

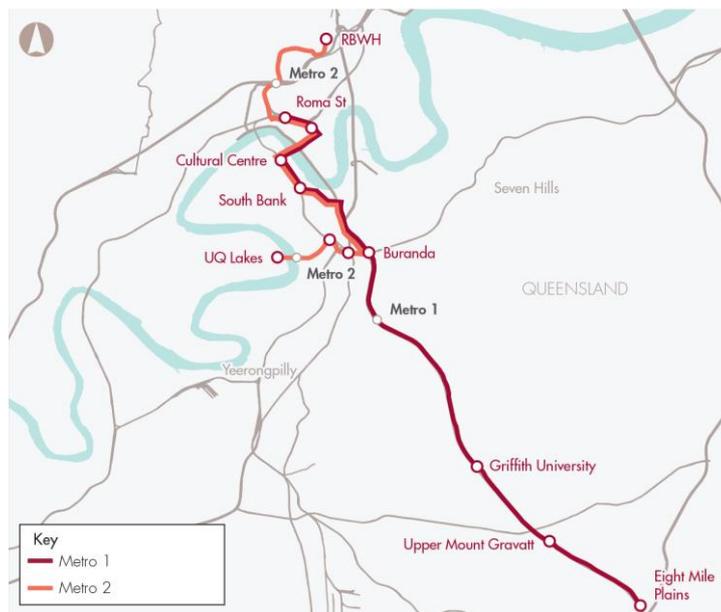
Project Evaluation Summary

Brisbane Metro

Proponent Brisbane City Council
Evaluation date 16 February 2018

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1. Evaluation Summary

Infrastructure Australia has added **Brisbane Metro** to the Infrastructure Priority List as a **High Priority Project**.

Brisbane’s bus network is critical to the city’s function as an economic hub. Overall, the city’s bus network moved 76 million people in 2015-16, substantially more than the entire South East Queensland rail network.

The busway system, which forms the backbone of the bus network, is capacity constrained, causing significant delays where it interacts with the road network in inner Brisbane. This impacts on a large number of bus passengers – currently, in the morning peak hour, 16,000 passengers use the South East and Inner Northern Busways. As Brisbane’s population continues to grow over the next 25 years, with jobs growth focused on the inner city, the impact of constraints in the busway system will become more severe.

Brisbane Metro proposes to address these constraints with infrastructure and service changes to bus operations in Inner Brisbane. These include removing key infrastructure bottlenecks on the South East Busway, using longer, higher capacity metro vehicles with faster and easier entry and exit through multiple sets of doors, and revising service patterns to increase frequency and truncate lower use services prior to the inner city, requiring passenger interchange. The outcomes for customers will be faster and more reliable journey times, with higher frequency services and lower waiting times, but less seating and more interchanges.

The proponent’s stated benefit-cost ratio (BCR) for the project is 2.4, with a net present value of \$1,235 million (7% real discount rate). Infrastructure Australia has tested this BCR against a wide range of circumstances, and is confident that the project will maintain a BCR greater than 1 under any reasonable scenario, even with no growth in demand, and low decongestion benefits.

The project is supported by the Queensland Government. This support is critical to the project proceeding, as the Queensland Government owns the busway infrastructure, holds planning authority over the proposed development, and has an ongoing financial commitment to subsidise bus operations.

2. Strategic context

Population and employment growth in inner Brisbane are driving increased demand for bus services. The population of the inner city area is expected to grow at around 2% per year to 2041, and some 50% of new jobs in the Brisbane local government area are projected to be in inner Brisbane. The Australian Infrastructure Audit (2015) noted the key role that bus services will play in the transport network as Brisbane continues to grow.

The Queensland Government has committed to constructing Cross River Rail, which would provide significant additional capacity to the South East Queensland rail network. The Cross River Rail and Brisbane Metro projects service different parts of the city, and are largely complementary. Passengers would be able to interchange between the two networks at Boggo Road and Roma Street, opening up a broader range of origin/destination combinations for users.

Brisbane Metro is identified as a priority project in *Connecting Brisbane*, the Brisbane City Council / Queensland Government shared vision for public transport in South East Queensland jointly released in 2017. The project is broadly aligned with other Queensland plans such as the State Infrastructure Plan.

