Australian Government | Infrastructure Australia

Project business case evaluation summary

Bunbury Outer Ring Road – Bunbury Freight Access Enhancement Project

Location
Bunbury, Western Australia

Geography
Smaller cities and regional centres

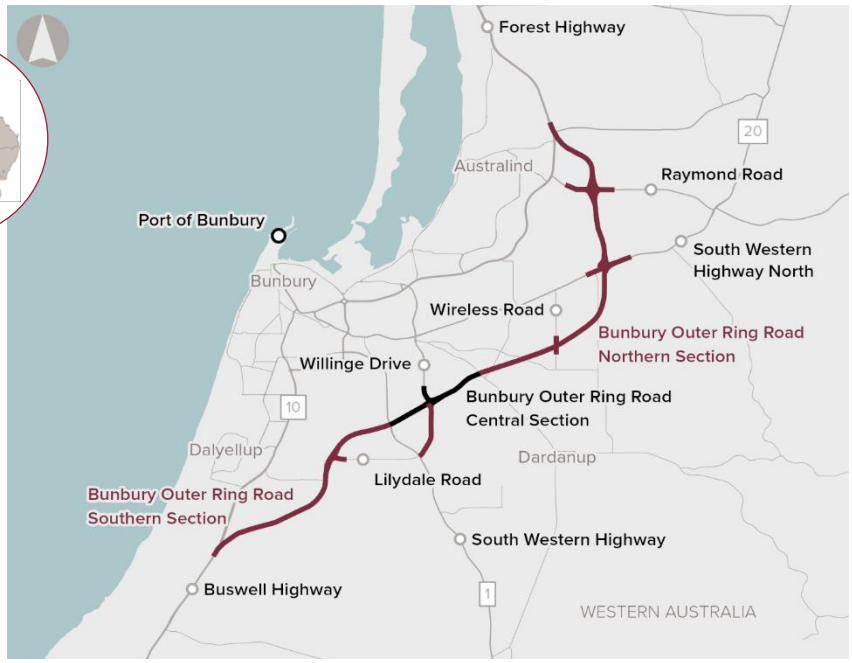
Category
National Connectivity

Capital cost
$851.8 million (P90, outturn)

Indicative timeframe
Construction Start: 2021
Project completion by: 2024

Proponent
WA Government

Evaluation date
8 December 2020



1. Evaluation Summary

The existing road transport infrastructure servicing the Greater Bunbury area (including the Port of Bunbury) features five key radial routes passing close to the City of Bunbury. These roads, together with the rail infrastructure in the area, form part of the National Key Freight Routes providing national significant freight connections, which recognises their importance as links contributing to local and national economic success.

The convoluted freight network to access the Port of Bunbury increases costs to freight and logistics in the region and reduces freight efficiency. Additionally, freight vehicles use local roads across the region, creating negative impacts on safety, amenity, tourism and urban development. These problems have been recognised as nationally significant, with Bunbury Outer Ring Road being listed as a medium-term Priority Initiative on the Infrastructure Priority List in March 2018

The Bunbury Outer Ring Road project is a proposed 27 km four-lane grade-separated dual carriageway road at the outer edge of Bunbury, connecting the Bussell Highway, north of Bunbury, to the Forrest Highway in the south. It aims to separate regional and port freight traffic from local traffic to improve travel times, freight efficiency, road safety and amenity.

The proponent's business case reports that the social, economic and environmental benefits of the project will exceed its cost, with a benefit cost ratio of 1.34 and a net present value of $243 million. The project demonstrates that it will improve the performance of the regional transport network and provide a range of economic, social and environmental benefits including improved amenity and liveability, aligning with local, state and national priorities.

Our review found some limitations in the proponent's social cost–benefit analysis. Overall, we consider that the benefits of the project will marginally outweigh its costs.

In proceeding with the project, we recommend further investigation of the delivery options to confirm the preferred packaging and delivery model, environmental impacts, and post completion review strategy.

