

Cross River Rail Project

Review of Challenges and Opportunities

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1. Why is a Stocktaking of Cross River Rail Important and Timely?

1.1 Background

Cross River Rail (CRR) is a \$5.4 billion underground railway project comprising 10.2 km of new rail infrastructure between Dutton Park and Bowen Hills through central Brisbane including 5.9 kilometres of twin tunnels under the Brisbane River and the Central Business District (CBD). By providing an additional rail corridor through Brisbane's CBD the objective of the project is to double rail capacity on this critical part of the passenger rail network in South East Queensland (SEQ).

The project includes the development of four new underground stations at Boggo Road, Woolloongabba, Albert Street and Roma Street, two upgraded stations at Dutton Park and Exhibition, six upgraded stations from Salisbury to Fairfield on Brisbane's Southside and the development of three new Gold Coast stations. Precincts at Boggo Road, Woolloongabba, Albert Street, Roma Street and Exhibition would be revitalised. CRR aims to allow more trains to run more often, integrating with bus services.

Construction works commenced in September 2019 with the total project scheduled to be completed in 2024.

Given the October 2020 Queensland State election, the effects of the COVID pandemic that has impacted government budgets, and recent travel behaviour change due to remote working, it is an appropriate time for a new government to review the challenges and opportunities of the CRR project.

1.2 Review Objectives and Scope

The purpose of this review of the CRR project is to assess current and emerging challenges, highlight issues and risks and look towards potential opportunities to maximise the value for money of the project.

In view of the current prevailing difficulties with access to persons concerned with, and knowledgeable on, CRR it has been necessary to rely on publicly available documents for data, analysis and conclusions, filtered for technical relevance and integrity by the authors.

2. What is the Cross River Rail Reference Project?

2.1 Project Packages and Delivery

The CRR project is being delivered by the Cross River Rail Delivery Authority (CRRDA) that was established during 2017 by the Cross River Rail Delivery Authority Act 2016. The project is being delivered in three packages that were awarded in mid-2019 as set out in Table 1. The CRR Reference Project refers to the project details that were put out to tender in 2019.

Of the total project cost reported as \$6.9 billion, the government is funding \$5.4 bn during the period of implementation as shown in Table 1. The difference between the two cost figures is the value of the Public Private Partnership (PPP) associated with the Tunnel, Stations and Development (TSD) package.

Table 1. CRR Project Packages

Component	Mode of procurement	Overview	Estimated cost
Rail, Integration and Systems Alliance (RIS)	Alliance contract UNITY Alliance, includes CPB Contractors, UGL, AECOM, Jacobs, HASSELL, RCS Aust, Acmena, Martinus Rail and Wired Overhead Solution	Rail infrastructure in the new tunnels, the new station at Exhibition, upgrading stations from Fairfield to Salisbury and integrating with the existing rail network	\$6.26 bn
Tunnel, Stations and Development (TSD) Public Private Partnership	Availability Public Private Partnership PULSE consortium, led by CIMIC Group, Pacific Partnerships, CPB Contractors, and UGL (also provide maintenance) with international partners DIF, BAM and Ghella	Underground section of the project, including 5.9 km of twin underground tunnels from Dutton Park to Normanby and four new, underground stations at Boggo Road, Woolloongabba, Albert Street and Roma Street, Albert Street Station development. 24 years of maintenance.	
European Train Control System contract (ETCS)*	Conventional contract Hitachi Rail STS	European Train Control System signalling	\$0.64 bn
Total project cost			\$6.9 bn
Government's initial funding			\$5.4 bn

Sources: Cross River Rail Delivery Authority. 2019. Annual Report 2019–2020; *QTRIP 2019–23.¹

¹ Transport and Main Roads. 2019. Queensland Transport and Roads Investment Program. 2019–2020 to 2022–2023. Refer [https://www.publications.qld.gov.au/dataset/queensland-transport-and-roads-investment-program-qtrip-2019-20-to-2022-23] accessed 15 October 2020.

2.2 Other Items Essential to CRR

Other works that are associated with CRR but not formally part of the currently approved project include:

- the supply of 75 six-car New Generation Rollingstock (NGR) trains² and a maintenance centre at Wulkuraka under a PPP availability contract³ for \$4,217 m with 32 year duration signed in 2013. All 75 six-car NGR trains were accepted into passenger service by December 2019. The need for disability access upgrades was announced in December 2018, and small volumes of NGR trains began modification in October 2019. By 2024 all 75 six-car NGR trains are planned to be in passenger service in time for the opening of CRR.⁴ The NGR trains would operate alongside the existing City network fleet that consisted of 154 x 3 car Electric Multiple Units, the equivalent of 77 six-car trains, as at July 2020, although only the NGR trains would operate in the CRR tunnels.
- Other related works includes stabling yard upgrades at Mayne Yard (\$120 m) and Clapham Yard (\$298 m)⁵ and the future upgrade of all suburban stations to cater to nine-car trains although this is several years in the future (refer Section 3 below).
- Any other capital upgrades required to the surrounding heavy rail network to ensure maximum benefits are gained from CRR. There is a multitude of work required including straightening of tracks, elimination of level crossings with grade separations⁶, and upgrading of stations to cater for disability access etc. None of these costs are identified or quantified in a single source document.

2.3 Other Items Complementary to CRR

In September 2019, the Queensland Government announced the locations for the three new train stations on the Gold Coast at Pimpama, Helensvale North (Hope Island) and Merrimac, to be delivered as part of the Cross River Rail project.

The government also recently announced a \$57 million upgrade to stations between Fairfield and Salisbury train stations (facelifts and enhanced access facilities).

