



CASE STUDY

REGIONAL RAIL LINK – Package F

Werribee, VIC, Australia

Reinforced Earth® Retaining Walls
TerraPlus®

Owner: Dept. of Transport
Victoria

Consultants: SMEC

Contractors: Leighton Downer
Joint Venture

Construction: 2012-2013

Background

The Regional Rail Link (RRL) Project was Victoria's largest rail infrastructure project, comprising of 90 km of new tracks, five new and upgraded railway stations, 40 bridges, 13 grade separations, and thousands of kilometres of wiring and conduits. Previously regional train services in Victoria shared tracks with the suburban metropolitan train services in the state capital city of Melbourne. The RRL Project segregates regional services from metropolitan rail services by providing dedicated railway lines for regional trains between Southern Cross Station and West Werribee Junction. Due to the project's size and complexity, the RRL Project was divided into six construction packages. The Reinforced Earth Company (RECO) provided Reinforced Earth® structures within three of these packages. This case study focuses on Package F – West Werribee Junction. The project team on Package F was Leighton-Downer Joint Venture (LDJV). RECO was contracted to design and supply 5517 sqm of Reinforced Earth® TerraPlus® retaining walls for two abutment walls and six flyover walls for this package.

Challenges

The scope of works for the West Werribee Junction Project comprised of: two new regional tracks over 2.5km linking the existing Geelong line to Regional Rail Link.; realignment of the existing main line tracks; rail-over-road grade separation at Bulban Road; a new rail bridge over the existing tracks and Bulban Road; realignment of Bulban Road to accommodate the new rail bridge. RECO was required to design and supply two Reinforced Earth® retaining walls at Bulban Road, one at each abutment of the rail-over-road structure. The skew between Bulban Road and the rail-over-road bridge is approximately 60 degrees. The intent of these walls is to support the RRL track formation as it approaches the Bulban Road overpass. The abutment was supported on cast-in-place bored piles, installed through the Reinforced Earth® walls and set into underlying basalt rock. The design included the piles which are sleeved through the reinforcing strips. The bridge deck is supported on pot bearings sitting on an abutment shelf (as shown in the second picture). Lateral loads from the bridge deck are transferred to the embankments through the reinforcing strips attached to the Reinforced Earth® TerraPlus® concrete facing panels.

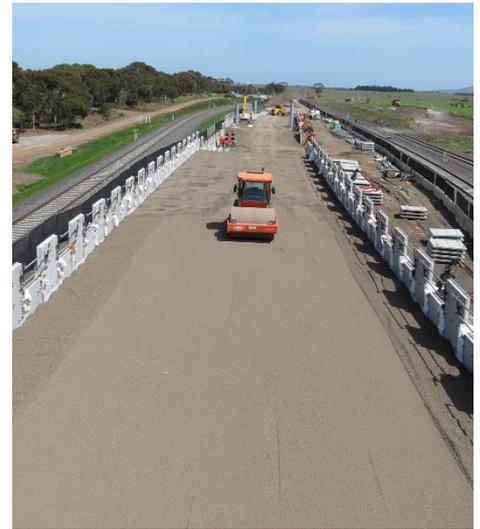


Main: View along the realigned section of Bulban Rd from underneath the new bridge.
Above first picture: Goods train travelling on the new rail-over-road bridge over Bulban Road
Second picture: The bridge deck supported by pot bearings sitting on an abutment shelf on the new rail bridge.
Third picture: Abutment walls under the new rail bridge at Bulban Road



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Transport infrastructure



Above: Aerial View of West Werribee Junction

Above Right: Aerial view of the grade separation during construction.

Special Features

One of the abutment walls is completed with staggered wingwalls which extend from the 60 degree skew between Bulban Road and the rail-over-road bridge structure. The wingwalls step back to match the curve of the Bulban Road realignment. As each wall ends, the connection to the next one is completed with a rock gabion structure. The Reinforced Earth® walls were designed to house these structures which are included for visual appeal.

Conclusion

Works on the final stage of Victoria's \$3.65 billion Regional Rail Link has been completed with all passenger services commencing in June 2015. In 2014, RRL was awarded the best Australian project of the year at the Infrastructure Partnerships Australia's (IPA) National Infrastructure Awards. In 2015, the RRL project has been recognized as the winner of the Australian Construction Achievement Award 2015 by the Australian Constructors Association (ACA) and Engineers Australia (EA).

ACA President, David Saxelby, said that the winning project "came in 8 months ahead of schedule and \$900 million under budget because the industry was able to work with the client to properly and effectively plan each stage of the project." The Leighton Downer Joint Venture construction team for RRL Package F along with RECO delivered: two major rail bridges that carry Geelong trains over the existing rail corridor and Bulban Road on to the new railway towards Melbourne's CBD; and a safer alignment of the 800m section of Bulban Road located below the new rail-over-road bridge.

Project specifications

Systems Reinforced Earth® with TerraPlus® concrete facing panels

Finish Concrete Smooth Grey

Structures 2 Bridge Abutment Retaining Walls & 6 Flyover Retaining Walls

Area 5, 400 sqm (total)

Max. Height 9 m

Design load 20kPa

Design life 100 years

Right: Placing the reinforcing strips behind the TerraPlus® concrete facing panels.