On the balance of our assessment, the **Bunbury Outer Ring Road has been added to the Infrastructure Priority List as a Priority Project**.

2. Context

Bunbury is the second largest city in Western Australia (WA) and is one of the fastest growing regional cities in Australia. In 2016, Bunbury had an estimated residential population of 31,644 people. Bunbury is located in the South West Region, where the population is projected to grow by 1.6% on average from 175,904 in 2016 to 206,640 by 2026.

The main economic drivers of the South West Region are mining and mineral processing, tourism, construction, the timber industry and agriculture including viticulture. The South West Region's mining and mineral processing sector was valued at $2,391 million in 2015-16. The Port of Bunbury is one of the world's major alumina ports, exporting around 11 million tonnes of alumina annually. Alumina accounts for 66% of the exports from the port. Tourism is also a major contributor to the South West Region's economy.

The road network near the Port of Bunbury carries a mix of freight and light vehicle traffic (including local, regional and tourist trips) with no separation of traffic streams and variable speed limits. Freight movements in the South West vary widely given the broad range of industries and destinations, including the Port of Bunbury (primarily for mining and mineral exports, as well as woodchips and grains) various industrial and commercial areas, agricultural areas and locations further afield. These freight routes also incorporate several at-grade rail crossings and intersections where speed limits have been reduced, impacting on the overall network efficiency. These factors contribute to the increasing costs for freight operators and industry and have a detrimental impact on the local community.

The proposed Bunbury Outer Ring Road would provide an alternative freight access route around the CBD to the Port of Bunbury as well as existing and proposed industrial areas east of Bunbury. Providing an effective and efficient freight transport network to access the Port of Bunbury is important for the long-term economic and social development of Bunbury, the Greater Bunbury area and the South West. This will allow the completed first stage of the Bunbury Outer Ring Road and the Port Access Road to fulfil their full productive capacity.

3. Problem description

The two main drivers of the South West Region's economic output are mining and mineral exports and the tourism industry. The Port of Bunbury exports approximately 12% of the world's alumina exports, while the regional tourism industry sees a total visitor spend of around $1.5 billion per annum before the COVID-19 crisis. The region has a multi-modal transport network, which includes both road and rail, and this transport network not only enables the economic productivity of the region, but also the broader freight industry.

The project is likely to improve the economic productivity of the region and its economic contribution to the rest of WA and Australia. Specifically, the project business case aims to address two problems and one opportunity:

- Problem 1 – Convoluted freight road network and lack of grade separation negatively impacts on freight efficiency. This leads to increased travel times and vehicle operating costs.
- Problem 2 – Mixing freight and regional movements with local traffic negatively impacts on safety, amenity, tourism and urban development.
- Opportunity – Improved freight connectivity will improve utilisation of existing industrial areas and development of industrial expansion areas.

The project will enhance the efficiency and safety of the transport network of Greater Bunbury and the surrounding region, and will form part of the National Key Freight Routes. This project will be support the long-term economic growth and social development in the region and assist in mitigating inefficiencies in the region's freight transport network.

4. Options identification and assessment

The proponent identified a wide range of potential options to address the problems, including different technologies and levels of intervention. These included the base case, regulatory and governance reform, asset optimisation and new investment options. The base case complies with the recommendations of the Assessment Framework, including an addition right turn acceleration lane at the Forrest Highway and Hynes Road intersection and no major changes to the current road network.

This long list of options was filtered through a qualitative multi-criteria assessment (MCA) process against eight criteria. Based on this assessment, four options were shortlisted:

- Further / improved traffic control
- Grade separate the worst performing interchanges and road/rail level crossing along key freight routes
- Upgrade Bussell Highway/Robertson Drive, Forest Highway and South Western Highway to freeway standard (road and rail)
- Complete the Bunbury Outer Ring Road.

The first three options were aggregated into Project Option 1, while complete the Bunbury Outer Ring Road became Project Option 2.