² These 75 six-car trains are the equivalent of 150 three-car trains since the three-car units can be operated independently.

³ This is based on government making regular payments to its private sector partner based on performance to specified levels including the availability of the contracted infrastructure. These payments can include payment for infrastructure provided by the private sector partner using their own finance.

⁴ Refer [<https://www.tmr.qld.gov.au/projects/New-Generation-Rollingstock>] accessed 18 October 2020.

⁵ These NGR works reported in QTRIP 2019-23.

⁶ Business Queensland. 2017. Cross River Rail Business Case. August. Page 140. Figure 6.12 indicates the maximum number of inbound train paths that can be operated through the CRR tunnels at 2036 is 34 per hour or 71% of the ultimate capacity of 48 per hour, with the latter dependent on “augmentation of the connecting surface network north and south of the project.”

2.4 Other Planned Outcomes of CRR

Urban renewal and liveability outcomes. The Cross River Rail Precincts Delivery Strategy of 2019⁷ looks at development opportunities in association with the five new CRR stations in the Reference Project. The aim is to “...generate unique opportunities for urban renewal, drive new investment for phased long-term economic stimulus and create a pipeline of employment growth for decades to come...”

Improved SEQ freight outcomes. Unlike an earlier Business Case for CRR, the 2017 CRR Business Case⁸ did not propose an increase in rail freight capacity (see further discussion in Section 5.2). However, the 2017 Business Case did describe the potential benefits to freight train movements of the new train control system enabling efficient and safer movement of passenger and freight trains, and due to a planned, induced switching of passengers from cars to the upgraded train services facilitated by CRR, reduced traffic congestion benefiting road freight transport operators.

⁷ Refer [<https://crossriverrail.qld.gov.au/station-precincts/precincts-delivery-strategy/>] accessed 16 October 2019.

⁸ Business Queensland. 2017. Cross River Rail Business Case. August.

3. What are the Risks and Obligations of CRR?

3.1 Integration of Train Control System Signalling with NGR Trains

New rail systems are very complex projects involving above ground and underground infrastructure (tunnels, rail lines, bridges, stations, etc), rollingstock (trains) and signalling systems. Usually each of these components is delivered by different suppliers or constructors and require careful integration.

For example, in the case of the Redcliffe Peninsula railway line (previously known as the Moreton Bay Rail Link) between Petrie and Kippa-Ring, completion was delayed for six months due to signalling system faults at Petrie where the new line joined the existing rail system.

The project was delivered by the Department of Transport and Main Roads without the end user Queensland Rail (QR) being directly involved in the design and construction phase of the project. More appropriate involvement of QR would have enabled identification of the signalling issues prior to the first trains using the line.

An independent investigation was completed in 2017, and a report presented to the Queensland parliament.⁹ The recommendations for future projects included:

- introduce a systems engineering management process, with appropriate assurance gates, particularly those projects with significant integration risk; and
- the highest rated project risks are included as a standing item on the agenda of major projects steering committees.

There have also been issues with the delivery of the new trains for QR under the New Generation Rollingstock (NGR) project where the NGR trains failed to meet disability requirements.

In the CRR project there is a combination of new trains (NGR), a new signalling system (ETCS) coming together with new infrastructure (tunnels, stations, etc), raising potential integration challenges, particularly with the interface with the existing rail system (trains and signalling in particular).

Are appropriate governance arrangements in place to ensure that systems integration is successful and timely given previous experience?

How robust and adaptable are the governance arrangements as the project moves from procurement to delivery phases?

Do the governance arrangements and availability of relevant information encourage informed decision making?

⁹ <https://www.parliament.qld.gov.au/documents/tableOffice/TabledPapers/2017/5517T812.pdf>

3.2 PPP Component of the TSD Contract

There are limited details on the Tunnel, Stations and Development Public-Private-Partnership (PPP) in the public domain. It is also not clear how the value of the \$1.5bn PPP comes about. This attributed value of the PPP most likely represents the capitalised value of the annual payments (i.e. availability payments) that must be paid to the Pulse Consortium over 24 years to ensure the availability of tunnels and stations.

As shown in Table 3, the annual availability payment to be paid to the consortium is conservatively estimated to be around \$100 million per annum. The CRR Project also includes 24 years of maintenance (Table 3) of about \$ 100 million per annum that is likely not included as part of the \$6.9 bn project total.¹⁰ As shown in Table 3, the annual total recurring annual payment that the government is obliged to pay is conservatively estimated to be about \$200 million or higher.

Table 3. Rough Estimate of On-Going Annual Cost (maintenance, plus availability payments)

Item	Component	Approximate cost (\$ million p.a.)
Availability payment (TSD)	Financing cost - \$ 63 million per annum of \$1.5 billion +50% (covering overhead, profit, risk component)	100
Maintenance (TSD)	Annual maintenance p.a. provided by UGL	100
Total, estimated recurrent obligation		200

Source: Authors' indicative estimates; note excludes any future maintenance of signalling system and surface stations.

Does the Government have a full understanding of the full direct and indirect costs, and the whole-of-life operating costs of the project?

To ensure accountability and transparency the ongoing government commitments to the CRR project need to be published.

¹⁰ Figure 8 of the CRR business case shows that recurrent maintenance to be around \$100 million per annum.

3.3 Construction Risk and Completion Delay

In terms of construction risk, it is understood that the TSD contract contains the standard allocation of risk with the contractor taking all construction risks as long as the project stays within the Reference Design. However, the recent decision to move the Boggo Road station raises the potential for increased costs and risk to the Government and time delays.

