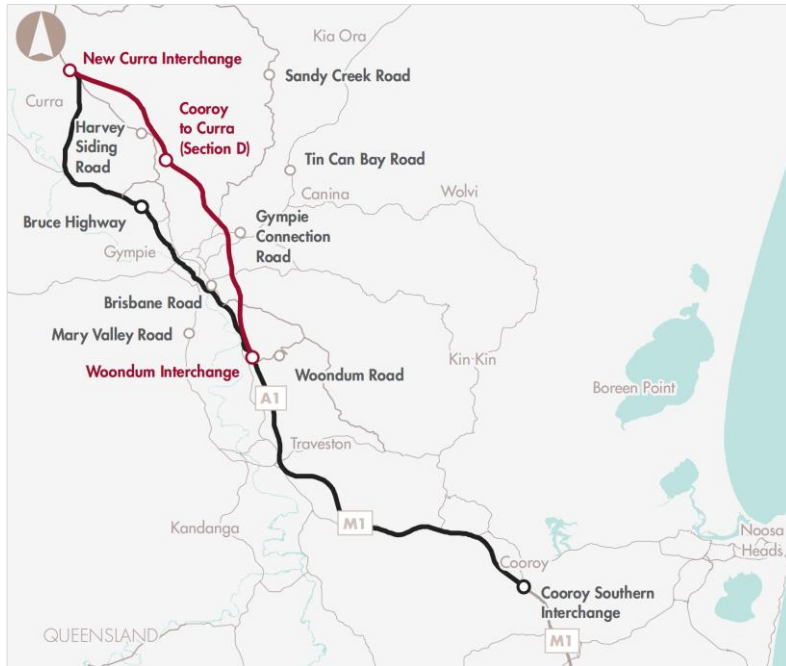


Bruce Highway – Cooroy to Curra Section D: Woondum to Curra

23 August 2019



Proponent

Queensland Government

Location

Gympie Region, Queensland

Capital cost

\$1,058.1 million (P90 outturn)

Indicative timeframe

Planning began Q3 2016

Construction planned for Q3 2019

Project completion by Q1 2024

1. Evaluation Summary

The **Bruce Highway Cooroy to Curra Section D: Woondum to Curra** has been added to the Infrastructure Priority List as a **Priority Project**.

The Bruce Highway is the major road transport route between Brisbane and Cairns, and is part of the National Land Transport Network (NLTN). The highway between Woondum and Curra is currently affected by safety, capacity and flood resilience issues.

As proposed, the Bruce Highway Cooroy to Curra Section D: Woondum to Curra project involves upgrading 26 kilometres of the highway, including works to reroute the highway to bypass Gympie. This is the final stage of a 62-kilometre program of highway upgrades between Cooroy and Curra. The program has four sections for construction purposes, with works on the first section having commenced in September 2009. The first three sections are now complete and open to traffic.

The Queensland Government's business case states that the net present value (NPV) of the project is estimated to be \$274 million with a benefit-cost ratio (BCR) of 1.36, using a 7% real discount rate and P50 capital cost estimates in 2018 prices. Infrastructure Australia evaluated the business case and considers the project to have a strong strategic case, but of marginal economic value. This is largely due to Section D being the last of a multi-section program. Completing Section D will help to realise the benefits of the entire program, but it also means that a significant part of the project's benefits may have already been captured by Sections A to C. A full program business case would have better demonstrated the alignment of the costs and benefits over all the different sections.

As a result, Infrastructure Australia considers the claimed safety benefits of the project may be overstated. However, the overall benefits of the project are likely to exceed its costs. Infrastructure Australia is also confident that the proponent’s proposed delivery model is appropriate.

2. Context

The Bruce Highway is part of the NLTN and is Queensland’s major coastal road corridor connecting population centres between Brisbane and Cairns. The highway is being progressively upgraded by the Australian Government and the Queensland Government, guided by the 10-year *Bruce Highway Action Plan* (2012). Developed by the Queensland Government, this plan sets out priorities to improve the capacity, safety and flood resilience of the highway. All of these issues can be identified on the highway between Cooroy and Curra.

The Queensland Government began developing a solution to address the identified issues on the Bruce Highway between Cooroy and Curra in 2004, and a 62-kilometre corridor of works was identified in 2008. The resultant Bruce Highway – Cooroy to Curra upgrade program was divided into four sections for construction purposes, with construction of the first section commencing in September 2009.

