

# KAREL AVENUE UPGRADE

## Roads & Motorways

### Widening Mixed abutments Retaining walls

AUSTRALIA, Perth



New abutments panels being installed next to existing panels for the bridge over Roe Highway

**Owner/Client**  
Main Roads Western Australia

**Engineer**  
Wallbridge Gilbert Aztec (WGA)

**Main contractor**  
Georgiou

**Terre Armée entity**  
Reinforced Earth Pty Ltd (Hornsby)

**Date**  
2020

**Activity :**  
Reinforced Earth

**System :**  
TA "Classic"  
TerraTrel

**Reinforcement :**  
HA / HAR steel strips

**Key figures :**  
Area : 75 m<sup>2</sup>  
Rise : 8 m



New abutments panels installed and relocated wingwalls in place

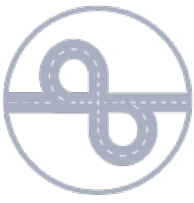
## The Project

The Karel Avenue Upgrade Project consisted of widening Karel Ave to a dual carriageway including upgrading the Roe Highway interchange and the Berrigan Drive interchange. Widening of Karel Ave included widening 2 existing bridges – the bridge over Roe Highway and the bridge over the Freight Railway line. Both of these existing structures, built circa 2005, include Reinforced Earth abutment walls. The bridge over Roe Highway has full height TerraTilt® walls with unique artwork relief and the bridge over the freight line has segmental TerraSet® walls.

## The Solution

Throughout the project, a total of 18 no. temporary loading (crane and piling rig) design checks were carried out on the existing abutment walls by Reinforced Earth design engineers to ensure the clients temporary works and staging criteria were met. Some of these checks ensured the safe operation on





# KAREL AVENUE UPGRADE

## Roads & Motorways

### Widening Mixed abutments Retaining walls

## AUSTRALIA, Perth

top of the walls of piling rigs with a bearing load of up to 250kPa under their mats.

The freight rail bridge TerraSet® abutment that had the top removed was able to be re-designed to ensure the structures stability, with the new bridge loading as well as the new panel arrangement, was maintained.

One of the TerraTilt® bridge abutments over Røe Highway were able to be re-designed, to ensure the existing panels could be re-used with the additional/longer soil reinforcement added to take higher loads above the structure. The other was re-designed to enable relocation of existing wingwall panels and addition of new abutment wall panels and columns in their place – widening the abutment by 10.5m, as well as ensuring continuity of the unique artwork pattern facing the road.

## The Advantages

The bridge over the freight rail was re-designed completely to enable a longer span to accommodate for future Metronet works. As a result, one existing abutment required demolishing and the other required the top portion to be removed to allow for deeper bridge beams. Staging works for this bridge involved piling for both bridge supports and for the new abutment, multiple crane lifts removing and installing bridge beams, installation of a temporary TerraTrel® wire wall to enable the new structure to be built in halves and maintain traffic flow, partial demolition of one existing TerraSet® abutment and full demolition of the other.

The bridge over Røe Highway widening included widening of one TerraTilt® abutment and re-design of the other to take the additional loads. Staging works included piling for bridge supports, grout injection and sheet piling for allowing temporary excavation of existing structures, excavation and relocation of existing TerraTilt® wingwalls, installation of new TerraTilt® abutment panels and new bridge footing/columns and multiple crane lifts to install new bridge beams.

