



BRUCE HIGHWAY—CAIRNS SOUTHERN ACCESS CORRIDOR  
STAGE 3—EDMONTON TO GORDONVALE DETAILED  
BUSINESS CASE 2017

BUSINESS CASE SUMMARY



Purpose of this document	This document provides an overview of the Bruce Highway—Cairns Southern Access Corridor Stage 3—Edmonton to Gordonvale Detailed Business Case 2017. The objectives of this document are to outline the key aspects of the project and provide transparency as to how the project has been developed and may be implemented.
Status	This summary was prepared based on the contents of the detailed business case presented to the Building Queensland Board in Q4 2017. The information presented may be subject to change as the proposal moves into the future stages of development, delivery and operations.



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## 1 Summary information

Project name	Bruce Highway—Cairns Southern Access Corridor Stage 3— Edmonton to Gordonvale	
Proposal owner	Department of Transport and Main Roads	
Proposed delivery agency	Department of Transport and Main Roads	
	<b>P50</b>	<b>P90</b>
Capital cost of proposal <sup>1</sup>	\$470 million	\$500 million
Incremental ongoing costs of proposal <sup>2</sup>	\$13 million	\$15 million
Net present value (NPV)	\$41.7 million	\$19.6 million
Benefit cost ratio (BCR)	1.13	1.06

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<sup>1</sup> Nominal capital cost estimates are undiscounted 2017 dollars and have been rounded to the nearest million.

<sup>2</sup> Incremental ongoing costs estimates have been rounded to the nearest million and presented for the 30 years following construction period of the infrastructure initiative (assumed 2023-2052).



## 2 Proposal overview

The Bruce Highway is part of the National Land Transport Network, connecting Cairns to the vast majority of Queensland, and servicing both intra and inter-regional movements. It is the primary freight access to Cairns, handling more freight than the Port of Cairns and the North Coast Rail Line combined.

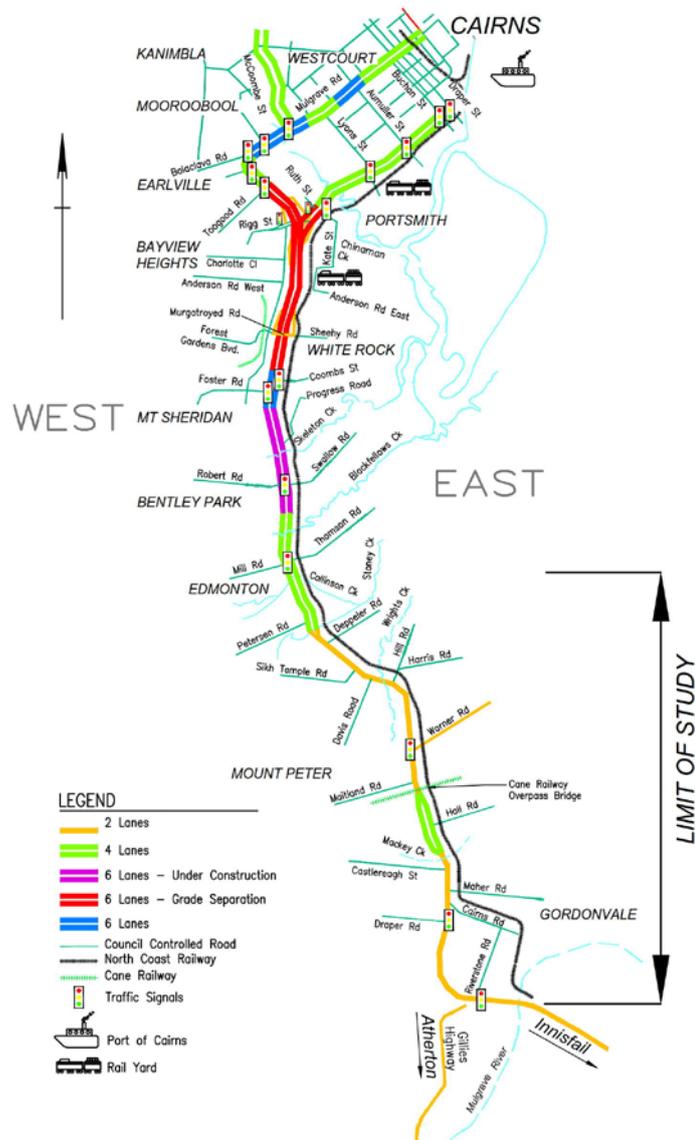
The proposal study area, Edmonton to Gordonvale, is a section of the Bruce Highway located approximately 13 kilometres south of the Cairns central business district. It extends for approximately 9 kilometres from Edmonton in the north to Gordonvale in the south (see Figure 1).

