

Gold Coast Light Rail: Stage 3A

23 August 2019



Proponent

Queensland Government

Location

Gold Coast, Queensland

Capital cost

\$709 million (P90, outturn)

Indicative timeframe

Planning: Q4 2019

Construction: Q1 2020

Project completion by Q2 2023

1. Evaluation Summary

The **Gold Coast Light Rail Stage 3A project** has been added to the Infrastructure Priority List as a **Priority Project**.

Rapid population growth on the Gold Coast is increasing demand for transport within the region and more broadly between the Gold Coast and Brisbane, and the rest of South East Queensland. The Queensland Government expects the population of the Gold Coast to grow by 55% to 928,000 people by 2041. The Gold Coast remains heavily car dependent, despite some increases in public transport trips in recent years.

Infrastructure Australia has recognised that the projected population growth will lead to congestion in the southern areas of the Gold Coast before 2031, and has listed Broadbeach-Burleigh Heads public transport connectivity as a Priority Initiative on the 2019 Infrastructure Priority List.

To address these issues, the Queensland Government and City of Gold Coast are proposing to extend the existing 20.3 kilometre Gold Coast Light Rail line between Helensvale and Broadbeach South to Burleigh Heads. This project, known as Stage 3A, would replace existing bus services between Broadbeach South and Burleigh Heads with light rail services and implement a complementary urban renewal and economic development strategy in the light rail corridor.

The strategic case for the project is largely dependent on the realisation of urban renewal and increased urban density. Furthermore, the strategic case depends on the project's ability to shift travel from cars to light rail. This typically requires the support of a proactive mode shift policy since travel times will be similar to existing bus services, even though light rail services should be more reliable and comfortable for passengers.

Overview	Context	Problem	Options	Proposal	Strategic Fit	Economic, social and environmental value	Deliverability
----------	---------	---------	---------	----------	---------------	--	----------------

3. Problem description

The proponent has identified five underlying issues, which the proposed project seeks to address:

1. The continuation of current urban development trends would increase pressure to accommodate growth through less sustainable urban expansion.
2. Employment opportunities in the southern Gold Coast are limited and have poor connectivity.
3. A high level of car dependency is placing pressure on the road network and will not support urban consolidation.
4. There are a limited number of road transport corridors, each having limited transport or expansion capacity.
5. Existing bus services do not have the level of accessibility, reliability or appeal to enable a significant mode shift or urban consolidation.

The proponent has estimated that the cost of congestion for the Broadbeach to Burleigh Heads corridor is \$38 million per year in 2018, increasing to \$145 million per year by 2041. Bus delay costs are much smaller, but are also expected to increase from an estimated \$550,000 in 2018 to \$2 million in 2041.

The proponent estimates that car travel times from Burleigh to Broadbeach will remain relatively stable from 2018 to 2041, as improvements to the M1 Pacific Motorway offset the impacts of trip growth. However, car travel times for journeys from Burleigh Heads to Southport and Gold Coast University Hospital are expected to increase by around 30% from 2018 to 2041. This indicates that road congestion could worsen more rapidly outside of the direct project corridor. Road congestion to the north of Broadbeach South appears to be influenced by trips starting within the project corridor.

The main problem with the two existing bus services in this corridor, route 700 and route 777, is noted to be journey time reliability. On average, approximately 83% of route 700 services run on-time and 85% of route 777 services run on-time (no more than two minutes early or six minutes late). During the afternoon peak period this reduces to 67% for route 700 and 54% for route 777 as road network congestion increases. In comparison, over 99% of light rail services run on-time.

The proponent has stated that urban renewal cannot be achieved between Broadbeach South and Burleigh Heads because of poor public transport accessibility. The base case population and employment projections have been adjusted by the proponent to reflect market conditions resulting in relatively low levels of growth. The proponent's base case population projections are lower than the Shaping SEQ 2017 targets, while the base case employment projections are slightly higher.