These two shortlisted options were then assessed against the base case using a rapid cost-benefit analysis to inform the project business case which was reported in the Stage 2 Submission to Infrastructure Australia. This rapid cost-benefit analysis indicated that Project Option 1 had an estimated BCR of 1.1 compared to 1.5 for Project Option 2, and confirmed the Bunbury Outer Ring Road as the preferred option.

These two options have again been considered in this business case and assessed using detailed cost-benefit analysis. This process has confirmed that Option 2 – Complete Bunbury Outer Ring Road is the preferred option as this better aligns with project objectives and provides higher net economic and social benefits.

The options assessment approach adopted aligns with our Assessment Framework's recommendation for using both qualitative and quantitative assessment tools in options assessment stage of business case development.

5. Proposal

The Bunbury Outer Ring Road proposal as submitted consists of:

- 27 kilometre, 4 lane, grade-separated dual carriageway highway at the outer edge of Bunbury connecting the Bussell Highway to the Forrest Highway
- Grade separation of interchanges at Forrest Highway (near Australind), Raymond Road, South Western Highway North, Wireless Road (Waterloo interchange), Willinge Drive, Lillydale Road and Bussell Highway (north of Lakes Road)
- Grade separation at river crossings, rail crossings and local roads, including Clifton/ Paris Road, South Western Highway, Boyanup-Picton Road
- Construction of local access roads
- Extension of Willinge Drive to South Western Highway.

6. Strategic fit

The Bunbury Outer Ring Road project aligns with national, state and local priorities, policies and initiatives including: National Land Freight Strategy; National Port Strategy; National Road Safety Strategy; Regional Development Australia Regions 2030 Unlocking Opportunity; WA Regional Freight Plan; South West Development Commission's South West Planning and Infrastructure Framework; Road to Export (Greater Bunbury Infrastructure Plan 2010) and South West Regional Blueprint (2014).

The project can also support the expansion of the Port of Bunbury and other industries currently situated within or close to Bunbury, including the potential development of a new Waterloo Industrial Park. The project would also improve access for the high-density housing in the Wanju district and also facilitate significant future developments within the vicinity of the proposed ring road. The significant increase in connectivity and accessibility could support increased land use and population density, catalyse future economic development in the region, and support the diversification of the local skilled workforce.

The project will separate freight and residential traffic, which will extend the useable life of residential roads, while also reducing travel times and mitigating safety risks to other road users. It will reduce freight traffic in the Bunbury urban area, reducing the conflict between through and local traffic movements to result in improved safety outcomes and improved urban amenity.

The project may enable the development of other transport infrastructure in the future, providing an opportunity for upgrades of the rail network; increased freight rail capacity to the Port of Bunbury and the South West; or separation of freight and passenger uses. The Bunbury Outer Ring Road also protects a corridor for a potential fast rail service between Perth and Bunbury in the future.

The City of Bunbury has raised concerns regarding the effect of passing trade on the Bunbury urban area, potentially reducing economic activity in the town. The *City of Bunbury Economic Action Plan*, released in 2020, specifically identifies ensuring working with the WA Government to continue to promote Bunbury following the development of Bunbury Outer Ring Road.

Analysis undertaken by the proponent found that that for through-trips, around 60% drive through without stopping, 30% stop for up to one hour and 10% stop for more than one hour. The economic activity associated with through trip stops in Bunbury may result in economic activity being displaced to elsewhere in the state. To help address these issues, the WA Government has committed to providing prominent signing and high-quality landscaping to create entry statements at each end of the Bunbury Outer Ring Road.

The business case highlights several key beneficiaries from delivering the project. These include:

- Freight companies and the broader supply chain: from enhanced efficiency and productivity in freight movements in the region and to the Port of Bunbury
- Residents, community and landowners: from the rerouting of freight movements and subsequent benefits, including improved safety, enhanced urban amenity, extended useful life of residential roads, reduced travel times and increased land values
- Southern Ports Authority: as the project could support an increase in freight at the port
- Public Transport Authority: as the project could support future passenger and freight rail line in the region.
- Businesses and industries within Greater Bunbury: as the project may reduce operating costs associated with the movement of goods and enable industrial expansion.

