

KEPPEL MERLIMAU COGEN II STOPLOGS FOR OUTFALL CULVERT AND SEAL PIT DISCHARGE STOPLOGS

PROJECT DETAILS

CLIENT: ALSTOM POWER SINGAPORE PTE LTD

LOCATION: SINGAPORE

DATE: MARCH 2012 – OCTOBER 2012

PROJECT VALUE: EUR300MILLION



KEPPEL MERLIMAU COGEN II STOPLOGS FOR OUTFALL CULVERT AND SEAL PIT DISCHARGE STOPLOGS



DESCRIPTION

Contracted to Keppel Merlimau Cogen Pte Ltd (KMC), Alstom, a global leader in the supply of equipment and services for power generation, engaged AWMA to supply isolation gates for Keppel Energy in Singapore.

The AWMA control gates divert water flow from the turbines, providing isolation and the mitigation of tidal waters for maintenance purposes.

PRODUCT

AWMA were engaged to supply the following:

- 1 set off grade 316 stainless steel 4200mm wide x 6000mm high roller stoplogs with 6500mm high embedded stainless steel frames and cathodic protection system
- 1 off grade 316 stainless steel 2600mm wide x 4200mm high segmented roller stoplogs with 6500mm high embedded stainless steel frames and cathodic protection system
- 1 off grade 316 stainless steel 4000mm high x 4000mm high segmented stoplogs and frame
- 2 off grade 316 stainless steel 2000mm wide x 2000mm high, 6m head pressure stoplogs
- 2 off self-engaging stoplog lifting frames with a working load limit of up to 6000kg
- 3 aluminium storage racks

SERVICES

AWMA provided 100% of the design and manufacture process as well as on-site installation supervision across three sites. Total value of AUD350,000.

Additionally, AWMA provided extensive documentation, training and support.

MANAGEMENT

Early Contractor Involvement:

Initial site visits by AWMA sales and engineering staff to contribute to conceptual design development (6 weeks).

Design and Drafting:

AWMA in-house engineering team (6 weeks).

Manufacture:

AWMA in-house manufacturing team including purchasing, fabrication, QA, administration (8 weeks).

Installation:

2 mobilisations by the installation team.

Commissioning:

AWMA Operations Manager (2 days).

Documentation:

Safety In Design, ITP, QA, MDR, O&M Manuals, Installation Manuals etc, managed by AWMA in-house administrative and QA departments.

Training:

Onsite by our Installation Manager (1 day), plus on-phone support as required.

DELIVERY

AWMA successfully delivered water control infrastructure for three sites within the power plant on-time and without variation, despite tight timeframes with multiple international mobilisations.

INNOVATION

The custom designed stoplogs feature rollers allowing the immersion of gates during a hydrodynamic flow of 4.65 cumecs.

All three sites control water which has passed through the turbines and is therefore of an extremely high temperature. In combination with tidal sea water in the outfall channel, the environment is highly corrosive requiring the inclusion of cathodic protection on the gates and frames. Stoplogs also include sacrificial anodes to maximize design life in the sea water application.

Low maintenance polymer bushes were employed for the rollers.

Frames were supplied flat packed for re assembly and installation on site in Singapore. The frame system allows easily alignment to achieve flatness tolerances of L/3000 by Alstom labour under AWMA supervision.

RELEVANCE TO FUTURE PROJECTS

AWMA was engaged to design, manufacture and supervise the installation of stainless steel roller gates for a project in Singapore.

The roller gates were designed and successfully tested for insertion under full discharge of the plant. AWMA supervised installation by Alstom and remobilised for wet commissioning and testing.

The gates feature AWMA's self-engaging lifting frame which is inserted through a slot in the outfall culvert for blind insertion and removal.



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BENDEELA PIPELINE CONTROL STRUCTURE

PROJECT DETAILS

OWNER/OPERATOR/CLIENT: SYDNEY
CATCHMENT AUTHORITY

LOCATION: NSW

DATE: OCT 2008 — JUNE 2009

PROJECT VALUE: AUD2MILLION



BENDEELA PIPELINE CONTROL STRUCTURE



DESCRIPTION

The Bendeela Pipeline Control Structure is an integral part of the Shoalhaven water supply and power generation scheme.

The control structure isolates the Bendeela Pipeline from water contained in the Bendeela Pondage, protecting the Bendeela Power/Pumping Station from flood events and allowing internal pipeline inspections and maintenance works.

PRODUCT

AWMA were engaged to design, manufacture, supply, install and commission:

- 1 off 4300mm wide x 8000mm high marine grade aluminium segmented stoplogs (4 of 2m segments) including a 200mm venting valve inserted into 20m deep guides.
- 1 off marine grade aluminium, stopboard self-engaging lifting frame
- 1 off marine grade aluminium storage rack

SERVICES

AWMA provided 100% of the design, manufacture, installation and commissioning process to the value of AUD205,000.

