

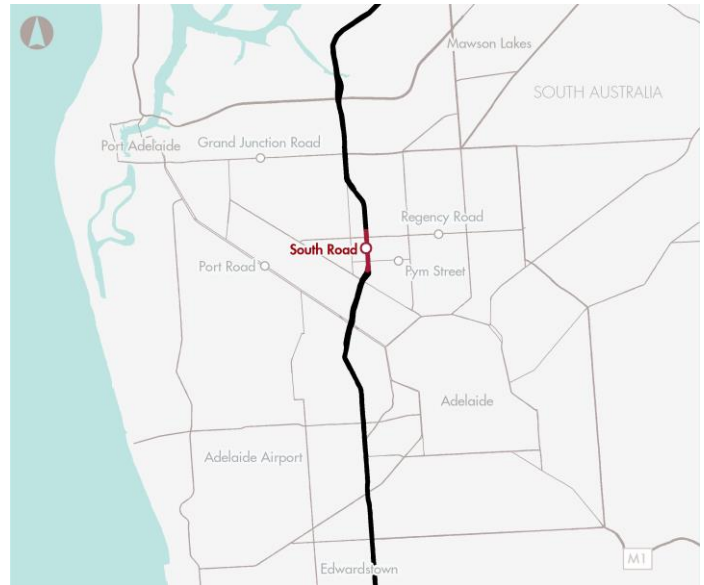
# Project Evaluation Summary

## Adelaide’s North-South Corridor: Regency Road to Pym Street

**Proponent** South Australian Government  
**Evaluation date** 5 April 2018

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### 1. Summary

Infrastructure Australia has added **Adelaide’s North-South Corridor: Regency Road to Pym Street** proposal to the Infrastructure Priority List as a **Priority Project**.

Adelaide’s 78-kilometre North-South Corridor is a key freight and commuter route between Gawler in the north and Old Noarlunga in the south. As part of the National Land Transport Network, it facilitates freight movements to and from Adelaide Airport, the Port of Adelaide and surrounding industrial areas. This project sits within a broader program of works to upgrade the entire length of the corridor to motorway standard. By 2019, there will be a continuous motorway between Gawler and the River Torrens (five kilometres west of Adelaide CBD), except for the South Road section between Regency Road and Pym Street.

Traffic demand from growing population and employment centres in the north and south will exacerbate slow travel speeds and delays at signalised intersections along the route. The Australian Infrastructure Audit 2015 found that, without further investment, delays on the South Road corridor are expected to cost \$164 million in 2031 (\$2011). Upgrading the remaining sections of the North-South Corridor is listed as a Priority Initiative on the Infrastructure Priority List.

The project would upgrade 1.8 kilometres of South Road to a three-lane (each way) motorway, connecting to the completed South Road Superway (i.e. North–South Motorway, Port River Expressway to Regency Road) and the Torrens Road to River Torrens Project (currently under construction). It includes a motorway overpass of Regency Road, and an east–west overpass bridge for pedestrians and cyclists at Pym Street. It also includes the implementation of Intelligent Transport Systems (ITS).

The proponent's stated net present value (NPV) for the project is \$624 million over 30 years, with a benefit-cost ratio (BCR) of 3.6 using a 7% real discount rate and P90 cost estimate. While the assumptions and methodology of the cost-benefit analysis are generally sound, the post completion reviews of other upgrades to the North-South Corridor show that there is a risk that the projected road demand and travel time savings may be overstated. However, sensitivity testing for this combined risk shows that the BCR remains well above 1 for a range of scenarios.

Overall, Infrastructure Australia is very confident that the project will deliver a net benefit to the Australian economy.

## 2. Strategic context

Adelaide's 78-kilometre North-South Corridor runs between Gawler and Old Noarlunga and connects the expanding industrial and residential growth areas in the north and the south. It is a significant freight route that is part of the National Land Transport Network - including the section of South Road between Regency Road and Pym Street.

