

MURRUMBA DOWNS SEWERAGE

MAIN CONSTRUCTION COMPANY : The Murrumba Alliance
DEVELOPER / CLIENT : Moreton Bay Water / Unitywater
PROJECT END VALUE : \$148 Million
COMPLETION : December 2010

JOHN HOLLAND & UNITY WATER ... SEWERAGE PLANT ALLIANCE

In mid 2007 John Holland was awarded a contract by Unitywater (previously as Moreton Bay Water / Moreton Bay Regional Council) for the upgrade of the Murrumba Downs sewerage Treatment Plant. General Manager of John Holland's specialist Water division, Greg Taylor, said at the time: "The award of this contract reflects Moreton Bay Regional Council's confidence in John Holland to deliver innovative and tailored engineering solutions that solve plant expansion, effluent quality and odour issues, whilst taking into consideration site space, budget and time constraints. Today's announcement increases the total value of works on site at Murrumba to almost \$200M and strengthens John Holland's relationship with MWH, a key sub-alliance partner".

The project was delivered under an alliance contract framework between John Holland and Unitywater. An 'Alliance' is an open book approach to contracting, in this case the Alliance was responsible for the design, construction, commissioning and operational support for the project.



The original AWTP plant consisted of four individual buildings with separate functions, the design brief for the new Advanced Water Treatment Plant called for a larger amalgamated building to be integrated into a confined site. John Holland staff identified a number of challenges relating to works under this contract. A key issue was that the team had to make the new advanced water treatment plant fit in and around the existing plant without too much disruption...this was achieved with distinction and although the AWTP had a very tight timeline for completion due to the drought, in the event, this was achieved 2 weeks early ... a real credit to Alliance teams.

The Alliance has built a 4 megalitre/day recycled water plant producing 'class A' desalinated water to send to local industry. The other purpose of the plant upgrade was to increase the capacity of the existing facility from 18 megalitres to 30.8 megalitres per day to meet the demands of a growing population within Brisbane's Northern Growth Corridor.

The project's scope of works also included a new odour control system. This stage commenced in June 2008 and was completed at the end of September 2010. This work resulted in a reduction of nitrogen and phosphorus content in the treated sewerage. A high quality discharge now complies with the new EPA regulation that limits nitrogen to 3mg/L and phosphorus to 1mg/L, making it significantly better quality when released into the region's waterways. This will have a major positive impact and will greatly benefit a region with one of the highest population growth rates in south-east Queensland. Locally it will minimise the impact of the plant on the nearby community.

The existing sewerage treatment plant has now been upgraded to its specified capacity of 30.8 megalitres/day. The rebuild involved a new inlet works, new balance tanks, new bioreactor, new clarifiers and an upgrade to the existing bioreactor. The new odour control facility has been installed plus new chemical dosing, new and upgraded sludge handling facilities and new UV disinfection. An upgraded outfall pipe to Pine river has been commissioned and new roads and landscape elements have been completed.

After about three and a half years, the Alliance is almost clear of the site now where they will have either demolished and rebuilt, or modified nearly every structure with the exception of the pre-existing control building. What Unitywater have now, is a brand new plant that will serve them very well for years to come and help support the growth expected in the area.

John Holland Group is one of Australia's leading and most diversified contracting, engineering and services providers, operating throughout each state and territory of Australia having the unique delivery model of national specialist skills integrated with strong regional businesses.

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“PSG AT MURRUMBA DOWNS... MONITORING WASTEWATER PROCESSING

PSG is one of Australia's leading electrical and communication services businesses, providing a national contracting solution for major construction projects and effective operational and essential asset monitoring and maintenance services for clients across Australia.

With a singular focus on the electrical and communication services market, PSG has actively developed one of the most comprehensive and fully integrated portfolios of electrical and communication services capabilities in the industry, with leading positions in the key markets within which the business competes such as Public Infrastructure (Health / Justice / Education / Water / Entertainment), Commercial (Office Accommodation/ Retail / Data Centres), Mining and Defence.

PSG Richard Flanagan Infrastructure offers a diverse electrical service for our clients which include all levels of government and

many of Australia's largest corporations. We are leaders in ecologically sustainable development, engineering cleaner projects and introducing innovative solutions.

At the Murrumba Downs Wastewater Treatment Plant Upgrade Project, PSG Richard Flanagan was contracted to deliver the upgrade of the existing Waste Water Treatment Plant with an addition of a 4ML/day Advanced Water Treatment Plant using a Micro-Filtration, Reverse Osmosis process. Effluent feed water is now being provided from this upgraded Murrumba Downs Waste Water Treatment Plant to the adjacent Amcor Paper Mill in Petrie, Queensland. The improved plant has significantly upgraded the quality of the effluent. Looking to the future, the capacity of the plant has also been improved to cater for the increased population demand estimated for 2016. Master planning has allowed for future expansion to meet estimated 2042 flow requirements.

PSG Richard Flanagan Infrastructure proved to be an effective sub-alliance partner working as part of the team on a brown field site. Together they were able to deliver a fully functional plant which was commissioned 3 months ahead of the planned completion date.