3. Problem description

Brisbane's South East Busway extends 13 kilometres from the Brisbane CBD to Eight Mile Plains. It is largely a dedicated busway, but interacts with the road network at key points including intersections at each end of Victoria Bridge. The lack of capacity on the busway leads to significant delays, and long queues of buses awaiting access to Victoria Bridge. For passengers, these delays lead to travel times up to 50% longer than scheduled.

The demand for bus services in Brisbane has grown more rapidly than either employment or rail demand since 1996. For the part of the bus network relevant to the project, demand is expected to continue growing consistent with historical growth. At this rate of growth, it is expected that by 2021 demand for Brisbane Metro services would be 95,400 boardings per day, growing to 121,900 boardings per day by 2031, and 149,200 boardings per day by 2041.

Figure 1 on the next page sets out the key problems in the Brisbane bus network which the project seeks to address.

4. Project overview

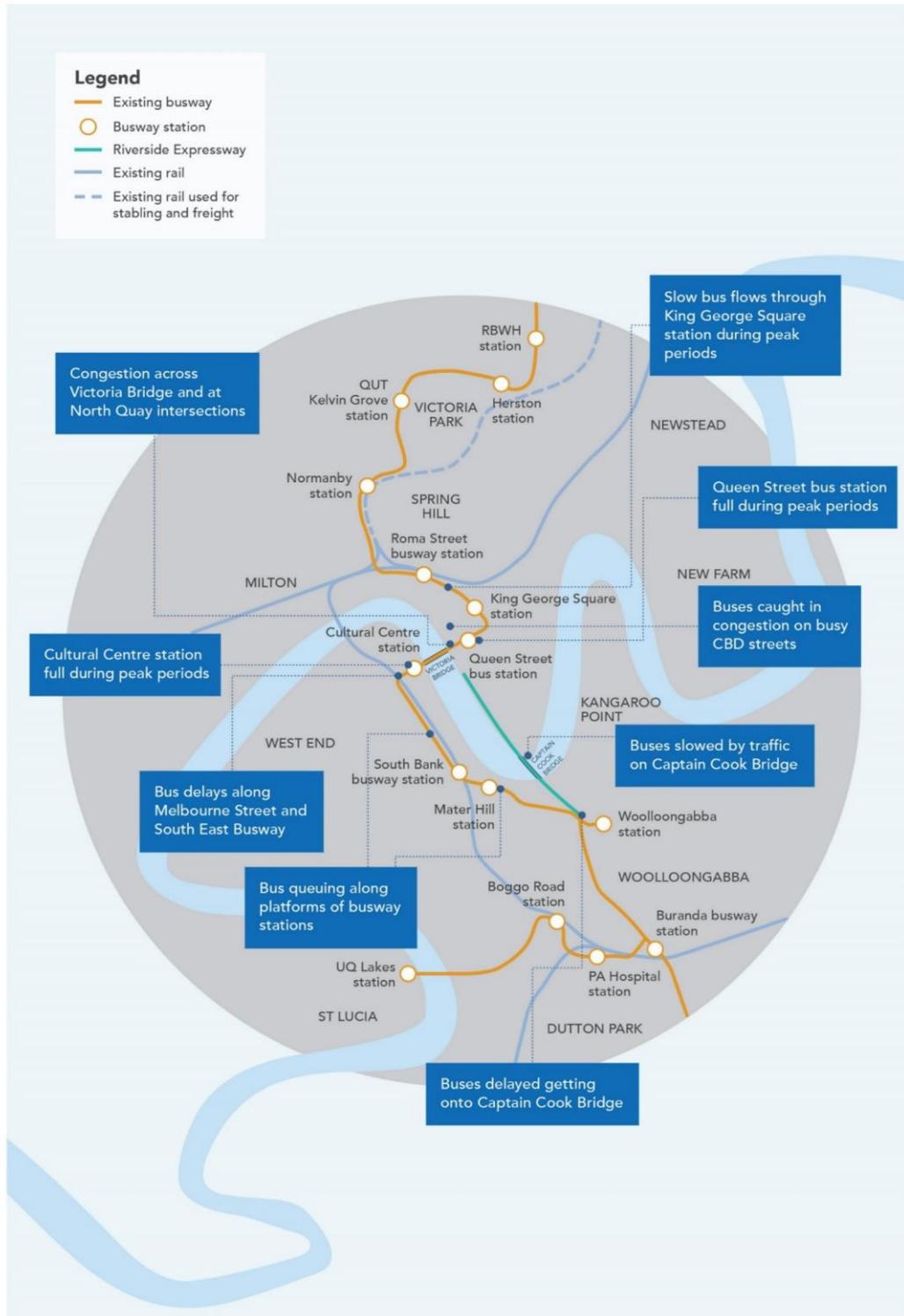
Brisbane Metro would provide fast and frequent public transport services between Eight Mile Plains and Roma Street busway station (Metro 1) and between the Royal Brisbane and Women's Hospital and the University of Queensland Lakes (Metro 2). To achieve this, the project proposes an integrated set of changes to remove infrastructure bottlenecks and improve passenger experience. These changes comprise:

- vehicle changes – introduction of 60 metro vehicles (bi-articulated buses) with a capacity of 150 people each
- service changes – high-frequency trunk services (every 3 minutes in peak periods) and truncation of some existing services, with interchange onto the high-frequency trunk services
- infrastructure changes – a new underground station at the Cultural Centre, a new Adelaide Street tunnel, changes to North Quay, existing busway station upgrades, and changes to remove cars from Victoria Bridge
- management and information system changes – to manage vehicles at stations and to provide information to customers about platforms and arrival times
- policy and operations changes – introduction of pre-paid zones for all metro stations, multi-door entry and exit through up to four doors per metro vehicle.

The project also includes a new metro depot and maintenance facility close to Eight Mile Plains.

The development of a full separated busway is the largest component of the project's cost. This would provide capacity to accommodate significant future growth. The Cultural Centre Station, and North Quay/Adelaide Street tunnel, together comprise a third of the capital costs (real non-risk adjusted). Other costs include station modifications, the new depot, new metro vehicles, the vehicle and passenger information system, and other road and bridge works.

Figure 1: Key problems in the Brisbane bus network



Source: Brisbane City Council *Brisbane Metro Business Case* (received August 2017)

5. Options identification and assessment

The project has been in development over many years. In recent years, key milestones in project development include the *Bus and Train Tunnel* business case in 2014, announcement of a Brisbane Metro Subway System in 2016, and finalisation of the Brisbane Metro business case in 2017.

The current business case reviews and builds on the previously considered options, taking account of the outcomes of customer consultations about each option.

The preferred option differs to earlier options in that:

- It does not truncate all bus services short of the city, requiring transition to a different service. Instead, high utilisation bus routes will continue to use the busway infrastructure into the city, with lower utilisation services being truncated and consolidated into metro vehicles. This will improve travel times.
- The network area covered is longer, extending from Eight Mile Plains and the University of Queensland to the Royal Brisbane and Women's hospital. In comparison, the earlier subway option terminated at Woolloongabba and did not include a line to the University of Queensland.
- Costs have been reduced, reflecting a greater use of existing infrastructure, and using vehicles with their own power. The subway option required track, power and traction infrastructure, and higher expenditure to modify end-points to enable the high levels of interchange.
- Total capacity is marginally reduced. The subway option was capable of moving 25,000 people per hour per direction, while the project option can move 22,000 people per hour per direction.

The options assessment also briefly considered a light rail option. This would be similar to a subway system in outcomes for customers, although substantially more expensive than the preferred option.

Infrastructure Australia considers that the changes made to the project design will make Brisbane Metro a lower cost option, with higher benefits for customers than previous options. As the project is procured, we expect that the preferred option will continue to evolve, with detailed consideration by private sector tenderers of specific project components including, for example, vehicle design.

6. Economic evaluation

The proponent's stated BCR for the project is 2.4 (7% real discount rate), not including wider economic benefits (WEBs). Infrastructure Australia's analysis shows that:

- The estimated demand for future bus services is closely aligned to past observed growth rates, and consistent with projected growth and distribution of population and employment
- The project is resilient to changes in demand – even with no growth in demand, the project BCR would remain above 1
- The estimates of the avoided costs for road users are high relative to benchmarks from other projects. However, the project BCR remains above 1 when a much lower value of decongestion benefit for road users is applied
- There are material upsides to the estimated benefits. For example, including a benefit for improved bus reliability, which is one of the objectives of the project, would likely increase the project benefits. The quantified benefits also do not include any gains from improved customer information or station improvements, or improvements in interchanges between services.