It is understood that two options for the Boggo Road Station were priced by the TSD consortium:

- Option A – new Boggo Road Station on the northern part of the Boggo Road precinct
- Option B – new Boggo Road Station shifted south to be closer to the PA Hospital. In this option Dutton Park is retained although it is quite close to the proposed Boggo Road Station. It is understood that this option was provisionally costed at around \$600 million and is included in the published \$5.4 billion cost to government.

Option B was chosen by the Government. An alternative solution was submitted that shifted Boggo Road but removed Dutton Park station altogether.¹¹ This has a range of technical and operational advantages but was rejected by the Government.

The TSD consortium is currently costing the chosen Option B in detail with the final cost expected to significantly exceed the provisional cost estimate. Minister Jones has publicly acknowledged the cost of the design change will be expensive – likely several hundred million dollars additional.

A revised price and necessary design changes would likely trigger variations to the consortium's contract potentially exposing the State to significant cost increases, particularly if under the variation, construction risk can be passed back to government.

Given that tunnelling has just commenced it is not clear what the financial risks to government would be in the event that unexpected difficulties in construction are encountered. For example, the construction in the Park Road – Dutton Park area will prove very challenging, with the tunnel and underground structure required to cross under seven operational tracks whose alignments are constrained by a number of crossovers in a corridor that itself is spatially constrained. There may be risks to construction due to this complexity.¹²

Apart from a likely direct increased cost and risk burden that the government is likely to assume, construction difficulties may lead to delays that would also have

¹¹Likely to have been at least \$600 million cheaper than the Reference Design with two stations. Refer [<https://www.couriermail.com.au/news/queensland/cross-river-rails-huge-cost-blowout-as-experts-ignored/news-story/913437eaa5d137faef375a4f47c0a6c4>] accessed October 20, 2020

¹² RTBU 2017. RTBU Submission to the CRR RPC 2017 March 2017.

cost implications. At the current cost of government debt of 0.8% per annum over 30 years on the total publicised project cost of \$5.4 billion, this would cost the government approximately \$43 million per annum for every year of delay in completion of the project.

Have Governance arrangements and short procurement timeframes provided the required level of interaction and early planning between project sponsors, contractors, and the operator to avoid and mitigate design and construction risks?

Independent careful monitoring, review, mitigation and reporting of risks to total cost and completion targets will ensure accountability of the CRR project.

3.4 Performance of NGR Trains

The \$4.4 billion NGR project involves:

- 75 new six-car electric trains; and
- maintaining these trains for 32 years

NGR trains first started service in December 2017, with all 75 trains delivered and in service by December 2018.

The Government needs to be sure the NGR trains can operate efficiently and effectively on the CRR project with its particular grades and ingress to and egress from stations, otherwise braking and traction systems may have to be retrofitted and upgraded at a significant cost.

The operation of NGR trains on the CRR project should be reviewed and any upgrades needed arranged.

3.5 Governance

The CRR project had an independent Board reporting to the Minister responsible for Cross River Rail, however the Board was replaced by a board of senior public servants in April 2020.

Independent governance arrangements need to be instituted for the CRR project to ensure accountability and value for money.

4. What are the Implications for Passenger Demand and Train Level of Service?

4.1 Trends in Rail Passenger Growth to 2019

Rail passenger demand in recent years has not been in line with growth expectations of the mid-to-late 2000s to 2019. Historical annual growth in rail patronage from 2011 to 2019 appears to have been modest. Furthermore, the outlook for sustained patronage growth is uncertain and patronage in the first year of opening of CRR likely to be no higher, and likely lower, than in 2019, due to effects of COVID-19.

2009 to 2015

After 2009 there was a marked decline in the rate of rail patronage growth to the CBD – down from around 4% p.a. average in the AM peak 1 hour (2005 to 2012) to just over 1% p.a. average over the four years (2008 to 2012, inclusive).¹³

The peak 2 hour AM rail passenger demand across the inner city rail cordon in 2012 was 48,000 passengers up from 30,000 passengers in 2009.¹⁴ By 2015, passenger demand across the inner city rail cordon over the two hours inbound grew to 51,700 passengers¹⁵ or by 7.7%, or an average of 2.5% per annum, from 2012.

Further, the ratio of AM inbound 1 hour peak to the AM inbound 2 hour peak fell steadily between 2005 and 2012 from an average for 2005 –2007 of almost 70% to just over 64% for 2011 and 2012. The decline implies a degree of peak spreading had taken place over the period without the implementation of specific measures designed to achieve this result. Significant supplied passenger carrying capacity on the railway was not utilised at the time.

2016 to 2019

Data on quarterly rail passengers on SEQ travelling between 2015-16 to 2018-19 shows that patronage grew by an average of 1.6% p.a. over the three years. This historical rate of growth was similar to that recorded from 2008 – 2012 reflecting steady though modest population growth at 1.7% p.a. from 2006 –2016.¹⁶ It is likely therefore that the peak two hour inbound rail passenger demand would have grown at a slower rate than for overall demand of 1.6% per annum from 2015 to 2019. This conclusion is supported by trends in journeys to work by public transport recorded between 2011 and 2016 as discussed in Section 5.3.

¹³ South East Queensland Public Transport Infrastructure Expert Panel. 2013. *Strategy Review Report*. September. Page 50.

¹⁴ Ibid. Figure 6.8

¹⁵ Business Queensland. 2017. *Cross River Rail Business Case*. August. Table 6.2.

¹⁶ Ibid. Page 13.

