

# Forrestfield-Airport Link, Australia

## Project specifications

Project type: Rail  
Application: Precast segments

## Partners

Owner: Public Transport Authority of Western Australia  
Contractor: Salini Impregilo-NRW JV  
Designer: GHD  
Supplier: Boral



The Forrestfield-Airport Link project extends Perth's suburban rail network by another 8.5km via twin bored tunnels excavated below the Swan River and Perth Airport. In addition to these sensitive surface-level structures, the project's two TBMs drove through diverse ground conditions including the region's Ascot formation, which comprises complex non-cohesive granular material.

## The challenge

Immediately following the contract award, the project launched several studies into concrete mix designs. Specifically, the research wanted to confirm early strength requirements for de-moulding and lifting segments. One of the main motivations for this research was to find a concrete mix that would best enable crews to meet required production targets.

The job site for the twin bore tunnels only had storage capacity for 14,000 of the project's 55,000 tunnel segments, produced down the road by the joint venture partners. The production process needed to ensure a quick and continuous supply to the site.

## The solution

Several trials were performed with cast concrete beams, according to standard BS EN14651, and 35 kg/m<sup>3</sup> of fibre. The characteristic values of these results were higher than the serviceability state, and the project adopted Dramix<sup>®</sup> 4D 80/60 BG fibres at a dosage of 35 kg/m<sup>3</sup> for its tunnel lining.

Segments were de-moulded at 20MPa and measured 300mm thick with an average length of 1,600mm. Rings are formed of five segments plus a key.

The 6,170mm idsegmental lining was designed to meet the project's requirements for concrete durability of 120 years.