Final Business Case Evaluation Summary

Princes Highway, Nowra – Replace Southbound Bridge over Shoalhaven River

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About this report

The ‘Princes Highway, Nowra – Replace Southbound Bridge over Shoalhaven River Project’ (the Nowra Bridge project) will provide a new 4-lane bridge over the Shoalhaven River at Nowra, west of the existing northbound bridge, and upgrade over 1.6km of the Princes Highway including improved intersections and additional lanes. The project will improve traffic flow and ease congestion on the Princes Highway and deliver safer, more reliable journeys within the Nowra-Bomaderry area.

The business case for the Nowra Bridge project was developed by Transport for NSW and submitted to Government in February 2018. This Business Case Evaluation Summary has been prepared by Infrastructure NSW, the NSW Government’s independent infrastructure advisory agency.

Strategic context

The Nowra Bridge project will remove a network constraint for larger freight vehicles, improve traffic flows, support residential growth in the Shoalhaven Urban Release Area, reduce ongoing maintenance costs and improve road safety. The existing southbound bridge, which dates from 1881, is identified as being of heritage importance to the local area and will be retained for adaptive reuse such as pedestrian, cyclist and community uses.

Princes Highway Corridor Strategy

The Princes Highway provides the main north-south connection between the M1 Princes Motorway at Yallah and the NSW border south of Eden and into the Victorian Gippsland Region. The highway links Sydney with the Illawarra and Shoalhaven regions and provides the principal route connecting the communities along the South Coast of NSW. The highway carries a mix of freight, local, long-distance and tourist traffic. Upgrading of the highway has been progressing with construction of the final section of dual carriageway between Sydney and Bomaderry commenced in August 2018 and scheduled for completion in 2022. The highway south of Nowra is largely a single lane in each direction with limited overtaking opportunities.

The Nowra Bridge project aims to improve traffic flow, freight efficiency and road safety along the Princes Highway between Bomaderry and Nowra. The proposal is part of a broader strategy to upgrade the Princes Highway in the South Coast region.

Project need

The Princes Highway crossing of the Shoalhaven River linking Bomaderry and Nowra is provided by 2 bridges:

- The southbound 'Whipple' truss bridge, opened in 1881, is a mixed cast and wrought iron structure. This bridge provides 2 narrow (2.75m wide) lanes for southbound traffic with a "clip on" pathway for pedestrians and cyclists on the downstream (eastern) side.
- The existing northbound bridge, opened in 1981, is a concrete box girder structure. This bridge has 3 (3m wide) lanes for northbound traffic, one of which provides a dedicated left turn into Illaroo Road. A pathway on the upstream side caters for pedestrians and cyclists.

Performing necessary upgrades

The current southbound and northbound bridges are the only crossings of the Shoalhaven River for many kilometres, they date from 1881 and 1981 respectively. Loss of either structure for any reason or period of time is of serious concern, as in 1997 when a large vehicle struck the 1881 southbound bridge and put it partially out of service for several months. As part of the Transport for NSW Princes Highway Corridor Strategy, a range of other enhancements along the Princes Highway are being considered which would open the Princes Highway to freight High Performance Vehicles (HPV) over time. The existing southbound bridge has height and weight restrictions for larger vehicles and would reduce the benefits derived from these projects.

Addressing existing traffic concerns

The project includes a new 4-lane bridge over the Shoalhaven River and upgrades to over 1.6km of the Princes Highway, including improved intersections and additional lanes.

The new bridge will replace the current 2-lane southbound bridge, which does not have capacity to manage current and future traffic growth, was built in 1881 and requires major maintenance. This maintenance cannot be undertaken without significant impacts on traffic.

The second 3-lane (northbound) bridge, constructed in 1981, does not have capacity to manage bidirectional traffic. When the project is completed, the existing 3-lane bridge will be converted to southbound traffic and the new 4-lane bridge will take northbound traffic including 1 dedicated lane turning into Illaroo Road, providing 3 lanes in each direction.

The proposed upgrades will provide both increased capacity and improved clearances and support heavier and higher freight vehicles.

When completed, the project will support improved regional access, tourism and economic growth, remove freight height and weight limits for southbound travel, and reduce daily congestion for residents who rely on the river crossing for local trips.

Preparing for future growth in the region

The project is addressing current and future congestion and traffic growth arising from local traffic trips, which comprise approximately 85% of total traffic. Traffic analysis and option testing have led

to the development of the project in its present scope as the best value for money solution for improved traffic efficiency and to support economic growth in the Shoalhaven Region.