Associated Train Supply to Meet Peak Demand

In 2019, it was found “The Brisbane CBD core has a combined current maximum capacity of just over 40 trains each way per hour (i.e. 80+ trains per hour in total). Currently, the vast majority (circa 80%+) of these paths are utilised in delivering the AM one-hour morning peak timetable, implying, that were there sufficient train sets available (as could well be the case once all New Generation Rollingstock is commissioned), additional services could be provided.”¹⁷

This estimate of capacity for 2019 was the same as in 2013 when only 65 peak 1 hour services were operated¹⁸ due to limits on the available train fleet that consisted of about 95 six-car city trains. This information indicates that each six-car train could operate 0.7 services in the morning peak one hour across the CBD cordon on average.

As at October 2020, the peak number of trains operated in the morning peak 1 hour was about 72 trains per hour¹⁹ indicating the deployment of NGR rollingstock has indeed permitted expansion of train services towards the capacity of 80+ indicated above.

4.2 CRR Business Case Demand Forecasts to 2026

The CRR business case projected that the peak two hour inbound rail passenger demand was projected to grow from 35,500 passengers in 2015 to 68,800 passengers in 2026 an increase of 94% or an annual growth rate over the period of 6.2% per annum.²⁰

This projected growth rate is considerably higher than recent experience of growth in daily rail passengers of 1.6% per annum. According to the Business Case report, the estimated contributing factors to the projected annual growth rate of 6.2% were:

- (i) population and employment growth (50%);
- (ii) improved rail, more frequent, services (15%); and
- (iii) parking charges, road congestion, lower rail fares etc (35%).²¹

However, before COVID-19, the historical growth rate of population (and employment) growth was 1.7% per annum as described above, about the same as overall rail passenger growth, and well short of the 3.1% p.a.²² attributed to population and employment growth in the overall growth rate. Further, government

¹⁷ Deloitte Access Economics. 2019. *Making the Case for a Dedicated Freight Rail Link from Acacia Ridge to the Port of Brisbane*. Refer page 13. Refer [<https://prod.portbris.com.au/getmedia/b793e8b5-edee-4945-850f-6feec8835720/DAE-Connecting-Inland-Rail-to-the-Port-of-Brisbane.pdf>].

¹⁸ South East Queensland Public Transport Infrastructure Expert Panel. 2013. *Strategy Review Report*. September. Page 41.

¹⁹ Translink Central Station timetable information. 75 train services includes 3 Nambour services.

²⁰ Business Queensland. 2017. *Cross River Rail Business Case*. August. Table 6.3.

²¹ Ibid. Figure 3.15.

²² Calculated as half of 6.2% p.a.

projections for national population growth, that relies on net in-migration, has a poor outlook in the short term²³.

When CRR opens, an expansion of rail capacity of 71% was estimated by the CRR business case to be required to cater to the projected peak demand increase mentioned above, as shown in Table 4.²⁴

It is also shown in Table 4 that with the current City train fleet of 75 six-car NGR trains and 77 six-car older trains, an increase in morning peak hour train services of 47% using 34 more trains may be possible. This estimated increase in services of 47% is unlikely to be able to cater for the projected demand by the business case at 2026 without purchasing new trains. Thus, the contribution of the increased train frequency of 15% to the projected growth rate would also be less than assumed.

Overall, it is likely that the average growth rate of demand from 2015 to 2026 would have been in the range 2 – 3% p.a. not 6.2% per annum, even without the effects of COVID-19.

Table 4. Indicative Estimate of Increased Train Services Possible with CRR and Current Train Fleet

Item	2020	2026
Train fleet (six-car equivalent)		
City network trains ²⁵	77	77
NGR	75	75
Total fleet	152	152
Expansion of CBD maximum morning peak 1 hr train paths	-	71%
Peak morning 1 hour services 2020 as per timetable excluding Nambour services (assumed to be constrained by capacity)	72	-
Estimated peak morning 1 hour services 2026 excluding Nambour services with 71% increase in capacity due to CRR	-	106
Increase in peak morning 1 hour services 2020 to 2026	-	+47%

Source: Authors' estimates

²³ Refer [<https://www.businessinsider.com.au/migration-australia-population-growth-federal-budget-projections-2020-10>] accessed 23 October, 2020.

²⁴ Business Queensland. 2017.Op. Cit. Figure 6.11.

²⁵ Excludes inter-city trains operating to Nambour.

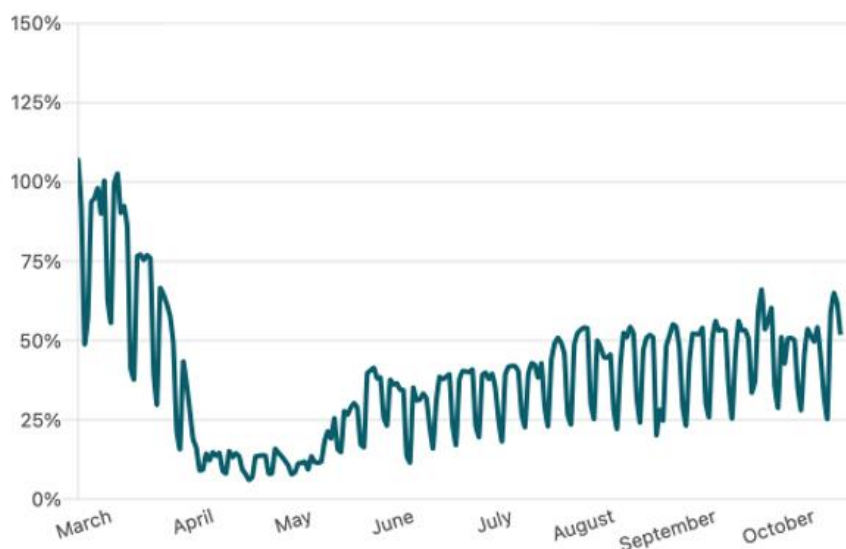
4.3 Current Effects on Demand of COVID-19

After COVID-19 started to impact Australia in March 2020, recent trends show current rail demand is around one third below pre-COVID 19 levels as shown in Figure 1. The effect of the Covid-19 pandemic not only looks likely to have affected rail passenger demand and commuting patterns - with the emergence of widespread working from home, and reluctance of workers to travel in public transport - in the short term, but also for several years in the future.

