

CASE STUDY

# Major Projects

CITYLINK MELBOURNE 1999

2018 EDITION

## Client/Construction Team

**Product:** Pavement Solutions

**Client:** Baulderstone Hornibrook

**Location:**

Western Link – Bulla Road,  
Tullamarine Freeway to Westgate  
Freeway – including Elevated Sections  
and Bolte Bridge

Southern Link – Westgate Freeway  
to Toorak Road, Monash Freeway –  
including Burnley and Domain Tunnels

**Construction Team:**

Boral Asphalt

## Customer

Baulderstone Hornibrook sub-contracted  
by Transfield Obayashi Joint Venture, the  
CityLink contractor to Transurban.



# BORAL

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### Project Impact Statement

CityLink is the first privately funded electronic-tolling road in Victoria and connects three of Melbourne's major freeways across the CBD and Yarra River.

With construction commencing in May 1996, the project spans 22km and was the largest civil engineering project in Australia since the Snowy Mountains Hydroelectric Scheme.

Fully opened in December 2000 at a cost of approximately \$AUD 2 billion, it has a BOOT scheme period of 34 years with a handover pavement residual life of 20 more years.

Apart from the economic benefits of connecting Melbourne's industrial and commercial precincts, CityLink has also delivered drive-time savings of about 15 minutes per route and is designed to limit noise to 63dB(A)L<sup>10</sup>(18hr).

Boral Resources (Vic) was awarded the tender for supply and delivery of cement treated crushed rock and asphalt for the entire CityLink Project except the Burnley and Domain tunnels. In other words, the supply and placement of large volumes of pavement materials that had to meet high quality assurance requirements completed in challenging timeframes.

### Design

#### Western Link

Surfacing	30mm OGA (PMB)
Wearing Course	40mm Size 14, Type H Asphalt
Intermediate/Base Course	135mm Size 20, Type T Asphalt
Sub-base	280mm Size 20, CTCR (5000 MPa)
Total	485mm (Incl. OGA)

#### Southern Link

Surfacing	30mm OGA (PMB)
Wearing Course	35mm Size 14, Type H Asphalt
Intermediate/Base Course	140mm Size 20, Type T Asphalt
Sub-base	245mm Size 20, CTCR (5000 MPa)
Total	450mm (Incl. OGA)

### Quantities

#### Western Link

CTCR	140,000 tonnes
Freeway	140,000 tonnes DG Asphalt (inc. lean mix)
Freeway	24,000 tonnes OGA (PMB)
Elevated Roads	10,000 tonnes OGA (PMB)
Elevated Roads	30,000 tonnes DG Asphalt

#### Southern Link

CTCR	20,045 tonnes
Freeway	22,700 tonnes DG Asphalt
Freeway	6,800 tonnes OGA (PMB)





## Project Scope

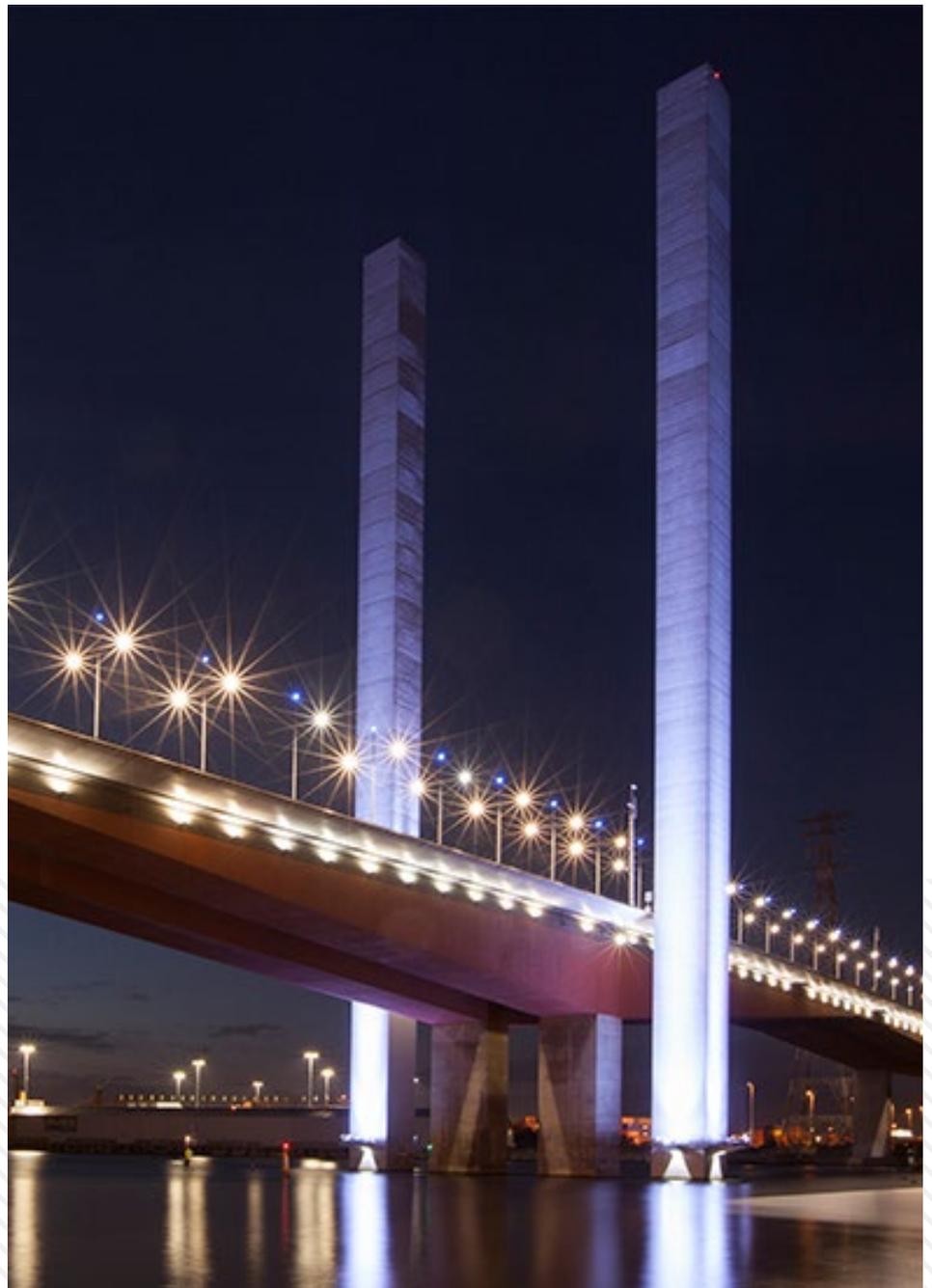
The placement of dense and open graded asphalts were some of the last and critical path activities before practical completion were delivered in compressed timeframes and to ensure that the performance parameters for all parties were achieved.