Confirming its not about public transport..its about cramming more people in. and building LR BEFORE they arrive !!

4. Options identification and assessment

The options assessment has covered a wide range of options at a strategic level. Eight options were evaluated using a qualitative multi-criteria analysis (MCA). These included:

- Road options — road pricing, road space reallocation, road upgrades of the Gold Coast Highway
- Bus network upgrades
- Light rail options — to connect to heavy rail at Robina, and to connect from Broadbeach South to Coolangatta and the Gold Coast Airport
- Bus rapid transit
- Heavy rail extension to the Gold Coast Airport.

Road pricing and road space reallocation were not progressed, the first because of complexity and the need to be addressed at a larger spatial level than the project corridor. The second was considered to be part of bus and light rail options, as these options would require some road space reallocation.

The remaining six options were progressed to a quantitative MCA which included estimated costs and a largely subjective analysis of other impacts. A heavy rail extension to Gold Coast Airport and light rail connection to Robina were removed at this stage. These options should have been evaluated using a more detailed quantitative framework since they are noted in planning strategies and could have significant interaction with a future light rail service to Gold Coast Airport.

Overview	Context	Problem	Options	Proposal	Strategic Fit	Economic, social and environmental value	Deliverability
----------	---------	---------	---------	----------	---------------	--	----------------

Based on the core scenario¹, the proponent’s stated net present value (NPV) for the project is \$56 million, with a benefit-cost ratio (BCR) of 1.1, using a 7% real discount rate and P90 capital cost estimate.

The project **cost estimates** are consistent with outturn costs achieved on Stage 1 and Stage 2 and the deliverability model for the project appears appropriate noting that the proponent has experience delivering the first two stages of the light rail network. However, the delivery model could be strengthened with appropriate public transport policies being put in place to encourage a higher proportion of light rail trips. The proponent has also undertaken a rigorous risk review noting recent construction issues experienced on comparable projects. On this basis, the project has a sound deliverability case. **Careful. This just means that it can be built for the money. Not that project has any benefit**

The proponent’s business case has found that only a small proportion (around one-quarter) of the first-round transport benefits are attributed to public transport users. The remaining benefits are primarily resulting from road decongestion and the redevelopment of land within the proposed light rail corridor. **Infrastructure Australia believes these benefits are disproportionately high and would expect public transport benefits to be higher for a project of this size and nature.**

Overall, Infrastructure Australia considers the total benefits of the project to be close to its total costs. The project’s strategic merit will be dependent on the appropriate land use changes being realised and mode shift to light rail being achieved, which will necessarily require proactive government policies, including strongly-focussed mode shift and traffic management policies.

So, without cramming more people in, the project doesn’t stack up!

2. Strategic context

The Gold Coast is Australia’s largest non-capital city. In 2018, the Gold Coast was home to around 600,000 people and, as a major tourism destination, hosted around 12 million visitors.

To manage the anticipated population growth and reduce urban sprawl, the South East Queensland Regional Plan (Shaping SEQ) 2017 seeks to encourage more sustainable urban development patterns in the Gold Coast and defines an urban consolidation target for the Gold Coast of 80% by 2041, compared to an overall South East Queensland regional target of 60%. The Gold Coast City Transport Strategy 2031 seeks to encourage more balanced travel choice through a range of policies and projects, including public transport infrastructure and supporting policies, including a policy for car parking.

Shaping SEQ anticipates the population of the Gold Coast increasing by approximately 60 per cent between 2016 and 2041 (to 928,000 people), making it one of the fastest growing areas in Queensland. Under the Shaping SEQ projections, the population of the Gold Coast would be increasing at an average annual growth rate of 1.9%, which would be faster than the Queensland average annual growth rate of 1.6%. To support the forecast population growth, approximately 170,000 new jobs are proposed within the Gold Coast region by 2041.