Retaining a historic landmark

The current crossing of the Shoalhaven River in Nowra includes the historic 1881 southbound bridge, which up until 1981 was the sole road crossing over the Shoalhaven River, and is currently being used for southbound road traffic. It is at the end of its useful life as a highway bridge and has inadequate clearances and limited strength to carry modern HPV trucks. Nonetheless it is recognised by travellers as marking their arrival to Nowra and so will be retained as a historic landmark and is intended in the future to be converted for community use, including for pedestrian and cyclists.

Project description

Project objectives

The Nowra Bridge project will improve traffic flow and ease congestion crossing the Shoalhaven River on the Princes Highway, which is the major coastal road link between Sydney, Wollongong and the Victorian border.

The primary objectives of the project are:

- to reduce crash rates on the Nowra Bridge
- to support future traffic growth along the Princes Highway associated with planned land use in the Nowra-Bomaderry area
- to provide southbound access for over height vehicles and higher productivity freight vehicles on the Princes Highway across the Shoalhaven River
- ro reduce delays and queuing on the Nowra Bridge
- to enable safe and efficient maintenance activities on the Shoalhaven River crossings and minimise delays.

Project details

The proposed Nowra Bridge project is an upgrade of 1.6km of the Princes Highway between 80m north of Bolong Rd and 75m north of Moss Street, from a mostly 4 or 5-lane road to a 6 or 8-lane divided road with a central median. The project is shown in Figure *0-1* and includes the following features:

- a new 4-lane concrete bridge with shared path on the upstream (western) side of and close to the 1981 concrete bridge
- widening of the existing bridge over Bomaderry Creek
- realignment and upgrade of the Princes Highway and the intersections with Bolong Road and Illaroo Road north of the bridges
- widening approximately 270m of Illaroo Road
- realignment and upgrade the Princes Highway and the intersection with Bridge Road south of the bridges
- closing the present Pleasant Way intersection with the Princes Highway
- building a new access road and intersection connecting Lyrebird Drive to the Princes Highway south of the intersection with Bridge Road
- converting the 1981 bridge to 3 lanes for southbound traffic
- closing the 1881 Bridge to vehicular traffic, complete investigations and necessary rehabilitation work and converting it for adaptive reuse such as pedestrian, cyclist and other community uses following a separate environmental assessment.