More Australians want to work from home an average of two days per week after the COVID-19 pandemic, according to a survey by the University of Sydney Business School and 75% of workers think employers will support future work from home plans.²⁶ This is supported by surveys by L.E.K. Consulting which asked whether workers new to working from home would like to continue the arrangement or return to their prior workplace after the pandemic has eased. These results have stabilised following three months of growth.²⁷

In the medium to long term, rail patronage would likely recover dependent on the extent of growth in the economy, employment levels, and employer policies on remote working, and the dynamics of the central city property market that was already under stress prior to COVID-19 (Refer Section 5.3).

Figure 1. Recent Effects on CBD Rail Passenger Demand



Source: COVID-19 Mobility trends dashboard – [<https://explore.veitchlister.com.au/covid-19-dashboard/>] accessed 21 Oct 2020.

Rail passenger demand needs to continue to be carefully monitored and the appropriate level of train services provided in response.

²⁶ Refer [<https://www.sydney.edu.au/news-opinion/news/2020/09/28/australians-want-to-work-from-home-more-post-covid.html>] accessed 20 October, 2020.

²⁷ Refer [<https://www.lek.com/insights/ei/employees-preference-working-home-has-reached-new-normal>] accessed 20 October, 2020.

5. What are the Risks to Achievement of Desired Long-Term CRR Outcomes?

5.1 Lower than Planned Train Frequency

The CRR project promises to allow more trains to run more often – a ‘turn up and go’ approach. In the 2017 Business Case it was stated that CRR would be designed for nine-car trains (although most of the rest of the network stations can currently only handle six-car trains) and ‘allows for a doubling of rail demand by 2026 and almost a tripling of demand by 2036.’²⁸

However, the 75 six-car NGR trains with the older six-car trains were estimated above to increase morning peak one hour train services through the CBD by 47%, not 80% as forecast by the 2017 CRR Business Case.

Further, on current passenger demand trends due to COVID-19 and the effects noted in Section 5.3 below, daily rail demand to the CBD in 2024 when CRR is scheduled to open is likely to be no higher than in 2019. The proportion of the morning peak period of daily rail demand is likely to be lower than in 2019 due to potentially continued ‘social distancing’ and remote working.

Even so, running 47% more morning peak hour train services would require, as shown in Table 4, the operation of 34 additional trains with an approximate annual operating cost of about \$2 million per six-car train or a total of \$68 million per annum, but with no more patronage or revenue than in 2019.

Although the CRR project proposed the purchase of sufficient trains to operate an expansion of peak hour train services of 80% by 2026²⁹, given the dampened outlook for CBD rail demand purchase of new trains can be delayed until the post-COVID passenger demand trends are better understood.

However, the net effect of lower peak hour train frequency than planned by 2026 and the competition for certain travel segments from the Brisbane Metro, that is expected to be operational by the mid 2020s, may also reduce rail passenger demand. On the other hand, Brisbane Metro is also complementary to CRR in that it may enhance rail passenger access to, and distribution from, some stations in pockets of the Central Area.

Overall, it appears that CRR’s ‘turn up and go’ offering in 2026 would be less than proposed in the Business Case.

Providing a lower train frequency in response to lower demand could have a negative effect on rail passenger demand as frequency is key factor encouraging increased demand.

²⁸ The daily rail demand on the SEQ network was estimated to grow from 177,000 rail users in 2015 to 560,000 in 2036. Table 6.2 CRR Business Case 2017.

²⁹ Likely requiring about 31 new trains plus replacements for the older and aging fleet.

5.2 Desirable SEQ Freight Outcomes Constrained

The current CRR reference project does not seek to directly provide more rail freight capacity by overcoming the current constraint south of Dutton Park station where there are currently only three railway tracks.

The tunnel structures proposed for CRR are just north of Dutton Park Station. This means that the CRR project will provide a total of five rail tracks north of Dutton Park station that must converge into the existing three tracks south of the station.

An earlier version of the CRR business case proposed a longer tunnel than in the current Reference Project that would have commenced south of Dutton Park station and avoided the bottleneck.

This problem was identified by a submission by the Rail, Bus and Tram Union (RTBU) in 2017³⁰ where they stated:

“This section of the network is already severely constrained and nearing its capacity.

As a result, a new rail network capacity constraint will develop on the southern corridor that will need to be addressed in the future if the revised Project is to achieve its theoretical capacity. This may take the form of an extension of the tunnel to Yeerongpilly,³¹ or further south of Yeerongpilly. Alternatively, there may be a need for future resumptions or resumptions of significant additional corridor width between Dutton Park and Yeerongpilly, or even as far as Salisbury.”

The 2017 CRR business case indicates that a new rail freight link to the Port of Brisbane will be needed to connect to the Melbourne to Brisbane Inland Rail in future although this link is unlikely to materialise until after 2040. In the meantime, rail freight and passenger train operations would be constrained south of Dutton Park.

Although rail’s share of the port’s freight is very low at 2.5% of container traffic, the low rail modal share is due to conflicts between passenger and freight rail operations, the significant absence of capital investment in rail freight infrastructure in Queensland, and the competitive pricing, reliability and transit time of freight truck operators.³²

The investment in a dedicated inland rail route to the Port of Brisbane plus associated upgrades to overcome the capacity constraint south of Dutton Park was assessed recently by Deloitte to lay the basis for rail to attract up to 20% of total container freight as is enjoyed by the Ports of Sydney and Melbourne.³³

³⁰ RTBU 2017. RTBU Submission to the CRR Request for Project Change 2017. March.