While providing more jobs in the Gold Coast will help to reduce the overall travel demand, the Gold Coast will continue to have strong links to Brisbane, with a large proportion of the population commuting to Brisbane each day. The Queensland Government is continuing to plan for this growth through strategic infrastructure investments in the M1 Pacific Motorway Corridor.

Buses currently provide public transport services in the southern part of the Gold Coast, including high-frequency bus services connecting to the Gold Coast Airport (service 777), Tweed Heads (service 700), and Varsity Lakes rail station (service 765) which provides a connection to heavy rail services towards Brisbane.

The Gold Coast Light Rail network currently operates between Helensvale and Broadbeach. Stage 1, between the Gold Coast University Hospital and Broadbeach, commenced operations in 2014. Stage 2, which runs from the hospital to Helensvale rail station, commenced operations in 2017.

Despite having a comprehensive public transport network, the Gold Coast has high levels of car dependency, with 88% of trips by private vehicle and less than 5% by public transport. Without action, the proponent has estimated that private car trips could increase significantly by 2041, while the public transport mode share would remain at around 5%.

¹ The core scenario relates to the ‘Total first-round transport benefits’ as set out in the table on Page 7.

Overview	Context	Problem	Options	Proposal	Strategic Fit	Economic, social and environmental value	Deliverability
----------	---------	---------	---------	----------	---------------	--	----------------

A rapid economic assessment was undertaken on the remaining options. However, all options were confined to the Broadbeach South to Burleigh Heads corridor, whereas previous options considered the corridor to Gold Coast Airport/Coolangatta. The rapid economic assessment assumed land use changes would occur from both light rail and bus rapid transit, but would not occur as a result of road or bus projects. It was surprising to observe the assessed bus rapid transit option having a higher capital cost than the comparable light rail option. Overall, the proponent's rapid economic assessment found that light rail performed the best economically and the bus option the poorest.

This is "yes minister" code for "we dont believe you"

Despite being the poorest performing option, the bus option was progressed to the detailed business case and was assessed against a light rail option from Broadbeach South to Burleigh Heads. Bus rapid transit and road upgrades were not analysed further beyond the initial assessment.

Given the investment decisions are incrementally extending an existing light rail network, it would be more robust to identify the scope, and consider the benefits, of a full light rail line within a program business case, with subsequent investment decisions made for each program stage. The potential overall extent of the light rail line is briefly discussed in the proponent's business case, with reference to the TMR Integrated Regional Transport Plan for South East Queensland, 1997 and the Gold Coast Rapid Transit Concept Design and Impact Management Plan, 2009. An extended light rail network is also discussed in the Gold Coast City Transport Strategy 2031. However, an overall program business case has not been provided to Infrastructure Australia.

Overall, the level of quantitative analysis for shortlisting options was very limited for a project of this size.

That is - you haven't done your homework

5. Proposal

The project proposes to extend the Gold Coast Light Rail service southwards from Broadbeach to Burleigh Heads. The project scope includes:

- a 6.7 kilometre extension of the light rail line from Broadbeach South station to Burleigh Heads, including eight new light rail stops
- five new light rail vehicles (and stabling facilities for these vehicles)
- 24 at-grade signalised intersections
- a service that would operate every 7.5 minutes on weekdays between 7am and 7pm and every 10 minutes between 7am and 7pm on weekends
- a light rail journey time of up to 16-17 minutes between Broadbeach South and Burleigh Heads
- truncation of bus routes 700 and 777 at Burleigh Heads after the light rail extension commences service.

The project also involves substantial levels of urban renewal, including potential land use zoning changes within the Stage 3A corridor. The estimated population increase attributable to the project within the light rail catchment by 2041 is 26,000 additional people and 5,760 additional jobs.

6. Strategic Fit

Infrastructure Australia has recognised that population growth in southern areas of the Gold Coast will lead to congestion before 2031, and has listed Broadbeach-Burleigh Heads public transport connectivity as a priority initiative on the 2019 Infrastructure Priority List.