Additionally, AWMA provided extensive documentation, training and support.

MANAGEMENT

Early Contractor Involvement:

Initial site visits by AWMA sales and engineering staff to contribute to conceptual design development (6 weeks).

Design and Drafting:

AWMA in-house engineering team (6 weeks)

Manufacture:

AWMA in-house manufacturing team including purchasing, fabrication, QA, administration (8 weeks).

Installation:

One mobilisation by the installation team.

Commissioning:

AWMA Operations Manager (1 day).

Documentation:

Including Safety In Design, ITP, QA, MDR, O&M Manuals, Installation Manuals etc, managed by AWMA in-house administrative and QA departments.

Training:

Onsite by our Operations Manager (1 day), plus documentation and on-phone support as required.

DELIVERY

AWMA successfully delivered the project on-time and without variation.

INNOVATION

AWMA's Stoplogs and ancillary equipment (lifting frame and storage racks) provide double isolation for the control structure.

When isolating the Bendeela Pipeline during maintenance, four of the stoplogs are fitted one on top of the other, in the existing concrete chambers.

The top sealing stoplog segments provide complete sealing against a water depth of 16m and inserted in 20m deep guides

Venting of the internal chamber to prevent a vacuum was provided via flexible pipe connected to the surface.

RELEVANCE TO FUTURE PROJECTS

The aluminium segmented stoplogs feature AWMA's self engaging lifting frame that insert and remove the stoplogs section into a 20m deep shaft without visual contact during operation. Operating pressure of 16m on comparably low yield strength fabricated aluminium stoplogs.

Bendeela is a high head segmented gate project, with sealing on all four sides. This project provided valuable lessons regarding the hydrodynamic forces and vacuum effects on gates under significant hydrostatic loads. These lessons have been incorporated into comprehensive CFD Models that can be applied to future projects.

While the static load is relatively simple to calculate and engineer a solution. The hydrodynamic loads acting upon the gate, water body, structure and winch is where previous experience holds greater value than text book analysis.



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SYDNEY DESALINATION PLANT

PROJECT DETAILS

OWNER/OPERATOR/CLIENT: SYDNEY WATER, NSW

CLIENT: BLUEWATER (A JOINT VENTURE OF
JOHN HOLLAND AND VEOLIA WATER)

LOCATION: DATE: OCT 2008 — JUNE 2009

DATE: JAN 2008 — JUL 2009

PROJECT VALUE: AUD2BILLION



SYDNEY DESALINATION PLANT



DESCRIPTION

The wind powered desalination plant can supply up to 250million litres of water a day, which is up to 15% of Sydney's water needs. Through a reverse osmosis process freshwater will be extracted from seawater before it is further treated and connected with Sydney's water supply. At the time the reverse osmosis building was the largest of its kind under construction in the Southern hemisphere and the second largest in the world.

PRODUCT

AWMA were engaged to design, manufacture, install and commission over 72 water control gates for the Sydney (Kurnell) desalination plant.

- 4 off 2800m wide x 3000mm high x 12m head, grade 2507 super duplex stainless steel, top sealing outlet gates
- 4 off 1500m wide x 2750mm high x 12m head, grade 2507 super duplex stainless steel, top sealing intake gates
- various sized, grade 2507 super duplex stainless steel, top sealing, electric actuated penstocks
- various marine grade aluminium segmented stoplogs up 2800m wide x 3000mm high, 12m head, with bi-directional seals and 2507 stainless steel guide frames up to 15m long
- Epoxy coated steel stopboard self-engaging lifting frames

SERVICES

AWMA provided 100% of the design, development, testing, manufacture, installation and commissioning process to the total value of AUD2.2million.

Additionally, AWMA provided extensive documentation, training and support.

MANAGEMENT

Early Contractor Involvement:

Initial site visits by AWMA sales and engineering staff to contribute to conceptual design development (24 weeks).

Design and Drafting:

AWMA in-house engineering team (6 weeks)

Manufacture:

AWMA in-house manufacturing team including purchasing, fabrication, QA, administration (8 weeks).

Installation:

Mobilisations by the installation team as per program schedules.

Commissioning:

AWMA Operations Manager (2 days).

Documentation:

Including Safety In Design, ITP, QA, MDR, O&M Manuals, Installation Manuals etc, managed by AWMA in-house administrative and QA departments.

Training:

Onsite by our Operations Manager (1 day), plus on-phone support as required.

DELIVERY

AWMA successfully delivered the project on-time and without variations

INNOVATION

The super duplex stainless steel control gates were manufactured to the highest specifications including hydrostatic testing to 180KPa with an equivalent load of 200 tonnes.