³¹ As was proposed in the original CRR reference project design.

³² Deloitte Access Economics. 2019. Making the Case for a Dedicated Freight Rail Link from Acacia Ridge to the Port of Brisbane. Refer Chart 2.6 and pages 12 – 13. Refer [<https://prod.portbris.com.au/getmedia/b793e8b5-edee-4945-850f-6feec8835720/DAE-Connecting-Inland-Rail-to-the-Port-of-Brisbane.pdf>].

³³ Ibid. Chart 3.1.

Deloitte identified the opportunity to preserve land requirements for a Cross River Rail (long tunnel) surfacing at Yeerongpilly, and for future additional surface tracks to Salisbury, that would facilitate a connection to the Inland Rail at Acacia Ridge. Two options for the rail freight connection between the Port and the Inland Rail were identified:

- (i) in the short to medium term, using new rail capacity between Salisbury and the Port via the existing rail corridor; or
- (ii) a dedicated new rail alignment between Salisbury and the Port.

Given that construction of CRR's short tunnel has already commenced, an alternative, practical solution to achieve option (i) would be to acquire the necessary rail right of way between Dutton Park and Salisbury that the Queensland Government sold in 2013.

Providing for rail freight capacity to the Port, in line with the Inland Rail project, is an important adjunct to the CRR project and needs further consideration.

5.3 Changing Property Markets and Weakened Market for Public Transport

The property market in the Brisbane CBD has exhibited vulnerability to several factors in recent years including the State's sluggish economic performance and the impacts of large developments such as Queen's Wharf disrupting the attractiveness of existing office and retail space. A recent assessment of the demand for Brisbane CBD office space indicated that the overall vacancy rate would remain above 10% to 2023/2024 slightly down from 12.5% in January 2020.³⁴

The CBD is a compact and relatively dense area with constrained private vehicle access that historically has been a major driver of public transport demand. In 2011, the CBD and the CBD Frame³⁵ contained 18.4% and 16.2% of all jobs respectively in the Brisbane Local Government Area.

As a result, the Brisbane CBD with the surrounding suburbs, has been a key attractor of regional public transport trip-making. Using a CBD definition that included the main residential suburbs of Spring Hill and Fortitude Valley, the CBD represented 23.9% and 43.8% of daily and morning peak two hour period³⁶ regional public transport travel respectively in the region.³⁷

³⁴ Refer [<https://www.commo.com.au/news/2019/09/30/outlook-positive-brisbane-cbd-office-market/1569802394>]. Accessed 18 October 2020.

³⁵ Includes South Brisbane, Fortitude Valley, Woolloongabba, Paddington-Milton, Newstead-Bowen Hills and Spring Hill.

³⁶ The morning peak period is more pronounced than the evening peak period because of the overlap of education and commuter peak travel. Public transport fleet requirements are therefore usually determined by AM peak period demand.

³⁷ Transport and Main Roads. 2010. *South East Queensland Travel Survey 2009*.

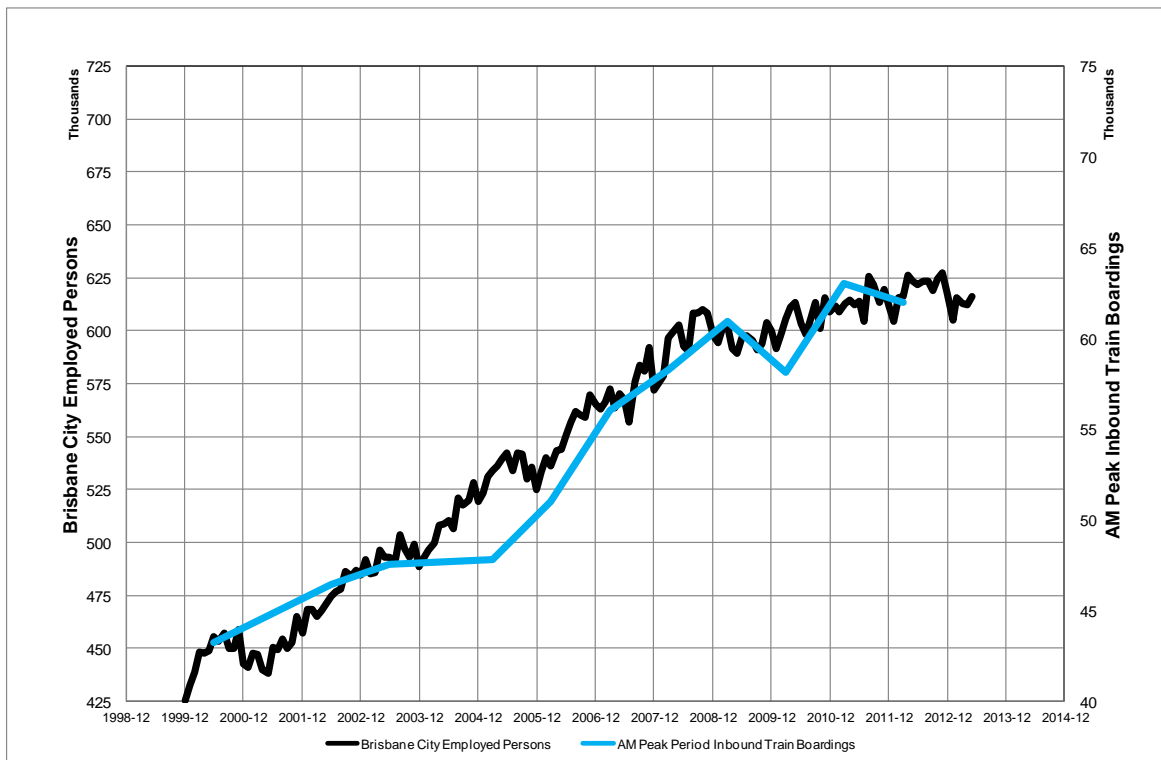
Key factors influencing recent growth in public transport demand have been population and employment growth.

