



CASE STUDY

CAIRNS BRUCE HIGHWAY UPGRADE

Cairns, QLD, Australia

TerraPlus® Abutment

Owner: Main Roads QLD

Consultant: SMEC

Contractor: BMD Albem Joint Venture

Construction: 2012

Background

The Cairns Bruce Highway Upgrade Project has been in planning with the Department of Transport and Main Roads QLD since 2007. The initial design of the \$150 million project was based on feedback from extensive community consultation.

The project covered 3.4 km of the Cairns Bruce Highway and involved the widening of Ray Jones Drive to six lanes, and the building of two overpasses for traffic accessing Mulgrave Road and Sheehy Road. The upgrade provides alternative routes for heavy and oversize vehicles and improves southern access into the Cairns CBD.

The Reinforced Earth Company (RECO) was engaged by BMD Albem Joint Venture to design and supply a total of 4675m² of Reinforced Earth® TerraPlus® walls for ten abutments to support the overpass bridges within the scope of the project.

- Four abutment walls for the Sheehy Road overpass on the Bruce Highway;
- Two abutment walls for a service road overpass on Sheehy Road;
- Two abutment walls where Ray Jones Drive crosses Mulgrave Road;
- Two abutment walls on Mulgrave Road crossing Rigg Street.

Challenges

The Reinforced Earth® structures support architectural feature panels that act as safety barriers along the top of the overpass structures. These feature panels are attached to and supported by piles built within the walls. Designers had to allow for any wind loads that these tall barrier structures would transfer through to the Reinforced Earth® walls.

Another impact on the loading conditions to be considered came from the severe weather conditions experienced in the Cairns area which can result in heavy flooding. Each structure was designed to support a live load of 20kPa applied at road level, in addition the designers had to account for the wind loads from the barrier structures being transferred through the piles.

The structures have a design life of 100 years and RECO can monitor the future performance of structures by accessing special in built durability monitoring strips. The durability monitoring strips are installed in specially built panels as part of the Reinforced Earth® global standard.



Main Picture: Bruce Highway under Ray Jones Drive Overpass

Top: Close up of the Reckli® 2/32 Inn Textured Panel finish

Above: Mulgrave Road over Rigg Street

Transport infrastructure



Special Features

Each of the 10 Reinforced Earth® abutment walls display a unique patterned finish. RECO has vast experience with meeting the requests of architects to design unique textures and finishes for our precast panels. The texture chosen for this project was Reckli 2/32 Inn Finish which was incorporated into our Reinforced Earth® TerraPlus® moulds in different arrangements. The precaster, Rocla Cairns, needed to cast five different facing panels which were then arranged to create a different design for each wall. These unique walls combined with different painted colours feature well with the other elements of the project, namely the coloured safety barrier panels.



Benefits

The Cairns Bruce Highway Project included the widening of Ray Jones Drive to six lanes. The Reinforced Earth® retaining wall systems maximise space in a limited area and by using our systems it enabled the delivery of extra traffic lanes.

The project on completion has successfully met the primary aims of the upgrade which were to improve safety, ease congestion and queuing by increasing the traffic flow, improve pedestrian and cycle facilities within the area and upgrade the highway to ensure that future works and capital costs are minimised.

Project specifications

System	TerraPlus®
Finish	2/32 Reckli® Inn
Structure	Reinforced Earth® Abutment Walls - 10 in total
Area	4675m ² (total)
Max. Height	11 m
Length	770 m (total)
Design load	20 kPa loading with transverse pile loading
Design Conditions	Severe Flooding
Design life	100 years

Main Picture: Bruce Highway under Ray Jones Drive Overpass

Left: Sheehy Road Overpass