



CASE STUDY

Roe Highway Upgrade Tonkin Highway to Orrong Road Perth, WA, Australia

Reinforced Earth® TerraHex and TerraTilt® Abutment walls, precast capping units and parapets

Owner: Main Roads WA

Consultants: AECOM

Contractor: McConnell Dowell

Construction: May 2016 - Apr 2017

Background

Main Roads Western Australia has progressively developed Roe Highway over more than 15 years as part of Perth's strategic freight network. These upgrades and widening works have eased congestion and encouraged free-flowing traffic at a "pinch-point" close to Roe Highway and Tonkin Highway interchange. More than 52,000 vehicles, including 6,000 heavy vehicles use this section of road daily. The project upgraded a two-kilometre section of Roe Highway from Tonkin Highway to Orrong Road.

Works included:

- Widening the existing road with additional lanes in each direction
- Installing a new bridge over the freight railway near Sheffield Road
- Providing a new off-road shared path for cyclists and pedestrians

Project benefits will include:

- Improved traffic times
- Improved road safety
- Better cycling and pedestrian options
- Landscaping and vegetation works

The Reinforced Earth Company (RECO) was awarded the design and supply of the two abutment wall extensions, including segmental panel, full height return walls and precast capping units and parapets. The total Reinforced Earth® wall area equals 1,204sqm.

The Reinforced Earth® walls were built to a maximum height of 8.9m sloping down to 2m at the lowest point.

Challenges

- Match the existing competitors' wall features with segmental panels and make the finish continue to the full height section as well.
- Confined space to fit the soil reinforcement while maintaining the existing road traffic flowing.
- A 500T crane was required to setup on top of the MSE wall with additional loads of 122kPa



Main: Abutment 1 showing the old and new bridges as well as the joint between segmental and full height panels at the corner

Above first picture: Existing wall to be extended on the north side

Above second picture: Precast parapets at RECO precast yard



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Above on the left: Reinforced Earth® TerraTilt® walls with hexagonal pattern

Above on the right: Extension under construction. Our sister company GFWA has also been involved in the temporary construction works.

Solutions

RECO needed to write project specific procedures to comply with: Project Management Professional Certification; Technical Specifications; Inspection and Test Plans and Precast Manuals. The precasting was completed at the RECO precast facility located in Landsdale, Perth. Twelve heavy duty segmental TerraHex moulds and two full height TerraTilt® moulds were used for the project. MRWA specifies that concrete temperatures during casting must remain under 32°C and that ambient air temperature cannot exceed 38°C. To achieve this, ice was added to the concrete mix to ensure that this requirement was met.

Significant design checks were carried out to ensure the capacity of the MSE walls was adequate for the additional short-term crane loads imposed while installing the bridge beams.

Special Features

The new MSE walls were all cast with panels that match the exposed aggregate finish and hexagonal pattern found on the original segmental panels.

Conclusion

By increasing the number of lanes in each direction and improving merge points, traffic flow has improved, leading to safer journeys for commuters, residents and the freight industry.

Project specifications

Systems	TerraHex and TerraTilt® precast capping units and parapets
Finish	Hexagonal features with exposed aggregates
Structures	2 Reinforced Earth® Bridge abutments
Area	1,204 sqm (total)
Max. Height	8.9 m
Design load	20kPa
Design life	100 years



Above: Reinforced Earth® Abutment walls with precast capping units



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