The 30-Year Plan for Greater Adelaide (2017 update) projects that the region will accommodate an additional 550,000 people (a 40% increase) by 2045. South Road will serve as an important north-south transport spine in facilitating this growth and providing reliable access to key destinations such as the Adelaide CBD, Adelaide Airport and the Port of Adelaide. It also provides access to industrial centres in the south, and key freight distribution centres in the north.

The South Australian Integrated Transport Land Use Plan (July 2015) prioritised the completion of the corridor within the short to medium term. Approximately 44 kilometres of the corridor have already been upgraded to motorway standard, including the Northern Expressway, the South Road Superway and the Southern Expressway. The South Australian Government established a 10-year strategy for the North-South Corridor which sets out the program of works required to upgrade the remaining 34 kilometres of the corridor. A number of sections are currently funded and nearing completion, including Torrens Road to River Torrens (2018), Northern Connector (2019) and Darlington Upgrade (2019).

## 3. Problem description

The 1.8-kilometre section of South Road between Regency Road and Pym Street, which is located approximately five kilometres to the north-west of Adelaide's CBD, is currently two-lanes in each direction with a 60-kilometre per hour speed limit and two signalised intersections. By 2019, the Northern Expressway, Northern Connector (to be completed 2019), South Road Superway and Torrens Road to River Torrens project (to be completed 2018) will create a continuous motorway from Gawler in the north to the River Torrens (five kilometres west of Adelaide CBD), except for the South Road section between Regency Road and Pym Street. This creates a significant bottleneck resulting in congestion, delays and unreliability, particularly at the South Road / Regency Road intersection. Outside of major capital works, there are limited opportunities to upgrade the intersection to improve performance.

The proponent projects that, by 2021, as a result of significant population and employment growth, maintaining the status quo (including committed and funded investments and an upgrade to improve intersection performance) will result in:

- Average daily speeds (48kph) that are 12kph below the posted speed limit (60kph).
- Average peak delays of up to 5.5 minutes per vehicle, with the South Road / Regency Road intersection operating at Level of Service F.
- A total of 1,750 hours per day spent delayed at the South Road / Regency Road intersection, impacting 68,000 vehicles per day.

## 4. Proposal

The proposal is to upgrade the section of South Road between Regency Road and Pym Street to a motorway with three lanes in each direction connecting the South Road Superway (elevated motorway) to the currently funded Torrens Road to River Torrens Project (lowered motorway). Specifically, it includes:

- A motorway overpass of Regency Road, between Tikalara Street and Minerva Crescent.
- An east-west overpass bridge at Pym Street for pedestrians/cyclists only.
- Tie-ins to the Torrens Road to River Torrens Project lowered motorway at Lamont Street.
- Two-lane surface arterial South Road (north and south bound) along the length of the motorway to provide connectivity for the arterial road network (as well as construction traffic management and incident management).
- Intersection upgrade at South Road / Regency Road.
- Upgraded cycling and pedestrian facilities.
- Civil works, landscaping, noise barriers and urban design elements.
- Property acquisitions and treatments – given the current arterial road corridor operates in an established built environment with development up to the corridor on both sides.
- Traffic management, signage and ITS.
- Relocation of utility services away from non-stop carriageway and located in a position to minimise impact of maintenance activities on traffic flows.

## 5. Options identification and assessment

### *Program options*

In identifying and assessing options for the corridor as a whole, the proponent considered a large number of infrastructure and non-infrastructure/better use options (such as road user charging, public transport service frequency and priority) using multi-criteria analysis. Several non-infrastructure options were short-listed for further investigation, but these appear to have been considered as potential future complementary investments, rather than as alternatives or deferral options that could delay higher cost investment in the motorway upgrade. Public transport options were not progressed because of low current demand.

The use of a rapid economic appraisal to assess a number of short-listed options would have provided a more rigorous assessment of potential alternatives to meet the future demand on the corridor.