## Existing Conditions

Many sections of CityLink involved widening and realigning of existing roadway with only a small component of construction in greenfield state.

Construction work was largely completed under traffic and included ramps and interchanges.

Elevated sections above the Yarra River estuary are subject to high winds, which is conducive to rapid cooling of hot mix materials and required special attention.



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## Design

A deep strength asphalt pavement was selected by Baulderstone- Hornibrook as it was the most cost effective configuration for this project based on whole of life analysis.

The sub-base would consist of high modulus cement treated crushed rock and would be followed by standard VicRoads asphalt layers, with the final surfacing consisting of polymer modified open graded asphalt to achieve specified noise and rain-water spray reduction limits.

As a BOOT contract, the onus was on the contractor to prepare suitable pavement designs for approval by independent auditors. During the delivery phase, any pavement design modifications for site specific conditions were carried out by Boral.

A significant innovation in this project was the construction of a high-modulus cement treated crushed rock sub-base without the need to increase cement content, thereby providing significant cost savings and reducing the potential for shrinkage cracking. CTRC was supplied from Boral Deer Park Quarry via pugmill, and utilized proprietary processes developed after detailed research commissioned by Boral.

Another technological edge was achieved by introducing a polybutadiene binder to improve the performance of the open graded asphalt layer in this project. Modification to the standard road agency (VicRoads) open graded mix was also made so that further improvement to outcomes in the field would result.

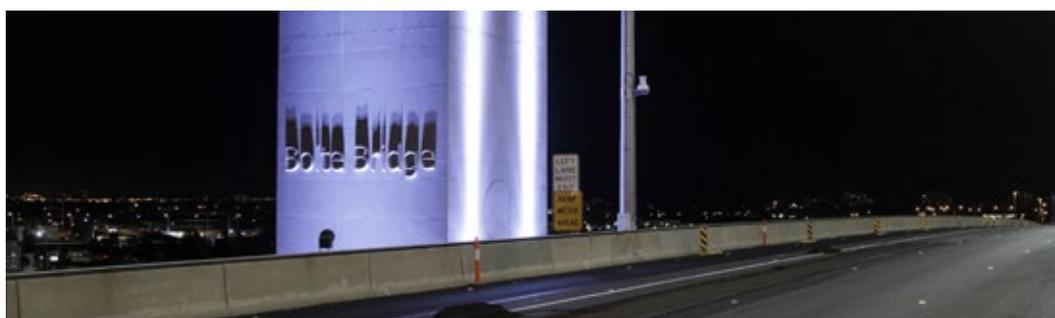
## Performance Review 2010

After more than ten years in service, CityLink is performing well and is expected to meet its design targets. The asphalt placed on CityLink continues to withstand the heavy traffic loading imposed on it.

Back analysis of the high modulus cement treated crushed rock layer has shown that the expected strength was developed in this layer and that the specialized processes were successful.

Performance of the pavement from a road-user perspective has been assessed by measuring road roughness. Ride testing undertaken after construction has shown that the rideability and level control on the project was met, leading to better pavement life and at the same time, more comfortable driving for motorists.

CityLink is now an established feature of Melbourne's landscape and has inspired other projects of similar nature throughout Australia.



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## Contact us:

At Boral we are committed to excellence in service so for further information please contact:

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