From the passenger perspective, the project benefits amount to the equivalent of ~10 minutes travel time saving per boarding (in the peak direction). This reflects faster journeys and lower waiting times, partly offset by less seating and more interchanges.

Overall, Infrastructure Australia is confident that the benefits of the project will remain well in excess of its costs, under a wide range of scenarios.

Benefits and Costs breakdown

Proponent's Stated Benefits and Costs	Present Value (\$m, 2016) @ 7% real discount rate	% of total
Public transport user benefits	841.5	39%
Road user benefits	878.2	41%
Avoided costs of operating existing services	290.8	14%
Other benefits (environmental externalities, residual value of assets, resource cost corrections, accident cost savings)	128.3	6%
Total Benefits	2138.8 (A)	100
Capital costs (P50)	583.2	65%
Operating costs	277.6	31%
Lifecycle costs	42.8	5%
Total Costs¹	903.5 (B)	100
Net Benefits - Net Present Value (NPV)²	1,235.3 (C)	n/a
Benefit–Cost Ratio (BCR)³	2.4 (D)	n/a

Sources: Proponent Cost Benefit Analysis and Business Case and Infrastructure Australia calculations.

(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 majority of capital costs relate to infrastructure changes (tunnels and new underground station). The net operating costs (the cost of operating Metro services less the costs of operating the services that Metro replaces) are minimal. This reflects higher costs from higher frequency of services, offset because the project would require fewer vehicles for the same passenger load, and has less dead running as a result of depot location.

Capital costs and funding

Total capital cost (nominal, undiscounted, P90)	\$944 million
Proponent's proposed Australian Government funding contribution	\$300 million
Other funding (source / amount / cash flow) (nominal, undiscounted, P90)	\$644 million Brisbane City Council

7. Deliverability

The business case notes that procurement of the project would be broken into four components:

- main works to be delivered through a design and construct contract
- council works to be delivered through a construct-only contract
- depot, vehicles and operations – the business case notes there is not a strong preference for either private or *Transport for Brisbane* operations
- vehicle and passenger management system.

This proposed division of works is appropriate, given the different skill sets involved in the tasks. Infrastructure Australia supports consideration of franchising of Brisbane Metro services.

The business case presented a program for the delivery of the project aiming for readiness for market by March 2018, awarding of contracts by June 2019, completion of early works by May 2020, completion of main works and all delivery activities by December 2022, and commencement of operations in 2023. Infrastructure Australia notes that since the completion of the business case, delivery activities for Brisbane Metro are being reviewed.

The main risks to the project that will have to be managed include disruption to services as a result of construction works, managing customer expectations around service changes, and defining appropriate Metro vehicle specifications.

The Queensland Government has identified a number of issues largely related to delivery, including:

- ensuring issues around removal of on-vehicle ticketing are aligned to the Queensland Government's *Next Generation Ticketing Solution*
- management of construction impacts and disruptions to services
- required approvals for effective delivery of the project.

The proponent will need to ensure these issues are managed through project delivery. Infrastructure Australia encourages the proponent and the Queensland Government to work closely to ensure metro/rail interchanges are designed to streamline interchanges and maximise network-wide benefits of the project.

The majority of project funding for the project is being sought from governments rather than users. Incremental farebox revenue accounts for 20% of the incremental costs of the project, on a present value basis. Infrastructure Australia considers that users should pay a higher share of the project costs as they will receive a large share of project benefits. This would best be realised through broader public transport network pricing changes, rather than for the project in isolation.

In the event that the project proceeds, Infrastructure Australia encourages the proponent to undertake and publish a Post Completion Review to assess the extent to which expected project benefits and costs have been realised. This will help to inform the development of future projects. In particular, such a review should assess project costs, and outcomes for customers, against the expectations set out in the business case.

This evaluation summary was considered by the Infrastructure Australia Board in February 2018.

During Infrastructure Australia's quality assurance process, a typographical error was identified in the 'Benefits and Costs breakdown' table on page 5 of the Project Evaluation Summary. The P50 project capital costs estimate of \$583.2 million was identified as a P90 estimate in the table. This has been amended in the current version of the Project Evaluation Summary. This change has no impact on the outcomes of the evaluation or the underlying analysis.