Sections A, B and C are now complete and open to traffic. Section D is the final section to be delivered, which will realise whole-of-network benefits along this stretch of the Bruce Highway.

3. Problem description

The highway between Cooroy and Curra currently has safety, capacity and flood resilience problems. The existing unseparated two-lane configuration, together with numerous direct property access points on the highway, limited overtaking opportunities and high speeds, are factors that combine to increase the risk of high-impact crashes (particularly head-on crashes). Safety and amenity issues within the Gympie CBD are caused by the mix of freight vehicles, local traffic, pedestrians, cyclists, and other urban users.

Population growth along the Queensland coast between Brisbane and Cairns is expected to increase freight and passenger traffic volumes on the Bruce Highway. Without the project, the proponent estimates that capacity constraints at several intersections would produce significant delays and congestion in Gympie and the surrounding areas by 2026.

The existing highway is susceptible to flooding and closure due to its proximity to the Mary River floodplain. Floods have resulted in delays and closures on the highway at least once every two years. Records collected since the 1860s show that 16 major flood events have occurred in the past, with four of these since 1999. Climate change is expected to increase the frequency and severity of major rainfall events in the region. When the highway is closed due to flooding, access to Gympie is limited and inter-regional freight and passenger traffic between Brisbane and Cairns are affected.

Infrastructure Australia included the Bruce Highway Upgrade Priority Initiative on the Infrastructure Priority List in recognition of the national significance of the capacity constraints, flood resilience, and safety concerns on the highway.

4. Options identification and assessment

The proponent’s preliminary evaluation assessed the merits of the following three options using multi-criteria analysis:

- ‘Do minimum’ option – ensures the maintenance and upkeep of existing infrastructure
- ‘Existing asset option’ – reconfiguration of the existing Bruce Highway through Gympie, including intersection upgrades
- ‘New asset option’ – construction of a new carriageway bypassing Gympie.

Overview	Context	Problem	Options	Proposal	Strategic Fit	Economic, social & environmental value	Deliverability
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In the multi-criteria analysis, the proponent assessed the three options against project objectives relating to future road use requirements, safety improvements to align with current design standards, network enhancement, improved connectivity for freight, increased flood immunity, enhanced outcomes for local communities and other land users, and improved environmental outcomes.

During the preliminary evaluation, the proponent considered the 'do minimum' option to be unviable when evaluated against the assessment criteria, as it did not meet any of the project objectives. The 'existing asset option', which would upgrade the highway through Gympie, was also considered unviable as it did not sufficiently address the project objectives. Through this process, the proponent concluded that a 'new asset option' was the only option that addressed the project objectives.

Several 'new asset options' were assessed during the preliminary evaluation:

- Scenario 1 – Dual carriageway with four lanes (two lanes in each direction)
- Scenario 2 – Dual carriageway with two lanes, combined with four lanes for overtaking sections
- Scenario 3 – Single carriageway with two lanes, and three lanes for overtaking sections
- Scenario 4 – Single carriageway with two lanes combined with four lanes for overtaking sections
- Scenario 5 – Single carriageway with two lanes
- Scenario 6 – Combination of above options on various route sections.

The proponent selected Scenario 1 as the option to be brought forward to the detailed business case stage. Scenarios 4 and 6 were considered as staged options and found by the proponent to be insufficient to meet the expected traffic demand growth. While Scenarios 4 and 6 have lower capital cost estimates than Scenario 1, they are also expected to deliver substantially lower benefits, leading to lower estimates of their net benefit to society, as measured by the NPV and BCR.

In the business case, the 'new asset option' was assessed relative to the 'do minimum' option. Overall, the proponent undertook an extensive process to identify and assess options to address the problem. However, Infrastructure Australia considers it best practice to retain a minimum of two project options for detailed investigation. A detailed investigation of a wider range of feasible options would give decision makers greater confidence that the proponent has selected the most effective and highest value-for-money solution that would maximise the benefits for the Australian economy.

5. Proposal

The proposed project involves constructing a 26-kilometre section of new, four-lane (two lanes each way), dual carriageway highway that has a speed limit of 110km/h. The new section would begin at the recently upgraded Woondum interchange in the south, running through to a new interchange north of Curra, where the new highway will link up with the existing Bruce Highway.