Advanced manufacturing practices in-house saw hydrostatic testing included in the supply agreement for the Sydney Desalination Plant. The unique testing capabilities established at AWMA provides clients with reduced asset risk.

Due to the nature of the desalination plant, the design specifications of the Blue Water Project were extremely demanding. The penstocks and stopboards will withstand high head pressure capacity in off seating conditions, continuous exposure to unfiltered and waste backwash sea water as well as daily exposure to shock chlorination.

The larger gates are approximately 3m x 4m and manufactured from super duplex stainless steel, due to its corrosive resistance and 100 year life expectancy. All gates manufactured for this project comply with stringent 'continuous welding' specifications for super duplex stainless steel.

RELEVANCE TO FUTURE PROJECTS

Below is an excerpt from an audit report conducted during the contract to supply super duplex stainless steel (SAF 2507) penstocks and stopboards for Sydney's Desalination Plant, one of the industry's highest specified water projects in Australian history.

"The audit scope was to look at the performance of the fabrication facility for supplying the stainless steel penstocks and stopboards in accordance with the specification requirements and reviewed and approved in-house documents. Testing data, certification, product delivery, materials suitability, control of subcontracted work, calibration and make-up of MDR documentation were all investigated in the time available. As a result of the audit trail it was evident that the level of workmanship and attention to detail within the AWMA facility is of a high standard with personnel committed to providing a product that meets the expectations of the client."

- Sydney Desalination Plant BlueWater Independent Quality Inspector.

In addition to the above audit, AWMA demonstrated consistent quality control by the receipt of zero non-conformance reports for the life of the project.



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BEAVERS CREEK UPGRADE – FLOW REGULATION WEIR AND FISHWAY

PROJECT DETAILS

OWNER/OPERATOR: WATERNSW
CLIENT: HASLIN CONSTRUCTIONS PTY LTD
LOCATION: WAGGA WAGGA, NSW
DATE: MAR 2012 – SEPT 2013
PROJECT VALUE: AUD8MILLION



BEAVERS CREEK UPGRADE - FLOW REGULATION WEIR AND FISHWAY



DESCRIPTION

The Beavers (Old Man) Creek project has seen the largest environmental regulators constructed in Australia. Principle Contractor Haslin Constructions partnered with AWMA as the only gate supplier in Australasia with the proven capability to deliver projects of that scale. Solutions developed by AWMA included a full hydraulic system with backup and manual hand pumps, cable drive actuation systems and the largest tilting weir gates in Australia. This project forms part of the Murrumbidgee Computer Aided River Management (CARM) system, a world-class, AUD65million infrastructure development and enhancement project that maximises the use of the Murrumbidgee River system.

PRODUCT

AWMA were engaged to design, manufacture, install and commission automated control gates including:

- 3 off 3500mm wide x 4500mm high cable driven marine grade aluminium LayFlat gates including hydraulically actuated rope drums, hydraulic control cabinet, access platform and handrails
- 1 set 3340mm wide x 4402mm high marine grade aluminium segmented Roller Stoplogs (in three 1500mm segments) including embedded stainless steel frames, certified stoplog lifting frame and stoplog storage rack
- 1 off 300mm wide x 3980mm high stainless steel sidewinder gate (Fishway Exit 1) with electric actuator
- 1 off 300mm wide x 3490mm high stainless steel sidewinder gate (Fishway Exit 2) with electric actuator
- 1 off 300mm wide x 2670mm high stainless steel sidewinder gate (Fishway Exit 3) with electric actuator
- 1 off 300mm wide x 1940mm high stainless steel sidewinder gate (Fishway Exit 4) with electric actuator
- 1 off 1580mm wide x 2020mm high marine grade aluminium stopboard (Fishway) in a stainless steel frame
- 1 off 2000mm wide x 2209mm high undershot gate (G8)

SERVICES

AWMA provided 100% of the design, manufacture and installation process to the total value of AUD100,000.

Additionally, AWMA provided extensive documentation, training and support.

As with all design and construct contracts, AWMA regularly liaise with the asset owner (in conjunction with the head contractor) to ensure all parties were satisfied with final design scope and specifications.

MANAGEMENT

Early Contractor Involvement:

Initial site visits by AWMA sales and engineering staff to contribute to conceptual design development (1 week).

Design and Drafting:

AWMA in-house engineering team (6 weeks). Design reports peer reviewed by GHD for AWMA, and also by NSW Office of Public Works on behalf of State Water.

Manufacture:

AWMA in-house manufacturing team including purchasing, fabrication, QA, administration (8 weeks).

Installation:

Mobilisations by the installation team as per program schedules.

Commissioning:

AWMA Operations Manager (1 week).

Documentation:

Including Safety In Design, ITP, QA, MDR, O&M Manuals, Installation Manuals etc, managed by AWMA in-house administrative and QA departments.