PSG Richard Flanagan Infrastructure's scope entailed the electrical, control and instrumentation detailed design, delivery, assisting with commissioning and optimisation of the complete plant. The work extended to the supply, installation and pre-commissioning of 12 major MCC's and associated LV Drives. This included control and ELV instrumentation which communicates over a fibre optic redundant ring topology, using Ethernet Profibus and Foundation Fieldbus protocols to a Delta V DCS system. All was integrated and installed on the existing brown field site.

PSG Richard Flanagan Infrastructure offers a wide range of electrical services; they include many departments at several levels of government as well as a cross-section of Australia's largest corporations. It is a leader in ecologically sustainable development, engineering cleaner projects and is constantly developing innovative solutions. Employing a blend of national leadership, product expertise and strong on-the-ground support, PSG is helping to shape landmark developments in their field.

In recent years PSG Richard Flanagan Infrastructure has completed many other projects which involved the reticulation and treatment of water and effluent. A few are: Wynnum MFRO, Wynnum Waste Water Treatment Plant at Lytton, the Merrimac WWTP Stages 1, 2 & 3, the Oxley Waste Water Treatment Plant, Sandgate Waste Water Treatment Plant upgrade, Wacol Waste Water Treatment Plant upgrade, the Noosa Coastal Sewerage Treatment Plant and the Lander's Shute Hydroelectric Co-generation Project.

In the department of 'serious technology, and having fun!' .. over the last decade PSG Richard Flanagan has been intimately involved with the design and installation of rides and infrastructure at Sea World and Wet'n'Wild. Behind the scenes, these businesses have the control, treatment and disposal of water and waste water as a primary focus."

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RPC DUCTS AND COVERS AT MURRUMBA

The Murrumba Alliance between Moreton Bay Council, John Holland and Montgomery Watson Harza was formed to upgrade an existing Waste Water treatment plant at Murrumba Downs north of Brisbane. A critical part of the specification was to improve the quality of the effluent and to control odours that would otherwise impact on the local community.

RPC Technologies was awarded a design and construction sub-alliance for the delivery and site installation of approximately 1000 metres of ductwork for the Odour Extraction System and 3500 square metres of GRP (Glass Reinforced Plastic) covers for bioreactor tanks 1 and 2. The scope also included 100 square metres of aluminium covers over the inlet works and a 1.3 metre diameter GRP exhaust stack.

The GRP covers span up to 13 meters across each of the two tanks, were bolted directly onto the concrete tanks and were designed for a live load of 1.5 Kpa. The duct system was subjected to Caesar Analysis to validate the structures.

The RPC team used in-house resources to manufacture all GRP components for the project. These included RPC's Newcastle manufacturing facility for large diameter ductwork and their factory on Batam Island in Indonesia for the GRP covers and smaller diameter ducts. The steel duct supports and saddles, aluminium covers and stainless steel

parts for dampers were made at their specialty fabrications workshop in Seven Hills Sydney.

RPC staff were involved with the Murrumba Downs Wastewater Treatment Project for 18 months prior to the installation being completed. Recent commissioning of the duct system demonstrated that flow rates and pressure drops inside the ducts were achieved as designed. The sub-alliance project delivery model provided the flexibility to assist the entire project to achieve the best overall outcomes, particularly at the many interfaces between the odour extraction system, and other mechanical and civil systems.

The Industrial Group of RPC, executed the project on time, on budget, and with no lost time injuries.

RPC has an operational presence in Australia, Singapore and Indonesia.

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WATERGATES AT MURRUMBA

Watergates is one of Australia's leading penstock suppliers to the municipal water market. During the past year (2009-2010), they designed and manufactured high quality stainless steel water control equipment, including penstocks, stopgates and weirs, for the new Murrumba Downs Water Treatment Plant just north of Brisbane. The company worked closely with John Holland Group, the main contractor, to ensure that their part in the project was executed smoothly and on schedule.

Watergates is part of Ludowici Australia Pty Ltd. A diversified industrials business formed in 1858. With a proud history going back over one hundred and fifty years, the company delivers quality in products and services, a high level of respect for people, a safe working environment and an ethical approach to its corporate responsibilities. Watergates' Brisbane base includes a sales office with engineering, fabrication and installation facilities exclusively dedicated to non-ferrous steels including stainless steel.

For the Murrumba Downs Water Treatment Plant project, Watergates provided innovative solutions and outstanding engineering expertise in the manufacture of high quality penstocks, stopgates and weirs. These water control elements were engineered to order, having been designed to suit specified requirements. Both the penstocks and stopgates consist of robust stainless steel frames designed to withstand

specified maximum on and off-seating pressures and operating forces. To achieve full perimeter sealing the 25S-T model incorporates a self-adjusting top seal.

The stainless steel sliding gate is designed and suitably stiffened to withstand specified pressures. Penstocks were fabricated using grade 316/316L stainless steel. These materials provide excellent corrosion resistance while self-adjusting UHMWPE seals provide optimum sealing and a low co-efficient of sliding friction during gate operation. Put simply, they're built to last, easy to use and guaranteed to perform according to specification!

Watergates is an ASSDA accredited stainless steel specialist fabricator and installer and is accredited to ISO9001:2008.



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