The new section would bypass Gympie, and include modern safety features that the current highway lacks, including concrete barriers and depressed median strips separating directional travel.

In summary, the key features of the project include:

- A four-lane (two lanes each way) dual carriageway with concrete separation barriers.
- 42 bridges at 23 locations over waterways, local roads, and the North Coast railway line to improve flood immunity.
- Connection with the recently upgraded Bruce Highway section at Woondum.
- New interchanges at Penny Road, Gympie Connection Road and Curra.

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The proponent expects the project to deliver a range of safety and transport efficiency benefits, including:

- Improved safety by removing 53 intersections and 106 property access points on the highway
- Increased separation of long-distance and local traffic in Gympie, with the project estimated to reduce heavy-vehicle traffic in Gympie by 50%
- Separation of traffic flows in opposite directions to reduce the risk of head-on collisions, which have accounted for 55% of all fatalities on the highway between Cooroy and Curra
- Improved immunity to flooding relative to the existing highway, which has historically experienced regular closures in the Gympie CBD and surrounding areas
- Increased speed limits from 90km/h, and 60-80km/h in some sections through Gympie, to 110km/h, resulting in improved travel times and transport efficiency
- Improved capacity and productivity for both passenger and freight traffic as a result of the Gympie bypass.

6. Strategic fit

The project demonstrates strong strategic merit. This project is the final stage of a four-stage program of works to modernise the Bruce Highway between Cooroy and Curra. The other three stages have been completed and are open to traffic. Completing Section D will allow the whole-of-program benefits to be realised, including maintaining a consistent posted speed limit and safety standards between Cooroy and Curra.

The business case indicates that the project will be effective in addressing current problems including safety, travel time and flooding issues which comprise 86% of estimated project benefits. The project also offers environmental and amenity improvements, such as reduced exposure to greenhouse gas emissions, air pollution, and noise pollution for the residents of Gympie as freight vehicles have an option to bypass the Gympie CBD.

The project aligns with the Bruce Highway Action Plan. Upgrades to the Woondum to Curra section of the Bruce Highway are rated under the Plan as 'High Priority 2' and 'High Priority 3' actions, which should be addressed by years 7 and 10 of the plan (2019 and 2022). The project also addresses all three of the major objectives of the Action Plan (safety, flooding and capacity improvements).

The project aligns with other Australian, state and local government policy and planning documents including the Australian Infrastructure Plan, Queensland State Infrastructure Plan, Queensland Department of Transport and Main Roads Strategic Plan and the Gympie Region Economic Development Strategy (2014-2019).

The proponent indicates that the project has broad community and government support, particularly due to its ability to alleviate the poor crash record and flooding impact. The crash rate on the Woondum to Curra section is two times higher than the adjoining sections of the Bruce Highway, based on data from 2008 to 2017. The proponent has consulted with property and business owners, the government, and indigenous groups, and identified a broad level of support for the project.

7. Economic, social and environmental value

The Queensland Government's business case states that the net present value of the project is \$274 million with a benefit-cost ratio of 1.36, using a 7% real discount rate and P50 capital cost estimate in 2018 prices. The majority of estimated benefits from the project are travel time savings (41% of total benefits) and avoided crash costs (32%). Improved flood resilience (13% of benefits) is the other major category of estimated project benefits.

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We evaluated the proponent's findings and methodology using the Infrastructure Australia Assessment Framework. Our evaluation found that the safety benefits reported by the proponent are likely to be overstated as the safety improvements from the first three Cooroy to Curra sections have not been captured in the base case. This makes the crash rate assumed in the base case to be higher than it should be, which in turn overestimates the crash benefits for Section D.

Infrastructure Australia acknowledges the challenges in accounting for the safety impacts of the first three sections in the base case given that sections A and C have only been recently open to traffic. However, we consider the appropriate definition of a proposed project's base case and project cases to be best practice. The approach used to quantify crash costs in the Section D business case, while erroneously capturing some benefits from earlier upgrades, does provide an indication of the strategic value of completing the final section of the Cooroy to Curra upgrade program.

Notwithstanding this issue, Infrastructure Australia's analysis indicates that the benefits of the project are still expected to exceed the costs.