Training:

Onsite by our Operations Manager (3 days), plus documentation and on-phone support as required.

DELIVERY

AWMA successfully delivered the project on-time and without variations.

DELIVERY

The large LayFlat gate leaves are driven by hydraulic actuation. Engineering and quality scrutiny required unique features including 500mmOD cast stainless steel rope drums, 28mm OD 7 x 37 316 stainless steel cables and a Rotork Worm gear box with winch design output torque of 90,000Nm of torque and 461 kN lifting capacity (46tn.)

Project Manager Mano Manorathan stated ***"The Old Man Creek Project required the biggest, heavy duty LayFlat gates on the market. State Water was looking for superior engineering design, a high quality product to meet the stringent specification and reliable after service"***.

RELEVANCE TO FUTURE PROJECTS

The winch design utilised in this WaterNSW project, to lift the LayFlat Gates via cable drum, gearbox and drive motor, is estimated at 90,000Nm torque, as required for the largest winch on the DTSS2 Roller Gate Project.

This winch sustainably regulates the Old Man Creek Gates 24/7, since practical completion in 2013.

The gates are automated via SCADA.

The segmented roller stoplogs are inserted and removed with AWMA's self engaging lifting frames, inserted into 7.2m deep stainless steel guide frames. Boards were designed and tested to insert and remove against 2m/s flow velocity.



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MULLAROO CREEK ENVIRONMENTAL REGULATOR

PROJECT DETAILS

ASSET OWNER/OPERATOR: SA WATER

CLIENT: LEED ENGINEERING & CONSTRUCTION PTY LTD

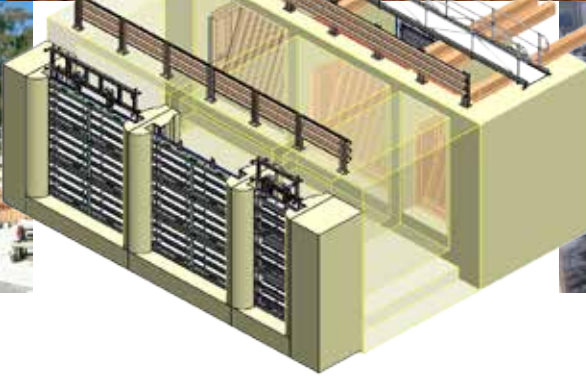
LOCATION: SOUTH AUSTRALIA

DATE: JAN 2014 – JULY 2015

PROJECT VALUE: AUD3.5MILLION



MULLAROO CREEK ENVIRONMENTAL REGULATOR



DESCRIPTION

AWMA were engaged by Leed Engineering and Construction to supply three new environmental regulators on the Mullaroo Creek. All sites are of significant environmental value, located within the iconic Living Murray Lindsay-Wallpolla Islands and Floodplain.

PRODUCT

AWMA were engaged to design, manufacture, supply, install and commission custom gates including:

- 2 off 3000mm wide x 2400mm high marine grade aluminium LayFlat Gates with hydraulic actuation systems
- 1 off 1500mm wide x 2400mm high marine grade aluminium LayFlat Gates with hydraulic actuation systems
- 1 off 3000mm wide x 2400mm high marine grade aluminium (roller) segmented stoplogs
- 1 off 1500mm wide x 2400mm high marine grade aluminium (roller) segmented stoplogs
- 2 off self-engaging lifting frames and storage racks

SERVICES

AWMA provided 100% of the design, manufacture and installation process to the total value of AUD800,000.

Additionally, AWMA provided extensive documentation, training and support.

As with all design and construct contracts, AWMA regularly liaised with the asset owner and catchment management authority (in conjunction with the head contractor), to ensure all parties were satisfied with final design scope and specifications.

MANAGEMENT

Early Contractor Involvement:

Initial site visits by AWMA sales and engineering staff to contribute to conceptual design development (1 week).

Design and Drafting:

AWMA in-house engineering team (6 weeks).

Manufacture:

AWMA in-house manufacturing team including purchasing, fabrication, QA, administration (8 weeks).

Installation:

2 mobilisations by the installation team.

Commissioning:

AWMA Operations Manager (1 day).

Documentation:

Including Safety In Design, ITP, QA, MDR, O&M Manuals, Installation Manuals etc, managed by AWMA in-house administrative and QA departments.

Training:

Onsite by our Operations Manager (1 day), plus documentation and on-phone support as required.

DELIVERY

AWMA successfully delivered water control infrastructure for three sites within the highly significant environmental floodplain. Delays were experienced due to weather, however the project was commissioned on-time without variation.