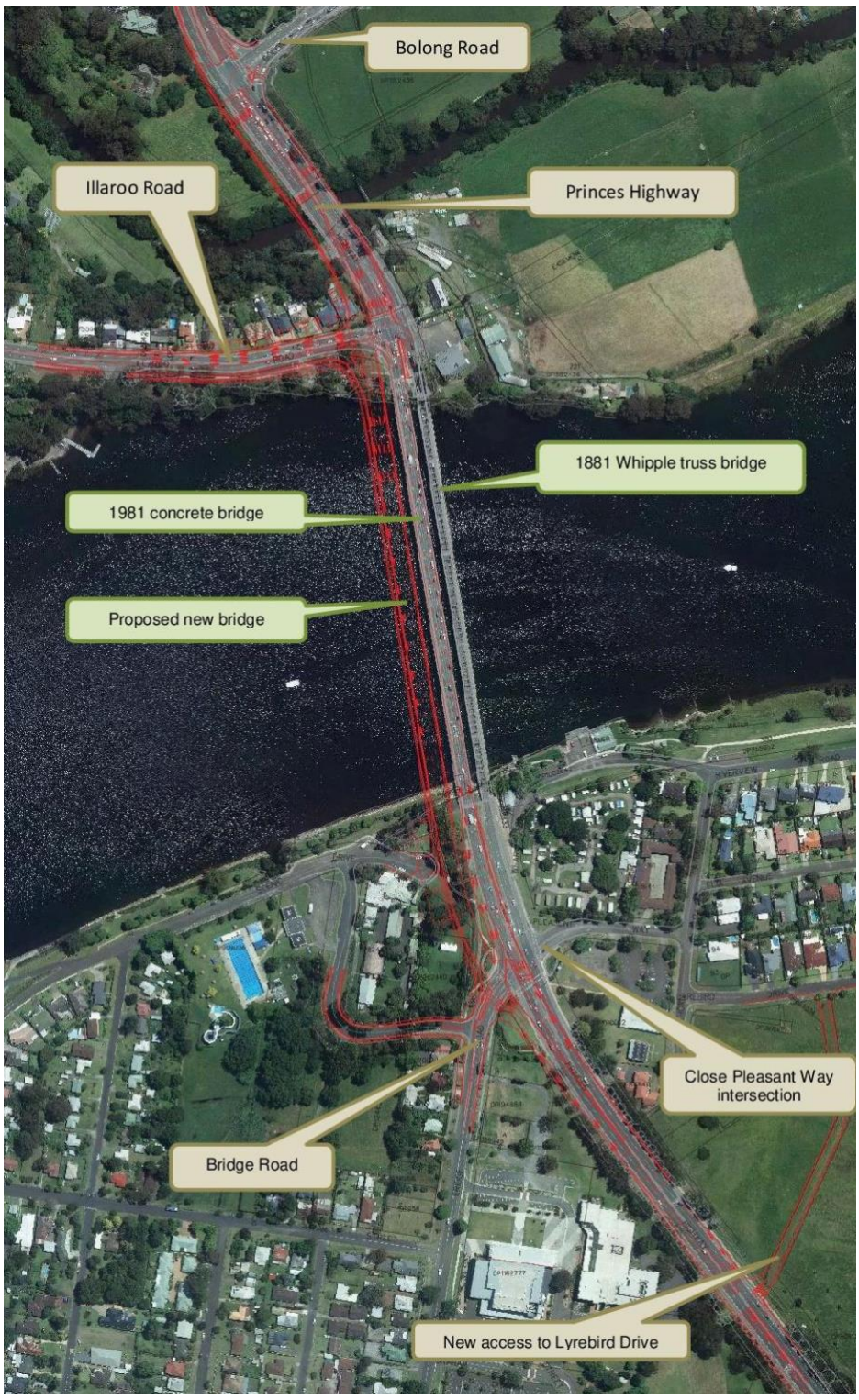

Figure 0-1 – Proposed Nowra Bridge project scope

Options identification and assessment

The options analysed in the business case represent outcomes developed through an iterative process over several years. The options allowed Government to make informed decisions while setting the framework of expectations for future decisions.

Options identification

Five route options for a new bridge crossing were defined for a detailed options assessment:

- Option A: a western bypass of Nowra.
- Option B: a new crossing immediately west of the existing concrete bridge.
- Option C: a new crossing on the alignment of the existing iron truss bridge.
- Option D: a new crossing immediately east of the existing iron truss bridge.
- Option E: an extension of rail (combined road and rail crossing east of the existing iron truss bridge).

Analysis

In developing the project to the stage of a favoured option, a range of matters were considered and assessed to ensure that a transport solution is delivered that will satisfy customer needs and align with strategic Government priorities and objectives. These included:

- understanding of existing problems
- considering Government strategies and plans
- considering customer needs and requirements
- understanding relevant internal stakeholder needs and expectations.

The options were also compared using the following perspectives:

Functional perspective, including:

- improve safety for pedestrians, cyclists and motorists
- easily constructed under existing and forecast traffic conditions
- improve through traffic efficiency
- improve local connectivity
- minimise impact on major public utilities
- allow easy maintenance of the existing southbound bridge.

Socio-economic perspective, including:

- minimise direct impacts to properties
- minimise changes to visual and landscape character
- best fits with existing and future planning
- minimise impact on urban business/service patronage
- minimise traffic disruption during construction
- minimise impacts to river users.

Environmental perspective, including:

- minimise impact on biodiversity
- minimise impact on Aboriginal heritage
- minimise impact on Non-Aboriginal heritage
- ease of managing flooding implications on the bridges and approaches
- ease of managing the impact of new noise.

The preferred option

Following analysis, Option B was selected as the preferred option because it provided on balance the better option from a functional, socio-economic and environmental perspective and delivered a better value for money outcome.

The results of the technical studies and value management process demonstrated that to meet the project objectives, an option close to the existing Princes Highway river crossings would be needed. While some members of the community expressed a desire for a bypass option, this would not solve the local traffic problem, which has been identified as the key driver of congestion issues. It was determined that an option to cater for rail could not be considered further due to the lack of a future strategy for a rail extension across the Shoalhaven River.

Of the options close to the existing Princes Highway river crossings, the results of the technical studies, value management and community consultation all demonstrate a preference for a new bridge immediately to the west of the existing bridges.

Stakeholder engagement

A Review of Environmental Factors, based on the preferred option concept design, was placed on public exhibition between 27 August and 28 September 2018. The process was given substantial publicity and was supported by 5 drop-in community information sessions conducted by the RMS Project Team. A total of 115 formal submission were received, including from the Shoalhaven City Council. There were about 360 issues raised. Only 25% of submissions were opposed to the project, mainly by people who advocated for a bypass as their preferred option.

Economic evaluation

An economic evaluation of the project was undertaken to support the final business case submission. This economic evaluation included an analysis of the economic, social and environmental impacts or benefits of the road project.

Capital costs

The $342 million Nowra Bridge project is jointly funded by the Australian and NSW governments.

The NSW and Australian governments have each committed $155 million towards construction, which is separate to funding provided for project planning, property acquisition and rehabilitation of the existing wrought iron truss bridge, which are all included as part of the full project cost.