The proponent's 2010 North South Corridor Development Plan considered high-level options for north-south transport and recommended upgrading the North-South Corridor to motorway standard. Following on from this, and two major concept planning studies, the proponent assessed the road infrastructure options as part of the Scoping Report for the 10 Year Delivery Strategy to determine which sections to prioritise. The Regency Road to Pym Street section was prioritised because it has the most significant transport problems (that is, lowest average speeds, highest intersection delays and second highest estimated accident costs), and it would enable a continuous motorway from Gawler to the Adelaide CBD. Three other sections were rated as having higher strategic importance, but did not have a higher overall rating because the size of their transport problems were not considered as significant.

### *Scope options*

The initial Reference Design included a motorway with three lanes in each direction, no east-west access at Pym Street, and a one-lane southbound surface arterial South Road and a two-lane northbound surface arterial South Road.

The following scope variations were considered for the Reference Design:

- **Scope Option 1A:** grade separation of Pym Street over the non-stop motorway (road and footpath).
- **Scope Option 1B:** grade separation of Pym Street under the motorway (road and footpath).
- **Scope Option 2:** grade separation of Pym Street over the motorway (road and footpath), with left turn access between Pym Street and surface arterial South Road.

- **Scope Option Variation:** Additional southbound lane on surface arterial South Road between Regency Road and Pym Street, with a number of different entry ramp and road configurations considered. This variation was applicable to all options.

The final Reference Design involved the proponent selecting a pedestrian and cyclist only bridge at Pym Street because it has the lowest estimated capital costs, provides equivalent pedestrian and cyclist connectivity, has the lowest property and visual amenity impacts and there are low traffic volumes on Pym Street.

An additional southbound lane was also selected by the proponent because of benefits to construction traffic management and incident management, with a relatively low marginal impact on property and capital costs (\$16 million).

## 6. Economic evaluation

The proponent's economic appraisal for the project estimates an NPV of \$624 million and a BCR of 3.6, using a 7% real discount rate and P90 cost estimate. The vast majority of benefits from the project are travel time savings for road users, resulting from average savings of 2.5 minutes during peak periods on South Road between Regency Road and Pym Street and avoiding two intersections. The appraisal assumes a 30-year evaluation period from the year of opening (2023). After the final year of traffic modelling (2036), benefits are assumed to grow at 1% per year until the end of the appraisal period.

The cost-benefit analysis uses different sources for different types of vehicle operating costs. While the sources for these costs are inconsistent, the impact on the BCR to correct for this is marginal.

The major downside risk for the project relates to the outputs of the strategic demand forecasting model. Post-completion reviews on other sections of the North-South Corridor have highlighted that there is a risk that the projected road demand and travel time savings may be overstated. However, capital costs have tended to be slightly less than estimated. Adjusting for this risk and the different vehicle operating cost sources still produces a BCR well above 1.0. This has been tested by Infrastructure Australia as an appropriate proposal-specific 'worst case scenario', as opposed to the standard 'worst case scenario' of a 20% increase in costs, and a 20% decrease in benefits.

At the time of this evaluation, Infrastructure Australia is also assessing the Gawler rail line electrification and modernisation project (June 2017). While both projects improve connections between Gawler and Adelaide, they both address different problems in the South Australian transport network. The transport modelling for the North-South Corridor: Regency Road to Pym Street project assumes that the Gawler rail line project will be delivered as part of the base case. While Infrastructure Australia recommends the use of a 'do-minimum' base case for the cost-benefit analysis, with only committed and funded projects, excluding the Gawler line project would slightly increase the BCR (as the road network would be more congested in the base case, and users would benefit more from the upgrade).

Overall, Infrastructure Australia is very confident that the project will deliver a net benefit to the Australian economy.

The following table provides a breakdown of the benefits and costs of the project as stated by the proponent. Overall, there is an increase in the total vehicle kilometres travelled because of the improvements to the road network. As a result of this, there is an increase in total vehicle operating costs, such as fuel and vehicle maintenance costs. Similarly, there are minor negative safety impacts from the increase in vehicle kilometres travelled. The costs and benefits for users switching to using cars have been calculated using the 'rule-of-a-half'.