INNOVATIVE SOLUTIONS

The custom designed Stoplogs feature rollers allowing the immersion and removal of gates during full flow. All infrastructure was designed and manufactured to encourage safe fish passage and improved wildlife habitat. The completion of the new and improved environmental water control infrastructure provides resources and opportunities for improved management, monitoring and control of environmental flows.

RELEVANCE TO FUTURE PROJECTS

The segmented roller stoplogs are inserted and removed with AWMA's self engaging lifting frames, via stainless steel guide frames. Boards were designed and tested to insert and remove against 2m/s flow velocity.

Winch systems for the tilting weir gates were operated via hydraulic motors. The hydraulic power pack was mobile. This mode of powering the winch system has proven successful on numerous projects where mobile/remote actuation power is required.

AWMA have developed a unique lifting frame to mobilise segmented stopboards/roller gates into position safely and efficiently.

The self-engaging lifting frame can autonomously deploy or retrieve segmented gate sections from any depth without operator intervention, other than a direct crane lift.

This capability significantly reduces deployment times, reduces required lifting capacity, reduces WHS risks and minimises adverse hydraulic conditions when removing boards.



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MOLLEE WEIR FISHLOCK AND REGULATOR UPGRADE

PROJECT DETAILS

ASSET OWNER/OPERATOR: WATERNSW
CLIENT: GEOTECHNICAL ENGINEERING PTY LTD
LOCATION: NARRABRI, NSW
DATE: OCT 2013 – OCT 2014
PROJECT VALUE: AUD6MILLION



MOLLEE WEIR FISHLOCK AND REGULATOR UPGRADE



DESCRIPTION

Geotechnical Engineering Pty Ltd was awarded the construction contract for WaterNSW's Mollee Weir Upgrade. As a subcontractor, AWMA was commissioned to design, manufacture and install fishway and regulator gates as part of the Keepit Dam Safety Upgrade Fishway Offsets Project.

This project required water control infrastructure that could sustain high frequency fish lock gate operation, as well as a regulator gate to attract fish, and pass environmental and low flows as required. All water control equipment can be linked to WaterNSW's SCADA system for remote monitoring and operation.

PRODUCT

AWMA were engaged to design, manufacture, supply, install and commission a custom overshot regulator gate and fishlock gates including:

- 1 off 4500mm wide x 4400mm high 316 stainless steel dual leaf overshot roller gate with cable actuation system
- 1 off 500mm wide x 3000mm high 316 stainless steel AWMA TLF-SP with hydraulic linear actuator (Fishway Entry 1)
- 1 off 500mm wide x 4750mm high 316 stainless steel dual leaf AWMA TLF-SP with hydraulic linear actuator (Fishway Entry 2)
- 1 off 1000mm wide x 4425mm high 316 stainless steel AWMA TLF-SP with hydraulic linear actuator (Fishway Exit)
- 1 off 4600mm wide x 4500mm high aluminium segmented stoplogs with self-engaging lifting frame and channel mounted stainless steel side frames
- 1 off 2000mm wide x 4600mm high aluminium stoplog with embedded stainless steel side frames

SERVICES

AWMA provided 100% of the design, manufacture, installation and commissioning process to the total value of AUD600,000.

Additionally, AWMA provided extensive documentation, training and support.

As with all design and construct contracts, AWMA regularly liaise with the asset owner (in conjunction with the head contractor) to ensure all parties were satisfied with final design scope and specifications.

MANAGEMENT

Early Contractor Involvement:

Initial site visits by AWMA sales and engineering staff to contribute to conceptual design development (12 weeks).

Design and Drafting:

AWMA in-house engineering team (6 weeks)

Manufacture:

AWMA in-house manufacturing team including purchasing, fabrication, QA, administration (8 weeks).

Installation:

Mobilisations by the installation team as per program schedules.

Commissioning:

AWMA Operations Manager (1 day).

Documentation:

Including Safety In Design, ITP, QA, MDR, O&M Manuals, Installation Manuals etc, managed by AWMA in-house administrative and QA departments.

Training:

Onsite by our Operations Manager (1 day), plus documentation and on-phone support as required.

DELIVERY

AWMA successfully delivered the project on-time and without variation.

INNOVATIVE SOLUTIONS

This project presented a number of initial design concerns regarding the potential wear of equipment, maintenance requirements and subsequent whole of life costs. To address these issues, AWMA developed a cable drive system for the regulator gate based on the mechanics of the proven AWMA LayFlat gate.

The dual leaf stainless steel DLF roller gate is 4.5m wide x 4.4m high and has been designed to withstand 5m of static head pressure plus debris loading. AWMA's innovative design effectively eliminates wearing parts from the actuation system, significantly reducing the whole of life costs and maintenance requirements. The cable driven system is powered by an electric actuator.

