NORTHERN COMMUTERS RIDE EASY TO PERTH

PRECAST CONCRETE TEEROFF BEAMS AND COLUMN SHELLS MANUFACTURED BY NATIONAL PRECAST MEMBER DELTA CORPORATION PLAY A BIG PART IN IMPROVING ROAD SAFETY IN WESTERN AUSTRALIA.

Delivered by Great Northern Connect, a joint venture between Laing O'Rourke and BGC Contractors, stage two of the State's Northlink road program includes the first section of the Perth to Darwin National Highway.

Stage two delivers almost 20 kilometres of highway with four interchanges, 14 road bridges and three footbridges.

It also removes two of Western Australia's most dangerous intersections, the Tonkin and Reid Highway intersection and the intersection at Beechboro and Gnangara Roads. It is expected northern commuters will benefit from reduced congestion and a free-flowing link into Perth.

Delta Corporation was awarded the supply contract for 151 TeeRoff beams for the project's bridges. The contract also included 200 precast concrete column shells for the bridge abutments.

Delta Corporation's General Manager Jason Walsh says that the design complexity of the bridges made the detailing of the beams some of the most challenging since the company started manufacturing TeeRoff beams in 2002.

"Both the design and layout of each bridge is unique, which has required each beam to be a different size and configuration. As well, the beams have a continuity joint at mid span over the supporting columns," he says.

According to Mr Walsh, the continuity detail at the beam ends required a complicated recess with various cast in fittings to enable the beams to become spliced on site.

Beam sizes ranged in length from 17.0 metres to 43.0 metres, with depths from 1.0 metres to 2.1 metres and widths between 3.2 metres and 4.8 metres. Weights ranged from 63.0 tonnes to 181.0 tonnes each.

Due to the bridge formation, beams have acute end skews and top flange edges radiused on plan. Stressing strands between 74 and 114 no. 15.2 diameter were used in each beam.

Most beams required the strands to extend through the shutters past the beam ends, with an onion end applied after demoulding.

Manufacture of the beams under factory-controlled conditions commenced in February 2018 and was completed by mid November 2018. Only two moulds were used for the production of all beams.

Specifications for durability control were one of the most stringent encountered to date and strict temperature controls were needed during the pour and steam curing.

To ensure concrete stayed under 350°C during the pour and below 750°C while curing, Delta produced its own concrete with state-of-the-art computerised batching plants.

Quality control was also onerous, as Main Roads WA required a third party to carry out inspections and authorise hold points between specified stages of production. Reporting had to comply with Great Northern Connect Quality Management System.

Mr Walsh is proud that given the complexities of the project, Delta was able to complete delivery to meet the contractor's delivery requirements.

WA Transport Minister Dean Nalder is also positive, stating that stage two will improve services for regional traffic movements to commercial and industrial areas such as Malaga, Kewdale, Perth Airport and Perth CBD. ■

Staged approach for better access to Perth's north-east

Stage one (Guildford Road to Reid Highway) of the project was completed in early 2018. Stage two (Reid Highway to Ellenbrook) has been recently completed and Stage three (Ellenbrook to Muchea) is well underway.
Stage three (Ellenbrook to Muchea) of the $1.12 billion project is due for completion at the end of 2019.

Stage two of the Northlink road program aims to improve services for regional traffic movements.

Project: NorthLink Stage Two
Location: Western Australia
Precast manufacturer: Delta Corporation
Client: Main Roads WA
Contractor: Great Northern Connect