



## CASE STUDY

# REID HWY - MALAGA DRIVE INTERCHANGE

Perth, WA, Australia

Reinforced Earth® Abutment Walls

TerraTilt®

Owner: Main Roads WA

Consultants: BG&E

Contractors: Georgiou Group Pty Ltd

Construction: 2015

### Background

Main Roads WA awarded Georgiou Group Pty Ltd the design and construction of the \$65 million Reid Highway works in late 2014. The Reid Highway needed additional lane capacity to improve safety and traffic flows at three locations.

The scope included:

- The addition of two lanes for 4.2km of the highway between Erindale Road and Marmion Avenue with associated intersection upgrades;
- A new bridge over the Mitchell Freeway and the railway line in Balcatta
- The installation of an interchange providing two new bridges to allow four lanes of Reid Highway traffic to flow uninterrupted over 4 lanes on Malaga Drive.

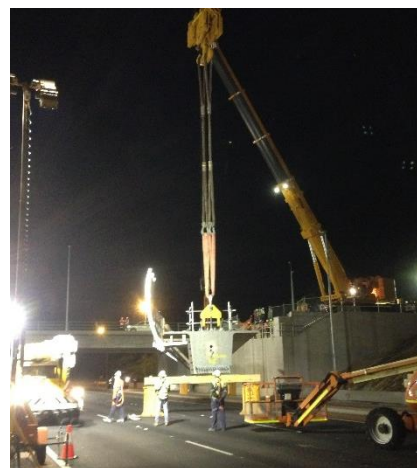
The Reinforced Earth Company (RECO) was contracted to design and supply two sets of bridge abutments for the project. One bridge was installed at the Malaga Drive Interchange, while the other bridge was a duplication of an existing bridge at the Reid Highway/Mitchell Freeway Interchange.

### Challenges

The two bridges are supported by a total of 1477m<sup>2</sup> of Reinforced Earth® abutment walls using TerraTilt® full height precast concrete panels. The project included the design and supply of the precast concrete facing panels and the earth reinforcing straps for the structures, on-site technical and construction advice, and the propping design for the structures during construction. This propping design is specific to site constraints and was realised in an area directly adjacent to the live Mitchell freeway on one site and the Reid Highway on the other. During a construction program of this size and scale community impacts were inevitable. The construction program was staged to reduce the impact on traffic flow.

### Solutions

The manufacture of the facing panels was subcontracted to Georgiou Group Pty Ltd as they were also the main contractors on the project. Four lifting points were precast into each panel providing greater safety during handling and construction. This, when combined with the customised prop configurations, made the full height panels easy to install. The good geotechnical conditions and the ample amounts of sand available as a good select backfill made these sites ideal for the tall walls. The ease and speed of construction reduced the overall cost.



**Main:** The Reinforced Earth® TerraTilt® panels are installed at the Malaga Drive Interchange.

**Above first picture:** Crane lifting the beams into position over the Mitchell Freeway from the Reinforced Earth® block during night construction

**Above second picture:** The new bridge beams across Mitchell Freeway.



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Above: Completed Reinforced Earth® Bridge Abutment at the Reid Hwy / Malaga Drive Interchange

These structures were built completely from behind and therefore did not interfere with access, traffic or obstacles in front of the wall.

Concrete beams for the bridges were manufactured offsite at Georgiou's precast yards at Hazelmere and transported as a whole to the work sites.

The beams for the new bridge crossing the Mitchell Freeway were some of the largest beams to have been lifted into place in the Perth metropolitan area. This bridge required eight beams the largest weighing 162T with a length of 44.5m. The complex process of installation involved night-time closures of the Mitchell Freeway and the rail corridor. RECO engineers took into consideration when designing this bridge the extra loading necessary to support the cranes needed to lift these beams into place. One of the cranes was a 600T crawler crane with an additional 300T counterweight providing a capacity of 800T. According to Main Roads WA "setting up this crane involved transport of components by 31 semi-trailers, and three oversize haulage vehicles". It was necessary for one of the cranes to work from the top of the Reinforced Earth® block. On the Malaga Interchange abutment walls these loadings were not necessary as all the beams were lifted into place from the lower road level.

The full height TerraTilt® precast panels provide the perfect surface for creating architectural and colourful finishes. The bridge abutment facing panels on the Malaga Interchange, as pictured above, were cast using a custom designed hatched pattern mould which were then painted when the structure was complete.

#### Conclusion

The key benefits of this project is improved intersection efficiency for the Reid Highway meaning a reduction in the level of congestion, delays, conflict points, crash frequency and lost travel time to road users. The project provided additional lane capacity, operational efficiencies and safety in the area.

#### Project specifications

**Systems** TerraTilt®

**Finish** 2 abutments with a Hatched Pattern and Painted Finish  
2 abutments with a Plain grey concrete and painted finish

**Structures** 4 Reinforced Earth® abutment walls

**Area** 1477 m<sup>2</sup> (total)

**Max. Height** 11 m

**Design load** 20kPa

**Design life** 100 years



Above: Abutment wall at Malaga Drive Interchange during Construction