AWMA TLF and DLF gates were utilised for the fishway entry and exit. They were all fitted with hydraulic linear actuators and position controllers, allowing full SCADA integration. These fishway control structures are specifically designed for high frequency operation with the gates fully opening and closing up to 24 times a day. This application demands precise manufacturing tolerances and inherently low friction sealing designs coupled with low maintenance due to the location of the fish lock. The control gates and the cylinders were both constructed from grade 316 stainless steel. The largest cylinder has a 4400mm stroke, delivers up to 5tn thrust, uses biodegradable oil, features integrated controls and is fully banded.

RELEVANCE TO FUTURE PROJECTS

The Roller Gate design utilised for this project successfully proved the maintenance free bearing materials.

The gate operates frequently in harsh river conditions with debris and abrasive silt loadings.

Regular operation proves the bearing material, seal materials and winch design, which would rarely be in use under 'normal', low duty cycle, roller gate applications.

The roller gates featured, 316 stainless steel and also super duplex stainless steel.

The aluminium segmented stoplogs feature AWMA's self-engaging lifting frame that insert and remove the lower stoplog section when submerged under 6m of water.

Essentially this site can be seen as a fast tracking 'proving ground' for innovative design concepts and build qualifications.



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KOONDROOK — PERRICOOTA FLOOD ENHANCEMENT WORKS

PROJECT DETAILS

CLIENT: FULTON HOGAN

LOCATION: BARHAM, NSW

DATE: FEB 2011 — JULY 2013

PROJECT VALUE: AUD80MILLION



KOONDROOK — PERRICOOTA FLOOD ENHANCEMENT WORKS



DESCRIPTION

The Koondrook-Perricoota Flood Enhancement Works project was one of the largest environmental projects undertaken within Australia.

AWMA were engaged by Fulton Hogan for the design, manufacture and installation of approximately 30 water control structures across six sites.

PRODUCT

A series of five (5) regulator gates were installed. The gates are cable operated using AWMA's proven cable drive system coupled to hydraulic motors. Design, manufacture, install and commission water control gates including:

- 5 off 3950mm wide x 3370mm high marine grade aluminium AWMA LayFlat regulator gates with cable drive actuation system (Offtake Regulator)
- 3 off 3950mm wide x 3370mm high marine grade aluminium segmented roller stoplogs
- 1 off stopboard lifting frame and storage rack (Offtake Regulator)
- 3 off 3950mm wide x 1710mm high marine grade aluminium AWMA LayFlat regulator gates with cable drive actuation system (Return Channel Regulator)
- 1 off 3000mm wide x 6300mm high marine grade aluminium dual leaf decant weir gate (Barbers Creek)
- 1 off 1260mm wide x 1579mm high marine grade aluminium AWMA ULF undershot/sluice penstock (Fishway Exit)
- 1 off 2525mm wide x 3200mm high marine grade aluminium dual leaf undershot/overshot regulator gate (Swan Lagoon Upstream)
- 1 off 2525mm wide x 2050mm high marine grade aluminium AWMA ULF undershot/sluice penstock (Swan Lagoon Downstream)

SERVICES

AWMA provided 100% of the design, manufacture and installation process to the total value of AUD2.1MILLION.

Additionally, AWMA provided extensive documentation, training and support.

As with all design and construct contracts, AWMA regularly liaise with the asset owner (in conjunction with the head contractor) to ensure all parties were satisfied with final design scope and specifications

MANAGEMENT

Early Contractor Involvement:

Initial site visits by AWMA sales and engineering staff to contribute to conceptual design development (12 weeks).

Design and Drafting:

AWMA in-house engineering team (6 weeks) peer reviewed by NSW Public Works on behalf of the client (1 week).

Manufacture:

AWMA in-house manufacturing team including purchasing, fabrication, QA, administration (12 weeks).

Installation:

4 mobilisations by the installation team (per production schedule).

Commissioning:

AWMA Installation Manager (5 days).

Documentation:

Including Safety In Design, ITP, QA, MDR, O&M Manuals, Installation Manuals, Design Reports etc, managed by AWMA in-house administrative and QA departments.

Training:

Onsite by our Installation Manager (1 day), plus on-phone support as required.

DELIVERY

AWMA successfully delivered the project on-time and without variation.

INNOVATIVE SOLUTIONS

Torrumbarry's new 20m wide regulator structure contains some of Australia's largest tilting LayFlat gates. The automated LayFlats allow clear water of 4m wide x 3.5m high per gate.

To meet the needs of project partners and operators, AWMA designed a unique hydraulic control system for the gates. The hydraulic actuation system allows for accurate torque control and long run times required to operate such large gates.