The proposed project has strong alignment to the overarching planning policies, which aim to increase the public transport mode share for travel within the Gold Coast, and between the Gold Coast and Brisbane. If the land use changes proposed within the business case are achieved, the project would also have a strong alignment to the urban consolidation aspirations of the South East Queensland Regional Plan (Shaping SEQ) 2017. However, Infrastructure Australia notes that if all the proposed land use changes proposed in the business case occur, urban congestion in the southern Gold Coast would increase after the project is completed. This would be a contrary outcome to the desired effects of reducing urban congestion.

That is..... "why are you proposing something that's not going to achieve its goals?"

Overview	Context	Problem	Options	Proposal	Strategic Fit	Economic, social and environmental value	Deliverability
----------	---------	---------	---------	----------	---------------	--	----------------

Stage 1 and Stage 2 of the Gold Coast Light Rail travel through higher density areas and activity centres, whereas the land use around Stage 3A is less dense with fewer activity centres. As a result passenger demands are forecast to be lower in Stage 3A than in Stage 1 or Stage 2.

The proposed project would provide better quality public transport services for passengers, with improved on-time running and a higher quality of public transport amenity (both within the vehicles and at stops). Therefore, with appropriate policy measures the project could play a role in a broader strategy to improve public transport mode share.

More broadly, the proposed project has been planned in an integrated manner so that existing bus services would be re-timed to connect to the new light rail stops, with new interchanges at Burleigh Heads and Christine Avenue, Miami. An accompanying integrated land use strategy has been developed to improve urban amenity along the project corridor.

The beneficiaries of the project investment would largely be car driver/road users, with only 27% of the first-round transport benefits being attributed to public transport users. This is a comparatively small proportion of benefits for users and we would have expected to see a higher proportion of benefits directly attributed to project users. Specifically, it would be expected that a public transport project of this scale would be supported by mode shift targets over the evaluation period.

That is, putting in LR without a plan to move people to public transport is madness
7. Economic, social and environmental evaluation

The proponent's stated NPV and BCR for the project ranges from \$56 million to \$685 million, depending on whether the potential impacts of land use changes are included. For the 'first-round transport benefits', where existing land use patterns are assumed to continue, the proponent estimates an NPV of \$56 million and a BCR of 1.1. When the proponent includes land use densification and its effects on transport efficiencies, the stated NPV is \$685 million, with a BCR of 2.0. These results are based on a 7% real discount rate and P90 capital cost estimate.

For the first-round transport impacts, only 27% of the estimated benefits are for the public transport users themselves. Typically, the majority of benefits from an infrastructure project are for the actual users of the new service. However, for this project, the proponent estimated that road users will receive over 70% of benefits. Furthermore, Infrastructure Australia noted anomalies in the underlying demand trip data. While public transport improvements usually help reduce road congestion, the business case suggests that most of the future light rail users are those that currently use the bus services, not car users.

"Move users from bus to LR for 700m ..you must be joking"

Infrastructure Australia considers that the estimated road user benefits are overstated and public transport benefits are potentially understated. A proactive mode shift policy will be crucial to further encourage people to use and benefit from the project.

"Get community onto buses first to remove congestion"

The second-round transport benefits are based on the land use changes and densification forecast by the proponent for the southern Gold Coast corridor. By 2041, the business case suggests that an additional 26,000 people will live in this corridor. However, the business case suggests public transport mode share would only increase slightly with the project – reaching 5.9% in 2041 with the project, compared to 5.3% without it. Unless there is a stronger mode shift to public transport, the project may not address the underlying congestion issues in the southern Gold Coast corridor.

Taking this into consideration, Infrastructure Australia is concerned that the proponent's forecast land use changes, and the benefits from these changes, are overstated. The level of urban renewal that can be achieved from the project will be critical in achieving the benefits of the project, and returning economic, social and environmental value beyond its costs.