The Cairns Bruce Highway Upgrade Master Plan is the strategic planning instrument on which all Cairns Bruce Highway projects are based. The Edmonton to Gordonvale upgrade of the Bruce Highway is identified in the master plan as Stage 3. Stage 1 has been implemented, Stage 2 (Foster Road to Robert Road) is under construction, and Stage 4 (Kate Street to Aumuller Street) had its detailed business case endorsed by the Building Queensland Board in 2017.

The Edmonton to Gordonvale upgrade is identified in the National Partnership Agreement on Land Transport Infrastructure Projects 2014<sup>3</sup>. Under the National Partnership Agreement, \$384.8 million in Australian Government funding has been committed to the project.

The delivery of the project is a priority because of its significant contribution to the Australian and Queensland Governments' strategy for improving the resilience, reliability, connectivity, efficiency and accessibility of the transport system on the Brisbane—Cairns corridor.

Figure 1 Project study area



<sup>3</sup> Australian Government will provide 80 per cent project costs, capped up to a contribution of \$384.81 million subject to Queensland providing 20 per cent of project costs.

[http://investment.infrastructure.gov.au/about/resources/national\\_partnership\\_agreement.aspx](http://investment.infrastructure.gov.au/about/resources/national_partnership_agreement.aspx)



Key objectives of the proposal are:

- increasing safety on the Edmonton to Gordonvale section of the Bruce Highway
- ensuring adequate capacity for future growth on the highway
- removing direct property accesses from the highway where possible
- securing a speed limit of 100km/h on the Edmonton to Gordonvale section of the highway.

### 3 Service need and problem identification

The Bruce Highway provides the only road connection from Cairns to the south. It is a critical link to other parts of Queensland and to areas inter-state. Approaching Cairns from the south, the Bruce Highway passes through the urban growth areas of Gordonvale, Mount Peter and Edmonton.

In 2015, permanent counters on the highway recorded annual average daily traffic (AADT) of 17,397 north of Gordonvale (the southern end of study area) and 19,532 AADT approaching Edmonton (the northern section of the study area). These traffic volumes were the highest of any two lane at grade section of the Bruce Highway between Brisbane and Cairns. Furthermore, traffic counts for 2016 (released during the development of the detailed business case) showed an increase of 4.9 per cent in traffic north of Gordonvale and 4.2 per cent increase at the approach to Edmonton in the twelve months from 2015.

The Edmonton to Gordonvale section of the Bruce Highway experiences delays during morning and evening peaks and has a high crash rate. Increasing industry diversification, densification of the central business district, and urban expansion to the south of Cairns are resulting in forecast traffic growth beyond the reliable capacity of the existing infrastructure. Furthermore, increased growth is predicted to heavily impact the ability for the intersections along this stretch of highway to cater for traffic without significant travel time delays.

The traffic modelling of the base case has identified the following performance issues:

- the model indicates average travel speeds for traffic moving through the Study Area are expected to deteriorate to between 10km/h and 56km/h during the peak periods
- intersection LOS is expected to deteriorate, with the Warner, Maitland, Draper and Riverstone Road intersections all expected to exceed LOS D by 2021 during the peak periods
- intersection LOS at 2036 exceeding LOS F is expected to be experienced at all signalised intersections within the study area during the peak periods.

The modelling indicates that, should the current two lane, two-way highway remain in place by 2036, the Petersen Road, Maitland Road, Warner Road and Draper Road intersections are expected to become significant constrictions to through traffic movement on the Bruce Highway, with excessive delays and queuing throughout the full extent of the study area.

The Edmonton to Gordonvale project therefore has three key project drivers:

- traffic congestion
- poor road safety
- population growth in the Cairns southern corridor.



## 4 Options assessment

The preliminary evaluation for the project considered a number of options to upgrade the existing highway. Prior to the commencement of the detailed business case, an affordability analysis indicated that the preferred option identified in the preliminary evaluation would be achievable, and that a number of other inclusions could be made to the proposal aligned to the service need. On this basis, the preferred option was progressed to the detailed business case. A further sub-option to replace two existing intersections with a single grade separated intersection was also progressed. This sub-option avoided the risk of the maximum highway speed being restricted to 80km/h due to closely-spaced at grade intersections. This option also addressed the public preference for not having signalised intersections on the highway. Therefore, the final two options evaluated in the detailed business case were: an 'at grade option' and a 'grade separated option'. The difference between the two options related to replacement of Warner and Maitland Road intersections with a grade separated intersection.

## 5 Reference project

The reference project will upgrade the Bruce Highway to four lanes between Edmonton and Gordonvale. Key features of the upgrade include:

- 16.4 kilometres of new two-lane carriageway (9.4 kilometres northbound and 7 kilometres southbound)
- 4.7 kilometres of relocated (new) Queensland Rail line with flood immunity increased to Q100
- removal of 21 direct property accesses from the highway
- removal of ten intersections from the highway (six completely removed, four left in or left out)
- two upgraded signalised intersections (Draper Road and Riverstone Road)
- two new signalised intersections (Petersen Road and the Bruce Highway, and Petersen Road and the proposed new service road)
- one grade separated intersection (Maitland Road)
- improvement in the flood immunity of the highway from Q2 to Q50
- removal of seven at grade crossings of the Queensland Rail line
- construction of an off-road cycle path.