The economic case for the project would have benefited from a program-wide business case with an estimated net benefit reported for the entire program of Cooroy to Curra works. This would have better captured the expected costs and benefits of the complete program, including the interdependencies between each section.

Benefits and costs breakdown

Proponent's stated benefits and costs		Present value (\$m, 2018 @ 7% real discount rate)	% of total	
Benefits				
Travel time savings (passenger and freight)		\$430.4	41.2%	
Vehicle operating cost (VOC) savings		\$48.5	4.6%	
Avoided crash costs		\$331.6	31.7%	
Flooding resilience		\$133.0	12.7%	
Residual value		\$35.2	3.4%	
Externalities (including air and noise pollution)		\$65.8	6.3%	
Total Benefits¹		\$1,044.5	(A)	100%
Capital costs (P50)		\$744.3	96.6%	
Operating costs ²		\$26.1	3.4%	
Total Costs¹		\$770.4	(B)	100%
Core results	Net benefits - net present value (NPV)³	\$274.1	(C)	n/a
	Benefit-cost ratio (BCR)⁴	1.36	(D)	n/a

Sources: Proponent's business case

(1) Totals may not sum due to rounding.

(2) Operating costs are incremental to the Base Case.

(3) The net present value (C) is calculated as the present value of total benefits less the present value of total costs (A – B).

(4) The benefit-cost ratio (D) is calculated as the present value of total benefits divided by the present value of total costs (A ÷ B).

A breakdown of the proponent's reported capital costs and funding is presented in the table below.

Capital costs and funding ¹	
Total capital cost	\$1,005.3 million (P50, nominal, undiscounted)
Proponent's proposed Australian Government funding contribution	\$804.2 million
Other funding	\$201.1 million (State Government contribution)

Sources: Proponent's January 2019 Business Case Addendum

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8. Deliverability

The Queensland Government’s Department of Transport and Main Roads (the proponent) will deliver the project. The proponent assessed various contracting models for delivering the project, including design and construct, design only, public-private partnerships, and non-competitive alliance delivery. The proponent’s preferred delivery strategy is a Transport Infrastructure Contract - construct only. This delivery model is preferred by the proponent for the following reasons:

- The scope for innovation is limited, with a defined and largely acquired greenfield corridor, standard construction techniques and a relatively uncomplicated design.
- The risks, issues and sensitivities associated with the project are well understood or can be fully defined prior to procurement, and will be more effectively managed using internal resources.
- Although the project is of considerable size, the construction task lacks complexity and is considered core business for the proponent. Project construction techniques are straightforward and well understood by both the proponent and the market, given the recent successful delivery of earlier project phases.

Infrastructure Australia considers that the proposed delivery model is appropriate given the reasons outlined by the proponent. The contract would be managed by the proponent, who has extensive experience in delivering similar major highway and road upgrades, including the first three sections of the Cooroy to Curra program.

The business case submitted by the proponent includes a Review of Environmental Factors and an Environmental Management Plan. The Review of Environmental Factors identified key environmental risks and impacts associated with the project, including clearing of large contiguous areas of native vegetation, loss of aquatic habitat, and erosion and sedimentation during the construction process.

The proponent has subsequently submitted a referral to the Commonwealth Department of Environment and Energy, which has identified that the project would result in a significant impact to the following matters of national significance: lowland rainforest of subtropical Australia; black-breasted button-quail; koala; and pineapple zamia. The proponent is following the appropriate process to manage the environmental risks and has documented these activities in an Environmental Management Plan.

The proponent has considered a range of funding approaches, including road user charges and the potential for private financing. The analysis conducted during the preliminary evaluation stage concluded that private financing would not deliver a value for money outcome. The proponent considered the application of a toll on this section of the Bruce Highway to be inappropriate as there are no practical alternative routes. As a result, the proponent proposed that the project be funded jointly by the Australian Government and the Queensland Government, consistent with the broader Bruce Highway Upgrade Program.

In early 2018, funding for the construction of Cooroy to Curra Section D was approved by the two levels of government on the basis of an 80:20 split between the Australian Government and the Queensland Government.

The business case includes a benefits management plan, but does not include a full Post Completion Plan. The proponent has committed to undertaking a benefits management process throughout the project lifecycle and completing a Post Completion Review. We encourage the proponent to assess the extent to which expected project benefits and costs have been realised and publish the Post Completion Review to inform the development of future projects.

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