The first stage of the Bunbury Outer Ring Road was completed in 2013, together with the Port Access Road. This project will help realise the full benefits of these previous investments.

7. Economic, social and environmental value

The proponent's business case reports a net present value of $243 million, with a benefit-cost ratio of 1.34 using a 7% real discount rate. The analysis is based on P90 capital costs and is evaluated over a 30-year period.

The proponent's quantified benefits consist of travel time benefits, vehicle operating cost savings, safety benefits and externalities. However, our evaluation found that the economic, social and environmental value presented in the business case does not have a strong alignment with project objectives. While freight efficiency and safety are identified to major issues, the proponent's social cost-benefit analysis estimates freight efficiency and safety benefits to be 21% of the total benefits.

The largest benefits accrue to car users through reduced travel time and vehicle operating costs. These are predominantly derived from increased travel speeds travelling on the ring road, a

reduction in traffic lights, and relief from congestion across the network from freight and other vehicles altering their routes to utilise the ring road.

Environmental externality benefits are significant for the project, as fewer heavy vehicles travel through urban areas of Bunbury. This benefit is from less noise and visual impacts in urban areas. However, the guidelines for these parameters emphasise their uncertainty, as they depend on project conditions such as population density in the project area and levels of congestion. There is a risk that this benefit could be overstated.

Our evaluation of the business case found that the stated benefits of the project may be overstated as:

- The Bunbury Transport Model, used to estimate traffic changes resulting from the proposed traffic network changes, uses a fixed-demand matrix and does not allow for induced demand. This may slightly overstate benefits from the project.
- The economic model has used vehicle occupancy parameters that are at the upper end of jurisdictional guidance and may overstate the benefits of travel time savings.
- Vehicle operating costs have been measured using the Australian Transport Assessment and Planning (ATAP) Guidelines (2016) approach, which Infrastructure Australia considers may overstate benefits. A large driver of the estimated benefits of the project relate to the transfer of vehicle kilometres from roads classified as urban to the ring road which has been classified as rural. The results of the economic analysis are relatively sensitive to this classification, and a reclassification of parts of the ring road as an urban road would substantially reduce the environmental externality benefits.

Our review of the economic appraisal has identified that the benefits of removing level crossings have not been quantified in the cost-benefit analysis. Removing level crossings would result in a travel time saving for road users and improved road safety, however these benefits are expected to be modest.

The proponent has also not quantified the benefits of increased land use take up associated with Bunbury Outer Ring Road, due to the relevant land use and traffic modelling not being available. Including land use benefits may increase the overall benefits of the project.

Although some benefits of the project are potentially overstated and some have been omitted, on balance, we consider that the benefits of the project will marginally outweigh its total costs.

The following table presents a breakdown of the benefits and costs stated in the business case.

Benefits and costs breakdown

Proponent's stated benefits and costs	Present value ($m,2018/19) @ 7% real discount rate		% of total
Benefits			
Cars			
Travel time savings	$506.4		52%
Vehicle operating cost savings	$108.0		11%
Heavy commercial vehicles			
Travel time savings	$91.3		9%
Vehicle operating cost savings	$29.5		3%
Other benefits			
Crash cost savings	$89.3		9%
Environmental externalities	$118.0		12%
Residual value of assets	$22.2		2%
Total Benefits[1]	**$964.7**	(A)	**100%**

Proponent's stated benefits and costs	Present value ($m,2018/19) @ 7% real discount rate		% of total
Capital costs (P90)	$711.0		98%
Operating and maintenance costs	$11.0		2%
Total Costs[1]	**$722.0**	(B)	**100%**
Net benefits - Net present value (NPV)[2]	**$242.7**	(C)	n/a
Benefit-cost ratio (BCR)[3]	**1.34**	(D)	n/a

Source: Proponent's business case

(1) Totals may not sum due to rounding.
(2) The net present value (C) is calculated as the present value of total benefits less the present value of total costs (A – B).
(3) The benefit–cost ratio (D) is calculated as the present value of total benefits divided by the present value of total costs (A ÷ B).