## Benefits and costs breakdown

Proponent's stated benefits and costs		Present value (\$m, 2016) @ 7% real discount rate	% of total
<b>Benefits</b>			
Road user travel time savings		982	114%
Perceived vehicle operating cost savings <sup>4</sup>		-34	-4%
Public transport user travel time savings		31	4%
Unperceived vehicle operating cost savings (correction) <sup>4</sup>		-139	-16%
Safety <sup>4</sup>		-28	-3%
Environment		38	4%
Residual value (straight line depreciation of assets)		12	1%
<b>Total Benefits<sup>1</sup></b>		<b>\$863</b>	<b>100%</b>
<b>Costs</b>			
Capital costs (P90)		\$236	99%
Operating costs		\$2	1%
<b>Total Costs<sup>1</sup></b>		<b>\$238</b>	<b>100%</b>
<b>Core results</b>	<b>Net benefits - net present value (NPV)<sup>2</sup></b>	<b>\$624</b>	n/a
	<b>Benefit-cost ratio (BCR)<sup>3</sup></b>	<b>3.6</b>	n/a

Source: Proponent's Business Case

Notes:

(1) Totals may not sum due to rounding.

(2) The net present value is calculated as the present value of total benefits less the present value of total costs.

(3) The benefit cost ratio is calculated as the present value of total benefits divided by the present value of total costs.

(4) A negative cost saving denotes an increase in costs. In other words, the project leads to additional vehicle operating costs and safety costs because of increased vehicle kilometres travelled in the project case.

## Capital costs and funding

Capital cost estimates have been peer reviewed, which identified a potential cost saving of \$15 million (\$2016) by applying alternative assumptions. The proponent has probabilistically estimated contingency using the risk register and Monte Carlo simulation. There is a relatively small difference between P50 and P90 estimates (\$16 million, nominal).

Total capital cost (nominal, undiscounted)	\$354.3 million (P90, nominal)
Proponent's proposed Australian Government funding contribution	\$283.5 million (80:20 Commonwealth to State Government split)
Other funding (source / amount / cash flow) (nominal, undiscounted)	\$70.8 million State Government

## 7. Deliverability

The South Australian Department of Planning, Transport and Infrastructure (DPTI) has delivered a number of other sections of the North-South Corridor within the budgeted capital cost estimate (as evidenced by post completion reviews). The risks appear to be relatively well understood by the proponent and have been captured in a risk register and incorporated in to probabilistic cost estimates.

The proponent has developed a delivery strategy which assessed the following procurement models:

- Design & Construct (Risk Allocated Maximum Price)
- Design Bid Build
- Early Contractor (and or Designer/Operator) Involvement
- Competitive Alliance
- Target Cost
- Delivery Partner / Managing Contractor.

The proponent did not progress other procurement models such as Public Private Partnership because the project covers a relatively short section of the corridor that would continue to be operated and maintained by DPTI, and the proponent has stated that tolling passengers vehicles does not align with current South Australian Government policy. However, given that the vast majority of benefits from the project are for road users, Infrastructure Australia encourages the South Australian Government to consider network-based road user charging as part of the funding options assessment.

Procurement options were assessed against the following criteria which considered the project objectives, risks and opportunities, optimal risk allocation, operations optimisation, market attractiveness, safety and culture systems, industry participation, collaborative transparency and value for money.

The proponent has stated that Design and Construct (D&C) was identified as the preferred procurement model because:

- DPTI has already developed a preliminary design for the project, allowing the department to confirm key scope, alignment and operational requirements for the project.
- The contractor's construction expertise is combined with its design responsibility to explore innovation and value for money opportunities.
- Through the implementation of collaborative processes within the procurement of a D&C contract, the department will have sufficient transparency.
- Land acquisition, services relocation, unsuitable ground conditions and traffic management risks are considered to be best managed by either DPTI or the Contractor through clear risk allocation rather than managed jointly by DPTI and the Contractor.
- Given the development of the preliminary design and the project risk profile, a D&C delivery approach will enable the department to commence key procurement activities relatively quickly.

Infrastructure Australia commends the South Australian Government for completing post completion reviews of other sections of the North-South Corridor, and encourages the proponent to also undertake a post completion review of this project to accurately understand the benefits realised.