The outcomes of the analysis

The economic analysis considers the comparative costs and benefits of the upgrade against the *'do-nothing'* (or base case) scenario based on the available capital and maintenance costs, crash costs and traffic data.

The economic merit of the upgrade was determined by comparing the present value of the change in net economic benefits (compared with the base case) less the change in capital and maintenance costs. The key benefits incorporated within this Cost Benefit Analysis (CBA) assessment were in the form of savings in maintenance costs and travel times.

Benefits analysis

The Nowra Bridge project is likely to generate substantial benefits to both local and regional road users, particularly through savings in travel time and vehicle operating costs. As part of this economic analysis, the projected benefits were quantitatively evaluated against a *'do nothing'* scenario.

The results of the economic appraisal of the preferred option show that the benefits of undertaking the project outweigh the associated costs as shown in Table 0 which identifies the calculated Benefit Cost Ratio (BCR). Specifically, at a 7% discount rate for the P50 estimate, the economic appraisal reflects that for every dollar invested, the project returns $2.20 of benefit.

Table 0: Preferred option BCR

	BCR @ 3%	BCR @ 4%	BCR @ 7%
Based on P50	4.3	3.6	2.2
Based on P90	4.1	3.4	2.1

Sensitivity testing of the BCR has been carried out under various assumptions such as 40% increased costs and 40% reduced benefits. Under all scenarios tested the BCR remained greater than 1.3. The BCR is therefore considered robust under adverse conditions. It should be noted that the BCR has been derived as a traditional traffic BCR, meaning that no benefits in terms of urban beautification, regional access to more efficient freight vehicles or wider economic benefits have been included. The calculated BCR is therefore considered conservative.

The outcome calculates, for each option, the Net Present Value (NPV - the present value of benefits less the present value of costs) using just the direct benefits of the project, and then using all project benefits. The table below presents the results of the economic appraisal at the 7% discount rate and based on the P50 probabilistic estimate.

Table 2: Preferred option NPV (7% discount rate)

	PV Costs	PV Benefits	NPV
Preferred option	$220,858,260	$489,036,873	$268,178,613

Table 3 provides a summary of the present value of benefits based on a 7% real discount rate.

Table 3: Summary of benefit present values (P50, 7% discount rate)

	Benefits (in 2018/19 constant dollars)	
	Project case ($'000s)	Percentage
Travel Time Savings	$476,638	97.5%
Crash Cost Reduction	$23,079	4.7%
Residual Value	$16,652	3.4%
Externalities	($9,894)	-2.0%
Vehicle Operating Costs	($17,438)	-3.6%
TOTAL	$489,037	100%

It is seen that savings in travel time produce the majority of the benefit in comparison to other types of benefits, at approximately 98%.

Deliverability

Delivery strategy

Based on the comparison of delivery options, and given the nature of the Nowra Bridge project, including its size (capital cost), a design and construct procurement method was found to be the most appropriate approach. Restoration works on the 1881 Whipple truss bridge would be delivered separately following decommissioning of the bridge.

Timeframe

The project is expected to be complete by mid-2024, weather permitting.

Key risks and mitigation

Key strategic risks for the project have been identified including:

- optimising design solutions and place-making through the procurement process
- ensuring relevant stakeholders are managed proactively to minimise adverse impacts on project delivery and budget
- ensuring construction impacts are managed to minimise impacts on the program, such as night works and aquatic sediment disturbance.

These risks will be further assessed by Infrastructure NSW in discussion with Transport for NSW during the next phase of the project. However, it is noted that the agency has a stable and experienced project team in place and has developed a robust community and stakeholder engagement plan.

The Infrastructure NSW view

Infrastructure NSW considers that the preferred option presented as the Nowra Bridge project in the final business case represents the best value for money of all the options considered, and that evaluation supporting the final business case is robust.

The final business case provides a robust case for the preferred option for the project and uses Whole of Life (WOL) costing analysis to derive a benefit cost ratio (BCR) that is consistent with NSW Treasury Guidelines.

When completed, the Nowra Bridge project will support improved regional access, freight, tourism and economic growth, but its predominant benefits arise from significantly reducing daily congestion for residents who rely on the river crossing for local trips and from improved freight connectivity especially for HPVs for local and South Coast businesses.

Infrastructure NSW notes the agency's approach to value engineering and innovation, to maximise benefits while minimising costs, will largely be derived under the proposed procurement process, and this will require careful management oversight by the agency to ensure appropriate outcomes and benefits are achieved.

The project team has developed a robust community and stakeholder engagement plan, which identifies the major stakeholders, including the local community, residents impacted by construction activity, affected Indigenous communities and the Shoalhaven City Council.