## 6 Project costs

The costs presented in this section represent a point in time estimate of capital costs and outturn costs of the reference project.

### 6.1 Capital costs

Table 1 outlines a breakdown of the risk adjusted capital costs.

Table 1 Summary project costs

PROJECT COSTS	REAL (\$M 2017))	NOMINAL (\$M)	NPC (\$M)
Raw capital costs	\$353.0	\$391.4	\$349.2
Risk adjustment (P90)	\$108.6	\$108.6	\$97.6



PROJECT COSTS	REAL (\$M 2017))	NOMINAL (\$M)	NPC (\$M)
<b>Risk-adjusted capital costs (P90)</b>	<b>\$461.6</b>	<b>\$500.0</b>	<b>\$446.8</b>
Net ongoing costs	\$6.3	\$13.4	\$4.2
Risk Adjustment (P90)	\$0.9	\$2.0	\$0.6
<b>Risk-Adjusted Ongoing Costs (P90)</b>	<b>\$7.2</b>	<b>\$15.4</b>	<b>\$4.8</b>
<b>TOTAL COSTS</b>	<b>\$359.3</b>	<b>\$404.8</b>	<b>\$353.4</b>
<b>TOTAL RISK ADJUSTMENT</b>	<b>\$109.5</b>	<b>\$110.6</b>	<b>\$98.2</b>
<b>TOTAL RISK ADJUSTED COSTS (P90)</b>	<b>\$468.8</b>	<b>\$515.4</b>	<b>\$451.6</b>

## 7 Project benefits

The Edmonton to Gordonvale project benefits include:

- reduced crashes and fatalities
- reduced serious injuries
- increased safety rating of road (AusRAP star rating)
- increased resilience during flooding
- decreased travel time
- increased productivity
- increased asset life
- maintenance of exiting reliability during flooding
- increased capacity.

The benefits and dis-benefits that have been monetised as part of the cost benefit analysis for the project are summarised in Table 2.

Table 2 Economic benefits and dis-benefits

PROJECT BENEFITS	TOTAL (UNDISCOUNTED \$ MILLIONS)	PRESENT VALUE (\$MILLION, ROUNDED 7% DISCOUNT RATE)	% OF BENEFITS
Travel time saving benefit	1,387.1	328.5	88%
Vehicle operating cost saving benefit	35.6	6.8	2%
Crash cost saving benefit	137.3	38.1	10%
Environmental impact	-6.5	-2.1	-1%
<b>Total benefits</b>	<b>1,553.5</b>	<b>371.4</b>	<b>100%</b>

A number of additional qualitative benefits were identified as part of the social impact evaluation for the project. These benefits include:

- improved access to facilities and services
- indirect employment through improved access to employment opportunities for a potential workforce



- improved access to new growth areas in the south through new local roads.

Further information on the economic evaluation of the project is outlined in the Cost Benefit Analysis Summary published on the Building Queensland website [www.buildingqueensland.qld.gov.au](http://www.buildingqueensland.qld.gov.au) in accordance with section 17(1)(a) of the *Building Queensland Act 2015*.

## 8 Environmental and sustainability impacts

A review of environmental factors was prepared to identify potential impacts, mitigation and management measures, and approval requirements for the project. The review concluded that the project is not likely to have a significant impact on matters of national environmental significance within or adjacent to the project area. As a result, it is not anticipated that the project will be considered a 'controlled action' and will not require referral to the Commonwealth Environment Minister under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act).

A number of potential issues concerning land were identified and mitigation strategies identified. Some of the key risks to be managed include: land acquisition; native title; and aboriginal cultural heritage.

The sustainability assessment found that the project will contribute to positive economic, environmental and social outcomes.

## 9 Project implementation and delivery

A value-for-money assessment was undertaken at the preliminary evaluation stage that leveraged market sounding conducted for other projects of this scale. The assessment concluded that a Public Private Partnership would not be appropriate for this project.

The delivery model assessment for the project considered three forms of delivery contract: Transport Infrastructure—Construct Only (TIC-CO); Early Contractor Involvement (ECI), which is a form of Design and Construct (D&C) contract; and Alliance Contracting. Analysis (including a multi-criteria analysis (MCA) process) concluded that superior outcomes would be achieved through a Double ECI delivery model.

The Double ECI contract stipulates that two tenderers be involved in a competitive evaluation during the planning stage, with one progressing to the delivery stage. A Double ECI is the default ECI model under the National Alliance Contracting Policy.

Market sounding conducted for the project revealed a preference for a D&C approach, noting that a Double ECI with a D&C contract would be acceptable. It was considered that there is limited scope for innovation in the project, particularly in the northern end of the alignment.