We dont even believe your land use figures"

Infrastructure Australia identified some areas of the business case which could have understated the benefits of the project:

- The light rail project would attract people travelling to special events on the Gold Coast (such as sporting and cultural events), which are typically not quantified in the underlying transport demand model. Including these would slightly increase public transport user benefits.
- The value of travel time has been kept constant over time. There may be justification for real wages increasing faster than inflation, and allowing for some of this increase would marginally increase the benefits of the project.

Overview	Context	Problem	Options	Proposal	Strategic Fit	Economic, social and environmental value	Deliverability
----------	---------	---------	---------	----------	---------------	--	----------------

- The proponent used a P90 capital cost estimate (including a higher contingency) in measuring the NPV and BCR. Using a P50 capital cost estimate would slightly improve these results.

The proponent also estimated the possible wider economic benefits (WEBs) of the project. With the methodology underpinning the quantification of WEBs in Australia still under development, the proponent has reported these benefits separately to the transport and land use benefits.

Benefits and costs breakdown

Proponent's stated benefits and costs	Present value (\$m,2019) @ 7% real discount rate		% of total first-round
Public transport user benefits			
Travel time savings	\$62.4		9%
Improved station amenity	\$15.3		2%
Improved vehicle amenity	\$7.0		1%
Improved reliability	\$24.7		3%
Health benefits from walking	\$37.6		5%
Fare resource cost correction	\$45.5		6%
Road user benefits			
Road user travel time savings	\$275.1		38%
Reduced vehicle operating costs	\$117.1		16%
Freight benefits	\$48.5		7%
Reduced crash costs	\$12.1		2%
Reduced environmental externalities	\$27.2		4%
Residual value of assets	\$8.9		1%
Other (environmental externalities, accident cost savings, health benefits)	\$42.4		6%
Total first-round transport benefits	\$723.8	(A)	100%
Second round-transport benefits	\$628.9		N/A
Total first and second-round transport benefits	\$1,352.7		N/A
Wider economic benefits	\$538.7		N/A
Urban regeneration benefits	\$598.6		N/A
Total Benefits¹	\$2,490.0		N/A
Capital costs (P90)	\$536.2		80%
Operating costs	\$131.8		20%
Total Costs¹	\$668.0	(B)	100%
Net benefits - net present value (NPV)²	\$55.9	(C)	n/a
Benefit-cost ratio (BCR)³	1.1	(D)	n/a
NPV including land use benefits	\$684.8		
Benefit-cost ratio (BCR)	2.0		
NPV including land use benefits and WEBS	\$1,822.0		
Benefit-cost ratio (BCR)	3.7		

Source: Proponent's business case

(1) Totals may not sum due to rounding.

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

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

The economic, social and environmental value of the project strongly depends on proactive government policies, including mode shift and traffic management strategies to encourage more

Overview	Context	Problem	Options	Proposal	Strategic Fit	Economic, social and environmental value	Deliverability
----------	---------	---------	---------	----------	---------------	--	----------------

people to use the light rail, and the realisation of urban renewal outcomes. These are essential to the project achieving benefits to the Australian community that outweigh its costs.

On balance, Infrastructure Australia considers this project to have total benefits close to its total costs. **“It’s break even - “do you really have no better community investments?”**

A breakdown of the proponent’s reported capital costs and funding is presented in the table below.

Capital costs and funding	
Total capital cost	\$709 million (P90, nominal, undiscounted)
Australian Government funding contribution	\$112 million (announced November 2018)
Other funding	\$351 million Queensland Government (announced July 2019) \$92 million City of Gold Coast (announced June 2019)

Infrastructure Australia considers that the process for **estimating costs is robust**. The cost estimates have been developed based on a detailed examination of resourcing requirements/quantities, and drawing on experience from Stage 1 and Stage 2 of the Gold Coast Light Rail. The costs have been independently peer reviewed and submitted as part of the business case.

