



CASE STUDY

ESPERANCE PORT ACCESS CORRIDOR

Esperance, WA, Australia

Reinforced Earth® TerraPlus®
Retaining Walls

Owner: Main Roads WA

Consultants: KBR

Contractor: John Holland Pty Ltd

Construction: Nov 2012 – Apr 2014

Background

Esperance is located in the south east of Western Australia. In March 2012, John Holland Pty Ltd was awarded the contract to design and construct the Esperance Port Access Corridor Project by Main Roads WA. The project was jointly funded by the federal and state government at a cost of \$120 million. It involved the design and construction of the following works:

- Realignment of 1.8km of the Highway which included intersections at Mungan Street, Johns Street Link and Smith Street;
- Bridge over the Highway and railway at Twilight Beach Road;
- Bridge over the railway at Johns Street Link;
- Railway tunnel under the Highway;
- Shared path underpass at Griffin Street under the Highway and railway;
- Realignment of 1.3km of single track railway and associated infrastructure.

The Reinforced Earth Company (RECO) was awarded the design and supply of 9 retaining walls and 3 bridge abutments with a total Reinforced Earth® wall area of 12,914sqm.

The Reinforced Earth® TerraPlus® wall system used was built to a maximum height of 12.5m, of which

1,978sqm had a textured wave and rope panel finish.

Challenges

The challenges for the RECO design engineers were mainly derived from the many different types of structures necessary for the project. The Twilight Beach Road Bridge and John Street Link Bridge needed longer reinforcement straps to accommodate pile foundations and due to a stabilised backfill.

Specialist geotechnical engineers were consulted concerning the frictional characteristics of the sandy backfill to ensure that it complied with RECO's technical specifications. Another concern for the designers was the variety of loading conditions: two of the walls had to allow for 50% loading transfer from noise walls, two wall designs had to consider loads from crash barriers, and two others had to cater for forces from the screen walls attached.

The next challenge was that many of the structures were built over a live road and rail corridor – with both of them servicing the Esperance Port with freight – so temporary steel support structures were erected to allow the corridors to remain operational at all times during construction. Deliveries and construction procedures allowed for this through detailed planning and logistics.



Main: North Approach to Twilight Beach Road Bridge. Photograph courtesy of John Holland.

Above first picture: Railway Tunnel with Reinforced Earth® Head Walls

Above second picture: Twilight Beach Road Bridge Reinforced Earth® Wall during construction



REINFORCED EARTH
SUSTAINABLE TECHNOLOGY

Transport infrastructure



Above: Reinforced Earth® TerraPlus® Retaining Walls with Painted Finish. Photographs courtesy of John Holland

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. Twenty four heavy duty moulds were utilised. 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.

Special Features

The artwork for the retaining walls of the Twilight Beach Road Bridge was designed by Mark Datodi, an artist from Perth. Mr Datodi said “the natural colours that occur in the land and seascape of Esperance are what people are drawn to and visualise when thinking of this region. A coherent colour palette will be applied to all noise walls and artwork elements.” The artwork depicts wave and rope

patterns, some of which were precast into the concrete panels, and then painted.

Conclusion

The completed project has significantly improved safety for all roads and railway users, including cyclists and pedestrians, by eliminating road and railway conflicts. It has enhanced community access across the transport corridor and provided infrastructure that supports the economic and regional development of Esperance and the Esperance Port.

Project specifications

Systems	TerraPlus®
Finish	Rope & Sea Pattern, Plain
Structures	9 Reinforced Earth® Retaining Walls 3 Reinforced Earth® Bridge abutments
Area	12,914 sqm (total)
Max. Height	12.5 m
Design load	20kPa
Design life	100 years



Above: Twilight Beach Road Bridge Wave Patterns