Train services facilitate commuter travel from outlying parts of the region to the CBD and suburbs located along the radial rail lines. Commuting patterns in SEQ have responded to the radial focus on the CBD.

Journey to Work data for 2011 shows that the suburbs with frequent and fast train services within 30km of the Brisbane CBD exhibit a high CBD-orientation with more than 10% of their jobs located within the CBD and with over 70% of their commutes to work made by train.³⁸

A slowing in overall employment growth in Brisbane from 2009 to 2013 is correlated with a slowing in rail passenger growth observed in the morning peak period as shown in Figure 2.³⁹ These trends continued from 2011 to 2016 when 4,584 new jobs, or about 4% of total CBD jobs, were added to the Brisbane CBD and South Brisbane, with 68% of these new jobs associated with private car use and not public transport use.⁴⁰

Figure 2. Brisbane City Employed Persons and AM Inbound Train Passengers



Source: Expert Panel report 2013, Figure 5.2 based on data from TMR, July 2013

³⁸ South East Queensland Public Transport Infrastructure Expert Panel. 2013. *Strategy Review Report*. September. p32 –33.
³⁹ Rail fare growth would have also been a factor. Fares grew rapidly between 2010 and 2015. But were were frozen in 2016 and substantially reduced in 2017.
⁴⁰ Based on an analysis of the Australian Bureau of Statistics Journey to Work data by [https://chartingtransport.com/2018/04/25/how-did-the-journey-to-work-change-in-brisbane-between-2011-and-2016/] accessed 18 October 2020.

The CRR itself and the Brisbane Metro project also focus on near CBD hubs at the expense of the CBD. Although these hubs, centred around stations, are intended to enhance public transport, including rail use, they also are easier to access by private vehicles, which in the few years after the COVID-19 pandemic, appears to be more attractive than in the period before COVID -19.

Ongoing monitoring of the CBD and adjacent area property markets is also required to assess the potential demand for CRR services.

5.4 Prospects for Station Precinct Developments

The CRR project was projected to stimulate property development opportunities around station precincts ...'Each station sits at the centre of a precinct that is undergoing or will undergo significant redevelopment over the next 20 years. Cross River Rail will boost the scale of planned redevelopment, shorten timeframes, improve the quality of outcomes and revitalise surrounding neighbourhoods.'

In the 2017 Business Case there was a lot of consideration for the new stations – Boggo Road, Woolloongabba, Albert Street, Roma Street and Exhibition – to provide property value uplifts.

Given the recent COVID-19 experience and the shift to working from home, and the impacts on the CBD office accommodation discussed above, the outlook for property development is weaker than in the past and less certain. Potential postponement of developments results in a risk for achieving the potential development benefits of the CRR project and, at the very least, delay.

The development of government office accommodation at Woolloongabba, which is understood to be still proceeding, could result in the movement of considerable government office space from the CBD, further negatively impacting the CBD office space market.

The precincts provide a generational opportunity to create major inner-city centres that complement and build on the CBD. However, COVID 19, changing work patterns and major developments at Queensland Wharf and in the Valley, North Shore Hamilton and West End will compete for capital and residential, commercial and retail space.

The transfer of the precincts into the Future Fund managed by the Queensland Investment Corporation (QIC) also complicates Governance and decision making. If QIC is not proactive with development of the CRR station precincts due to the current circumstances of the property market, there would be uncertainty on the timing and type of the developments that the precincts will ultimately deliver.

Is the Governance and ownership of the CRR precincts conducive to delivering the best outcome in terms of urban design and city building?

Should consideration be given to providing additional incentives for property developments around a limited number of high-volume precincts, such as Woolloongabba, serving office, commercial, retail, recreational etc markets?

5.5 Governance Challenges

There has been much research over the years into the reasons Mega Infrastructure projects fail. Ineffective, confusing and misaligned governance is often identified as a major contributing factor to sub-optimal performance. In delivering Mega Infrastructure projects, temporary, stand alone, Special Purpose Vehicles (SPVs) such as the CRRDA are not unusual structures to provide overall accountability, programme management, and sound governance.

Research has shown however, that misalignment and a lack of clarity around roles and responsibilities between the Project Sponsor, the Owner, the intermediary Client and the Operating entity increase risk, especially if there is optimism bias and the project is considered too big to fail and too costly to change, modify or slow down.⁴¹

With CRR's multitude of overlapping roles and responsibilities and the recent and sudden changes to governance (removal of the non-government members of the CRRA) and significant changes to project scope, there are early and worrying signs that governance is lacking.

A cursory look at current governance, roles and responsibilities shows the complexity and various grey areas of responsibility – there is the CRRA reporting to the State Development Minister; the Department of Transport and Main Roads, Translink, and Queensland Rail reporting to the Minister for Transport; and the Treasurer being responsible for QIC (the re-development of the precincts). CRR also has a range of procurement strategies – PPPs, alliance contracts, managing contracts as well as private companies implementing significant and complex new signalling infrastructure and technology.

One thing is certain, if things do go wrong, the Transport Minister will have to answer all the questions – that is the stark political reality.

