum.

"The first phase of the migration process was very efficient, taking less than an hour, instead of the typical time frame of several days." commented Mills. "Furthermore, all racks apart from one were cutover within five working days; a process that can normally take months of work."

## On time, on budget and without downtime

By avoiding the traditional 'rip and replace' mentality, Schneider Electric was able to help Hunter Water make best use of its existing infrastructure. As a result, the control system implemented by Schneider Electric was completed within a demanding eight-week schedule and came in on budget. The cut-over strategy also meant the migration project avoided any downtime so the impact on households was nil.



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Commenting on the migration, Mark Mills said: "As an operating plant serving a large proportion of Hunter Water customers, it was essential Burwood Beach remained operational throughout the migration process. Schneider Electric's technical expertise, strong project management and competitive pricing meant that we were able to meet this requirement and ensure the project was completed within the tight eight-week schedule we demanded."

"By involving partners such as NR&D and providing a single point of contact, Schneider Electric removed the headaches traditionally associated with projects of this nature. As Schneider Electric's installed-base services team oversaw the project through every stage, we were confident everything was being done to minimise potential risks of the migration."

"In the past, parts and technologies in the plant were replaced on a case-by-case basis. Now we've standardised that with Schneider Electric products and have the latest infrastructure in place, the plant is far more reliable and any operating problems can be tackled quickly and easily", said Mills.

Commenting on Schneider Electric's approach to the project, Scott Wooldridge, Vice President, Schneider Electric Industry Business said:

"The Burwood Beach migration project is an example of the results Schneider Electric can deliver when truly embedded within an organisation. Our detailed understanding of the 'pain points' facing Hunter Water, combined with our holistic approach in tackling them, meant we were able to deliver a complete solution, not just individual products."

"This project also demonstrates the skills and expertise of our installed-base services team in developing customer-orientated solutions that reduce capital and operating expenses while increasing operational efficiency," added Wooldridge.



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### Looking ahead

Together with Hunter Water, Schneider Electric is delivering innovation and investment protection to many of Hunter Water's most critical assets. This includes supporting the migration of the organisation's 12 other plants over the next five years, to increase plant reliability and install more efficient technologies.

In the long term, Schneider Electric will continue to work closely with Hunter Water, so that the organisation can continue to achieve sustainable growth while maximising return on investment.

"This project has laid the foundations for future work to improve the energy efficiency of the plant. Long term, we're looking forward to working more closely with Schneider Electric on other projects, that will enable us to monitor and manage energy more effectively and future-proof our plants against likely consumer and regulatory requirements," concluded Mills.