The project’s operating and maintenance costs over a 30 year period have been estimated at \$716 million (nominal, undiscounted), which exceeds the total capital cost of the project.

“One things for sure, you won’t have any savings on cost projections”

8. Deliverability

Stage 1 of the Gold Coast Light Rail was delivered under a Public-Private Partnership (PPP) contract with GoldLinQ as the operator franchisee. Stage 2 was undertaken through a modification to GoldLinQ’s PPP Project Deed. The proponent’s procurement assessment for the delivery of Stage 3A found that a further modification of GoldLinQ’s Project Deed, as opposed to other contractual models, would offer greatest value for money through:

- cost effective procurement processes for the overarching operator contract and downstream sub-contracts, including for construction, rolling stock and systems
- better mitigation of risks during construction, particularly for interfaces with the existing system
- seamless operation of the Gold Coast Light Rail with a single operator for the whole network (“interoperability”)
- assessment and allocation of risk following the same framework currently adopted for Stage 2.

GoldLinQ, the incumbent operator, would undertake the Stage 3A construction works through a design and construct contract, with tailored arrangements for areas of key risk. Infrastructure Australia considers that the proposed delivery model is appropriate given the reasons outlined in the business case.

The approach adopted for assessing and managing project risk was undertaken in accordance with the Queensland Government Department of Transport and Main Roads’ (TMR) Risk Management Framework and the department’s Project Cost Estimating Manual (PCEM). A contingency of approximately \$164 million (23% of the base estimate) has been included in the forecast total cost of the project (P90 costs), which is consistent with PCEM Guidelines.

The proponent’s Risk Management Framework involved a series of risk workshops and risk analysis tools. The risk assessment process included, but was not limited to technical, construction, strategic and design considerations, as well as potential treatments. Overall, the risk assessment and mitigation approach is appropriate and consistent with this stage of business case development, although further ongoing work would be required as part of any delivery and construction process.

Prior to design and construction contracts being awarded, TMR as the project owner will continue to undertake activities such as site investigations and ongoing design refinement to reduce residual risk exposure to major construction elements such as integration with public utilities and plant, investigating contaminated land, and the suitability of existing pavements to carry the required loads.

Overview	Context	Problem	Options	Proposal	Strategic Fit	Economic, social and environmental value	Deliverability
----------	---------	---------	---------	----------	---------------	--	----------------

The proponent is seeking investment from all three levels of government to enable Stage 3A to be fully funded. The expected funding requirement through the delivery and operating phases of the project cannot be offset by incremental farebox revenues alone.

A benefits realisation plan has been developed for the project and it is proposed to be implemented in accordance with the Queensland Government's Project Assessment Framework. The plan summarises project objectives, measurement indicators, beneficiaries, and assessment timeframes. We recommend that the benefits realisation plan should focus on measuring road user benefits given they make up a large proportion of the total benefits. In addition, the benefits realisation plan should investigate the extent to which second-round transport benefits and land use benefits have been realised.

It is evident that lessons learned from Stage 1 and Stage 2 of the Gold Coast Light Rail have been captured in developing the business case for Stage 3A. While the proponent provided some information on the performance of the completed stages, Infrastructure Australia has not been provided with Post Completion Reviews for the previous stages which would help to understand how the actual costs and benefits of those stages have compared to those which were anticipated in their business cases.

The business case includes a benefits realisation plan, but does not include a full Post Completion Review Plan. The proponent has committed to undertaking a benefits management process throughout the project lifecycle and completing a Post Completion Review. Infrastructure Australia encourages the proponent to assess the extent to which expected project benefits and costs have been realised and publish the Post Completion Review to inform the development of future projects, in particular a potential Stage 3B extension.

"If you were so sure its a good idea..why are you not telling us the benefits that you have achieved since 2014 investment ?

Overview	Context	Problem	Options	Proposal	Strategic Fit	Economic, social and environmental value	Deliverability
----------	---------	---------	---------	----------	---------------	--	----------------