Added to this is the inherent and secretive nature of the SPV where the authority is not subject to the normal scrutiny of the general government sector (exempted from RTI and Judicial Review). This does not allow relevant and timely information to be released, analysed and scrutinised.

Good governance can sometimes come second in the race to deliver Mega Infrastructure Projects.

⁴¹ J. Denicol, A. Davies and I. Krystallis. 2020. What Are the Causes and Cures of Poor Megaproject Performance? A Systematic Literature Review and Research Agenda. The Bartlett School of Construction and Project Management, University College London. UK.

Are current governance arrangements for CRR effective and adaptable in managing such a complex project with so many interdependencies?

Are the strategic objectives of the Project Sponsor, the Owner, the intermediary Client and the Operating entity aligned? Where is the single point of accountability for CRR?

6. What are the Potential Budget Implications?

Based on the above the various cost impacts on the government budget due to the unfavourable materialisation of implementation risks and also recurrent financial obligations to the Government are set out in Table 5.

Table 5. Indicative Budget Impacts due to CRR

Item	\$ million
During implementation	
Boggo Road station, detailed design and new cost	+ some \$100 millions
Cost due to construction delay (per one year)	\$ 43
NGR braking and traction upgrades to negotiate CRR grades and curves	Likely significant
<i>Sub-total by completion of implementation</i>	<i>\$ 300 - \$500+</i>
Ongoing operational obligations (p.a.)	
PPP availability payment including maintenance	\$200 p.a.
Operating increased train frequency = + 47%	\$68 p.a.
<i>Sub-total</i>	<i>\$268 p.a.</i>
Other in near term	
Purchase rail Right of Way (Salisbury to Acacia Ridge)	Moderate, likely some \$10 millions
Overcoming surface rail constraints on SEQ rail network affecting achievement of CRR ultimate capacity	Likely significant but has not been quantified

Source: Authors' estimates

Ongoing monitoring is required of the potential budget impacts of changes in the CRR project and the operating environment.

7. What are the Opportunities to Reduce Risks and Enhance Outcomes?

7.1 Options to Reduce Cost

Considering the potential medium to longer term reduction in public transport demand to the Brisbane CBD, options to reduce cost are worth consideration.

Options could include:

- Reduce the scope or scale of some of the station developments, allowing for later augmentation. In addition, rationalising the variations proposed for the Boggo Road and Dutton Park stations could result in significant cost savings in the short term;
- Match the number of trains provided to the demand, being careful not to reduce frequency, as this is a primary determinant of patronage;
- Increase the price of fares for travel to and from the CBD zone recognising the improved accessibility and travel time savings provided by CRR;
- Defer further NGR train purchases until projected further demand is better understood post-COVID;
- Reassess the approach to the delivery of the precincts in terms of land use, development, financing and delivery models; and
- Provide incentives for property developments around a limited number of high-volume precincts, such as Woolloongabba, serving office, commercial, retail, recreational etc markets.

7.2 Reduce Integration Risk

As discussed in Section 3.1, successful and timely integration should actively involve QR as it is responsible for operations as part of the delivery process.

7.3 Increase Train Frequency

As described in Section 5.1, CRR's 'turn up and go' offering in 2026 would be significantly less frequent than planned. Given that CBD rail demand is not likely to experience significant growth in the near future, it would be possible to increase train frequency by operating a portion of the peak hour train services using 3 x car trains. Careful timetabling would be needed to respond to demand by line and individual time periods within the overall peak period.

7.4 Defer Construction

Construction risk is a major issue for tunnelling and underground station infrastructure. For example, the Boggo Road area has site constraints resulting in tight curves and challenging vertical alignments.

If the final cost of the Boggo Road station at the location decided in 2019 blows out to a level that is considered unaffordable, it would appear the opportunity remains to adopt the TSD Consortium's non-conforming offer that shifted the Boggo Road station closer to the PA Hospital and remove the Dutton Park Station.

The CRR project is designed to cater for nine-car trains, however only six-car trains will be in use for some time, so platform upgrades at stations on the SEQ rail network could be retrofitted in the future as needed.

7.5 Accommodate Freight

As discussed in Section 5.2, there remains the opportunity for the Government to reacquire the rail right-of-way between Dutton Park and Salisbury. New infrastructure and right of way between Salisbury and Acacia Ridge may also be needed to connect with Inland Rail, but this would be common to the current CRR project configuration with short tunnel and the CRR with long tunnel, as proposed previously.

8. Recommendations

It is recommended that:

1. Given the recent changes in governance with the removal of the non-government members of the CRRA, the new Minister should immediately commission an independent review of CRR, ensuring the Commissioner has the necessary investigative powers to assess the overall performance of the project.
2. The investigation should also include a full technical review, identification of major risks, as well as confirmation of the total direct, indirect, and associated capital costs for the project and the whole-of life and operating costs for the project.
3. The investigation should also identify and recommend ways to better integrate the planning and delivery of other associated infrastructure projects such as inland rail and inner city freight corridors, Brisbane Metro and major urban redevelopment projects such as Queens Wharf Brisbane and the proposed Eagle Street redevelopment.
4. The investigation should also consider whether current governance arrangements are best suited to the evolving nature of the project as well as mechanisms to ensure ongoing reviews of the project. This includes the concept of “pop up” governance such as an ongoing, independent and appropriately-powered Inspector-General to develop and implement an ongoing assurance programme for the Minister for Transport as the Project Sponsor.

About the Review team

The review comprised two experienced advisers:

Professor Phil Charles, consultant and Director Transport Futures Institute with extensive experience as an adviser on transport strategy and planning projects.

Philip Sayeg, consultant and Managing Director of Policy Appraisal Services with wide ranging Australian and international experience in urban and regional transport.