The off take regulator redirects water directly from the Murray River above the Torrumbarry Weir. The site is remote and does not have access to power. AWMA have developed a portable petrol powered Hydraulic Power Pack (HPP). The portable device requires no mains power or manual lifting to operate the 4m gates. A trolley system, Honda petrol motor, oil reserve, control valve and hydraulic pump are some of the components of this new product. The portable hydraulic power pack is housed in a concrete enclosure on site. Vandalism and tampering is a challenge for today's water operators. The AWMA Hydraulic actuation system removes expensive infrastructure from accessible locations.

Other design challenges addressed by AWMA on this project included; reducing OH&S risks associated with operation and maintenance, locking gates in the upper position to eliminate vandalism and for ease of maintenance, eliminating cables from the open water way, engineering to accommodate hydrostatic loads in excess of 50 tons

RELEVANCE TO FUTURE PROJECTS

Sustainable cable winch systems were operated via hydraulic motors. The hydraulic power pack was mobile. This mode of powering the winch system has proven successful on numerous projects where mobile and long run time actuation power is required.



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MELBOURNE DESALINATION PLANT

PROJECT DETAILS

CLIENT: THIESS DEGRÉMONT
JOINT VENTURE (TDJV)

LOCATION: MELBOURNE, VIC

DATE: JAN 2010 — MAY 2011

PROJECT VALUE: AUD4BILLION



MELBOURNE DESALINATION PLANT



DESCRIPTION

AWMA were engaged by the Thiess Degrémont Joint Venture to design, manufacture, supply and commission over 100 flow control structures with associated lifting mechanisms and storage solutions for Melbourne's Desalination Plant.

PRODUCT

AWMA were engaged to design, manufacture, supply and supervise the installation of:

- 4 sets off 2300mm wide x 4000mm high, 15m head, marine grade aluminium guard gates with 25m long super duplex embedded frames
- 86 of various size marine grade segmented stoplogs up to 6000mm wide x 4000mm high with super duplex embedded frames
- 2 off 3000mm wide x 4000mm high super duplex stainless steel decanting penstock gates
- 6 off 1500mm wide x 1500mm high super duplex stainless steel drip tight isolation gates
- Epoxy coated steel stopboard self-engaging lifting frames and storage rack trailers

SERVICES

AWMA provided 100% of the design, manufacture, installation and commissioning process to the total value of over AUD2.5million.

Additionally, AWMA provided extensive documentation, training and support.

MANAGEMENT

Early Contractor Involvement:

Initial site visits by AWMA sales and engineering staff to contribute to conceptual design development (24 weeks).

Design and Drafting:

AWMA in-house engineering team (6 weeks)

Manufacture:

AWMA in-house manufacturing team including purchasing, fabrication, QA, administration (8 weeks).

Installation:

Mobilisations by the installation team as per program schedules.

Commissioning:

AWMA Operations Manager (2 days).

Documentation:

Including Safety In Design, ITP, QA, MDR, O&M Manuals, Installation Manuals etc, managed by AWMA in-house administrative and QA departments.

Training:

Onsite by our Operations Manager (1 day), plus documentation and on-phone support as required.

DELIVERY

AWMA successfully delivered the project on-time with scope extensions including supply of miscellaneous fabricated super duplex stainless steel flanges, screens and seal replacement kits.

DELIVERY

The intake guard gates feature 20m deep guide frames which were installed using an innovative engineered polymer upper portion to reduce installation time and cost. The stoplogs are transitioned from the polymer upper frame to the primary lower frame (fabricated from super duplex) with funnels.

The frames are subjected to weekly shock chlorination and sea water, and have a design life of 100 years. This was achieved by using a fully encased design that is free of crevices, the frames were also immersion pickled prior to installation.

RELEVANCE TO FUTURE PROJECTS

The Melbourne Desalination project was one of the largest desalination projects in the world at the time, with the completed investment exceeding AUD4billion.

AWMA was contracted directly to TDJV the constructor and was subject to some of the most stringent commercial and QA specifications and conditions ever developed within the Australian water infrastructure sector.

The equipment supplied had multiple processes and operational interfaces throughout the plant, the AWMA design team ensured a seamless interface throughout this process.

The Stopboards/bulkheads designed for this project are stored and deployed from a depot separate from the desalination plant. Mobile storage and transport for quick deployment were key considerations on this project, as well as innovative approaches to reduce installation time.



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RAKAIA RIVER INTAKE GATES

PROJECT DETAILS

OWNER / OPERATOR:
CENTRAL PLAINS WATER LIMITED (CPWL)
CLIENT: FULTON HOGAN/JOHN HOLLAND JOINT VENTURE
LOCATION: NEW ZEALAND
DATE: DEC 2013 – JULY 2015
PROJECT VALUE: NZD385MILLION



RAKAIA RIVER INTAKE GATES



DESCRIPTION

AWMA were awarded a contract to design, construct install and commission the open canal irrigation gates including the electrical works and controls for the NZD385 million Central Plains Water Project, one of the largest construction projects in South Island, New Zealand. Derek Crombie, CEO of Central Plains Water, said "The CPW scheme is a game changer for agriculture and improvement of the environment in Central Canterbury and the start of a new economy for the province".

