

GLADSTONE AREA WATER BOARD (GAWB)
QUEENSLAND

Curtis Island pipeline infrastructure case study

How a water utility is supporting a booming Australian export industry

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**WATER SERVICES
ASSOCIATION OF AUSTRALIA**

Gladstone Area Water Board had to find a way to supply a water service to Liquefied Natural Gas production facilities on Curtis Island, with less environmental and community impact than an individual desalination plant option. To provide an interim water supply within a compressed timeframe, a pipeline extension to GAWB's distribution network involved three bore holes navigating some 60 metres under Gladstone Harbour at 2.12 km, at the outer edge of technical feasibility for Henniker Directional Drilling. The first bore hole successfully crossed the harbour in December 2011, providing information for holes two and three, using the "intersect method", drilling from both the mainland and Curtis Island simultaneously, using a "Gyro" to ensure the drill remained on course.



PROVIDING WATER TO SUPPORT ECONOMIC GROWTH

The Gladstone region is a major economic and industrial hub that is currently experiencing further growth through the construction of three separate Liquefied Natural Gas (LNG) production facilities on Curtis Island with a further LNG facility currently undergoing environmental approvals. The combined value of the projects currently under construction including upstream project elements total \$45 billion and provide for a combined production capacity output of 25.3 million tonnes per annum. Gladstone Area Water Board (GAWB) is the bulk water supplier to the Gladstone Region supplying major industry and Gladstone Regional Council. When compared to GAWB's other industrial customers, the LNG production facilities are not large water users. However, the provision of

a water service is essential for the construction and ongoing operations of the facilities.

CONSIDERING THE ENVIRONMENT AND THE COMMUNITY

The Curtis Island Pipeline Infrastructure Project was initiated to allow the water needs of the LNG proponents on Curtis Island to be met through an extension to GAWB's distribution network. The project involves three elements:

1. Gladstone mainland works necessary for connection of the new infrastructure to GAWB's existing distribution network. These works involve:
 - > Converting a 7 km section of a raw water distribution main to a potable water distribution main
 - > Construction of a water booster pump station and
 - > Construction of a 4.4 km rising main.
2. Harbour Crossing
 - > 2.12 km Horizontal Directional Drilling (HDD)
3. Curtis Island works
 - > Development of materials and offloading facility
 - > Construction of access roads and reservoir site
 - > 4km of distribution pipelines and
 - > 12.4ML Modular reservoir and Chlorination facility

The project has significant environmental benefits for the region, as the only alternative water supply to GAWB's pipeline would have been individual desalination plants at each of the LNG production facilities. The provision of water via pipeline from the mainland will prevent the unnecessary discharge of brine into Gladstone Harbour. The project thus has had less of a 'footprint' on the local community than it would otherwise have had. This issue was of considerable importance as the local community were already feeling the combined impact of the LNG facilities development and other industry expansion currently underway in the region.

COOPERATIVE PROJECT FOR MUTUAL BENEFITS

The project generates significant benefits to GAWB and to the region. The commercial arrangements for the project were based upon the concept of common use infrastructure and both the LNG proponents and GAWB's existing customers benefit through better utilisation of existing infrastructure. Further to this, the asset will form part of GAWB's Regulated Asset Base and GAWB will receive a commercial return on the infrastructure.

GAWB is undertaking the project in conjunction with Gladstone Regional Council (GRC) who is responsible for the provision of wastewater services throughout the region. This joint approach to the project has provided significant benefits through undertaking joint procurement, co-location of infrastructure, single approvals process, project team resourcing and economies generated from a joint operations and maintenance approach.



A MARVEL OF PLANNING AND ENGINEERING EXPERTISE

The initial feasibility into the project commenced in July 2010 through the commissioning of a Concept Advice as to the viability of supplying water via pipeline to Curtis Island. The Concept Advice, which was received in September 2010, provided alternative route options, environmental approval considerations, risk analysis and construction approaches. Subsequent to this advice, a Concept Design phase of the project was commissioned initially by only one of the LNG proponents (the Foundation Proponent) with the other LNG proponents participating shortly thereafter. The

Concept Design phase was completed in May 2011 and covered the following scope of activities:

- > Obtaining construction related approvals and permits
- > Geotechnical investigations
- > Finalisation of the infrastructure concept design
- > Identification of contracting arrangements and the procurement strategy
- > Finalisation of commercial arrangements with the LNG proponents.

A considerable challenge with the project was the compressed construction timeframe in order to meet the water supply requirements of the Foundation Proponent. The Foundation Proponent initially requested for a water supply solution to be in place by February 2012. Given these factors, the construction program was designed so as to allow for an interim water supply solution to be provided to the Foundation Proponent prior to construction being complete. GAWB also commenced an Early Works Construction phase of the project upon completion of the Concept Design phase. This approach provided GAWB and the Foundation Proponent time to finalise internal business case approval without adversely impacting the construction timeline. Internal business case approval was completed in late August 2011 upon finalisation and execution of the commercial arrangements with the Foundation Proponent. Construction commenced shortly thereafter. Commercial arrangements with the other LNG proponents were finalised between October and December 2011.

Despite the compressed construction timeframe, the work being undertaken on the mainland and on Curtis Island was standard from a design and construction perspective. The success of the entire project however depended on the HDD crossing of Gladstone Harbour – three bore holes in total. There were two main challenges faced with the HDD: there was limited geotechnical information on the proposed route (some 60 metres under Gladstone Harbour); and the length of the HDD crossing at 2.12 km was at the outer edge of technical feasibility. The pilot hole for the first bore hole successfully crossed Gladstone Harbour in

December 2011 with only one area of ‘soft material’ identified. This information was used to better facilitate the crossings for holes two and three. The HDD bore holes were made using the ‘intersect method’ with drilling occurring from both the mainland and Curtis Island simultaneously. A ‘Gyro’ was also used to ensure the drill remained on the desired course.

FLOWING SMOOTHLY

GAWB is currently providing the Foundation Proponent and one other proponent with an interim water supply. Practical completion of final water supply services is forecast to be completed by the end of September 2012. Completion of the access road and construction of the other LNG proponents infrastructure is forecast to be completed by the end of December 2012. The current forecast cost for the water supply services portion of the project is \$52.5M.

GLADSTONE AREA WATER BOARD

Gladstone Area Water Board (GAWB) is the bulk supplier to the Gladstone Regional Council. The Gladstone region is a major economic and industrial hub.