

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
REFERENCE:
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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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