The Brighton Bypass is a $176 million investment in upgrading the Midland Highway to the north of Hobart, funded by the Australian and Tasmanian Governments. Managed by the Department of Infrastructure, Energy and Resources (DIER), it will provide a bypass of the towns of Brighton and Pontville as well as significantly improved connections to developing industrial, retail and residential centres in Brighton and to the historic settlement of Pontville.

The bypass will provide a new dual carriageway highway between the East Derwent Highway at Bridgewater and the existing Midland Highway north of Pontville.

Employed by the VEC Thiess Joint Venture, Orica’s role in this project was to blast an 800 metre long cutting known as the “Jordan Cut” in the northern section of the bypass.

Managing vibration

Up to nine metres deep and 30 metres wide, the Jordan Cut involved blasting as close as 50 metres to occupied houses. Key to the success of managing vibration in such a critical area was the Blast Evaluation. Conducted prior to full scale blasting, this process involved firing a number of small explosive charges along the length of the cut and measuring the vibration generated at key points. The data obtained was used to determine the local ground characteristics which affect the transmission of blast generated vibration, in turn enabling the calculation of Maximum Instantaneous Charge (MIC) weights which could be used along the cut.

As the MIC has a direct influence on the blasting method and ultimately the degree of blasting complexity, the Blast Evaluation allowed for a more accurate estimate of time and resources required to complete the job. This greatly simplified the tendering process and provided the customer with realistic expectations for project progression.

Novel blasting method saves time

Blasting in a suburban environment requires a unique blasting approach to successfully break rock while staying within legislated vibration limits and reducing the effects of blasting on neighbours. Conventional blasting methods would have required multiple passes to achieve the cut depth, necessitating excavation of each blast, preparation of a new drill bench and extra drilling time in order to blast the next pass. Using this method to complete the cut would have required more than 40 blasts, and increased the duration of the project by two to three months.

To reduce costs and maximise efficiencies, Orica developed a unique method to allow the full cut depth to be blasted in one pass, thereby reducing the overall number of blasts required on the Jordan Cut to just 21.

The innovative method involved loading blastholes with up to four individual explosive decks each primed with Orica’s i-kon™ electronic detonators. The i-kon™ system allowed each deck to be fired separately, enabling relatively large, complex geometries to be blasted whilst controlling vibration levels.

Rohan Stevens, Orica’s Construction Blasting Engineer highlights that Electronic Blasting Systems also offer safety and security advantages. “With a higher level of accuracy and a large delay range, the i-kon™ system provides greater timing flexibility. Its inherent safety features also it to be loaded over a number of days which enabled the size of blasts on the Brighton Bypass to be maximised in a safely controlled and efficient way.”
Community Relations

Blasting in close proximity to local residences required an active approach to community relations. Regular engagement with neighbours was an integral part of managing expectations and resolving concerns. To this end, Orica operated a blast notification system whereby neighbours were notified in advance of blast events by email and SMS. This allowed neighbours to keep abreast of blasts which were close to their properties and make arrangements for their pets and livestock.

To further minimise disruption to neighbours, blasts were ‘slept’ so that loading could continue over a number of days. This allowed blast sizes to be maximised, thereby reducing the number of overall blast events for the project and for the neighbours.

With careful planning, correct product application and Orica’s technical expertise, over 100,000BCM of hard basalt was successfully blasted up to a distance of 50m of occupied residences and with minimal disturbance to neighbours. Alternative means of rock breakage would have significantly lengthened the project duration and had an adverse effect on community relations. The Brighton Bypass project is testament to the fact that blasting is a safe and economical method of rock breakage in built-up areas.

Acknowledgements

Orica wishes to acknowledge the VEC Thiess JV and DIER for their co-operation as well as the patience of the Brighton residents throughout the blasting programme.
Brighton Bypass – Project Details

- **Excavation Type:** Road Cutting
- **Total Volume:** 111,000 BCM
- **Number of Blasts:** 21
- **Project Duration:** Three months
- **Environment:** Suburban Residential
- **Nearest Neighbours:** Residential Dwellings (50m)  
  Tasmanian Main North/South Rail Line (30m)
- **Blasting Method:** Up to nine metre benches with multiple decks per blast hole
- **Explosive Types:**  
  ~ 20,000kg ANFO  
  ~ 34,000kg Bulk Centra Product  
  ~ 7,000 electronic detonators