PRODUCT

AWMA were engaged to design, manufacture, supply, install and commission custom control structures including:

- 4 off 3500mm wide x 2500mm high, grade 304 stainless steel, top sealing fixed wheel roller, electric actuated, intake gates
- 2 off 5000mm wide x 5500mm high, mild steel epoxy coated, electric actuated, radial gates
- 1 off 3000mm wide x 3000mm high, grade 304 stainless steel undershot, hydraulic drive, headrace gate
- 10 off various sized, grade 304 stainless steel, top sealing, electric actuated penstocks facilitating offtake isolation
- Isolation segmented stoplogs, mild steel epoxy coated and grade 304 stainless steel lifting frames for intake and headrace gates up to 5000mm wide, 7500mm high and 3tn weight.
- Walkways and platforms
- Associated instrumentation, SCADA, controls and electronics

SERVICES

AWMA tendered on a Design and Construct basis for the water control penstocks/gates, associated electronics and controls directly to the Principal CPWL. There were two separable portions for Design (SP1) and Construction (SP2) of the equipment.

Total contract value to AWMA was NZD2.8million.



Proposals were evaluated by the Principal and the nominated Engineer. The design of the gates was a critical input in achieving the project consent approval, from Environment Canterbury. This process allowed the Principal to review all submissions taking into consideration, design innovation, technology alternatives, quality, supplier track record and cost. This empowered the asset owner to make an informed decision to ensure achievement of their desired project outcome.

AWMA provided 100% of the design, manufacture, installation and commissioning process as well as providing extensive documentation, training and support. This involved multiple international mobilisations by numerous AWMA personnel.

MANAGEMENT

Early Contractor Involvement:

AWMA were engaged to complete the initial design for the client, to obtain project approval (2 weeks).

Designs:

Concept drawings and design loads applied to structures (2 weeks after contract award). Design calculations, design drawings, fabrication specifications and Producer Statement PS1-Design (6 weeks after contract award). Full design reports were prepared with certification to Environment Canterbury (ECAN) requirements.

Meetings:

Attendance and participation at a HAZOP workshop organised by the Principal in conjunction with other contractors.

Manufacture:

AWMA in-house manufacturing team including purchasing, fabrication, QA, administration (22 weeks).

Installation:

Including mobilisations by AWMA's installation team from Australia to New Zealand (10 weeks).

Commissioning:

Dry (4 weeks), Wet (2 weeks) by AWMA Project Manager and Site Supervisor.

Documentation:

Including Safety In Design, ITP, QA, MDR, O&M Manuals, Installation Manuals etc, managed by AWMA in-house administrative and QA departments.

Training:

Onsite by our Site Supervisor (5 days), plus on-phone support as required.

DELIVERY

AWMA successfully delivered water control infrastructure for 13 sites over a distance of 60kms within the irrigation delivery network, before project deadline and without variance, despite tight timeframes.

INNOVATIVE SOLUTIONS

The roller Intake Gates are derived from AWMA's engineered TLF-SP design. Gates are operated using a proven cable drive system featuring aluminium rope drums and stainless steel cable to reduce ongoing maintenance requirements associated with spindles, as well as cable slack rope detection. All gates include rollers to minimise frictional loads during operation.

Additional design considerations include:

- Low whole of life costs during the 50yr design life.
- Gate loadings (debris, wind and mud), flow velocities, earthquake compliance to NZS1170.5.
- Material selection and isolation of dissimilar metals.
- Inclusion of self-engaging stopboard lifting frames to minimise operator risks.
- The radial gates are designed to withstand flood and sediment loading totalling 1.2 MN and designed for flat pack transportation and reassembly on site.
- The Headrace control gate is subject to 7.5m head pressure and required to control flows into the main supply channel with flows up to 33 cumecs and velocities up to 7m/s.

RELEVANCE TO FUTURE PROJECTS

All equipment was designed and manufactured in Australia, shipped to the construction site in the remote South Island of New Zealand, re-assembled, installed and commissioned as a turn-key solution by AWMA. Large isolation segmented stoplogs fabricated from epoxy coated steel were featured utilising AWMA's self-engaging lifting frames.

AECOM was the designer on this project. As this was a design and construct contract AWMA worked closely with AECOM.

AWMA was awarded the contract directly with the asset owner CPWL. AWMA worked in partnership with the principle and their designer AECOM to design the most viable solution, taking it through manufacture.

The install and commissioning relationship was primarily with Fulton Hogan John Holland Joint Venture. This arrangement was very effective.



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