The proponent's reported capital costs and funding sources are presented in the following table.

Capital costs and funding sources breakdown

Capital costs and funding	
Total capital cost	$755.4 million (P50, undiscounted) $851.8 million (P90, undiscounted)
Australian Government funding contribution (committed)	$681.4 million (80% of the P90 cost estimate)
Other funding	$170.4 million (WA Government)

Infrastructure Australia observed that the cost estimates have not been independently peer reviewed. We also observed that the cost estimates include significant costs ($75 million pre-escalation and risk) for the Central section of the Bunbury Outer Ring Road, which was completed in 2013. The proponent has confirmed that these costs are to upgrade the central section to facilitate the connection to the South and North sections, including Willinge Drive.

The cost estimates have been developed based on a detailed examination of resourcing requirements and quantities. A probabilistic risk estimate has been developed which appears to appropriately account for the expected risk of constructing the project.

The operating cost estimates have been developed based on increased road maintenance requirements due to the change in kilometres travelled across the network. There is no explicit cost for the new ring road sections, and this is likely to understate the true operating and maintenance costs of the project.

8. Deliverability

The proponent has considered packaging and procurement options consistent with the requirements of Main Roads WA. Their initial assessment shortlisted two options for further consideration in the development phase: a single package or two separate packages. The business case did not identify a preferred delivery model, as this depends on the final packaging of the project. Design & Construct and Alliance procurement models were shortlisted for further consideration. The project cost estimates assumed the project would be delivered through a Design & Construct model. In October 2020, following the business case submission, the WA Government announced the project had been procured using an Alliance contract model. They have advised Infrastructure Australia that the project can still be procured within the estimated capital cost.

The delivery of the project has a number of complex risk areas related to the delivery of the project, including environmental considerations. A risk assessment has been undertaken for the project, sufficient to develop a P90 cost estimate (based on a 90% probability that the cost estimate will not be exceeded). Mitigation measures have been proposed to manage risks identified

within the risk register. The business case states that, after mitigation, there are two residual high risks: managing potential stakeholder impacts from the proposed northern section alignment; and optimising the interface of the proposed project and potential future rail projects. The proponent is taking actions to manage these risks.

The impact of the project on habitats for federally listed endangered species and ecological community has been identified as a key project risk, as the project will impact upon Matters of National Environmental Significance. The business case states that the project's construction and operations may impact on the region's environment and wildlife, specifically the critically endangered Western Ringtail Possum, and federally listed Black Cockatoo and Banksia Woodland Threatened Ecological Community.

A Benefits Realisation Plan has been developed for the project, along with a detailed set of Key Performance Indicators for each benefit to measure and assess whether the project benefits will be delivered and realised. A full Post Completion Review Plan has not been submitted to Infrastructure Australia.

Infrastructure Australia encourages the proponent to conduct and publish a full Post Completion Review to assess the extent to which the project benefits and costs set out in the business case were realised. This will help inform the development of future projects.

Consideration of COVID-19

The COVID-19 pandemic has significantly affected the use of infrastructure. Infrastructure Australia has been working collaboratively with the Commonwealth Government to provide advice on a staged response for managing, and recovering from, the impacts of the COVID-19 pandemic.

One critical element of our advice is to maintain a pipeline of nationally significant infrastructure investments. Nationally significant infrastructure projects are long-term investments, typically considering a 30-year view of the project's social, environmental and economic impacts. In making this recommendation, Infrastructure Australia continues to take a long-term view and has also considered the sensitivity of key planning assumptions using the best data available to us.

As noted in the 2019 Australian Infrastructure Audit, we must continue to evolve the way we plan for Australia's infrastructure to embrace uncertainty. There are still many uncertainties regarding the long-term impact of the COVID-19 pandemic on infrastructure use.

We will continue to collaborate with industry, the community and governments at all levels to understand the impacts of the COVID-19 pandemic on infrastructure decisions in Australia.