

Logan and Gold Coast Faster Rail (Kuraby to Beenleigh)



PURPOSE OF EVALUATION

Committed and funded proposal



EVALUATION OUTCOME

Funded proposal (not eligible for the Infrastructure Priority List)

**ASSESSMENT
FRAMEWORK
STAGE**



LOCATION

South East Queensland

GEOGRAPHY

Fast-growing cities

SECTOR

Transport

OUTCOME CATEGORY

Efficient urban transport networks

PROPONENT

Queensland Government

INDICATIVE DELIVERY TIMEFRAME

Construction start: 2023

Completion by: 2028

EVALUATION DATE

8 September 2022

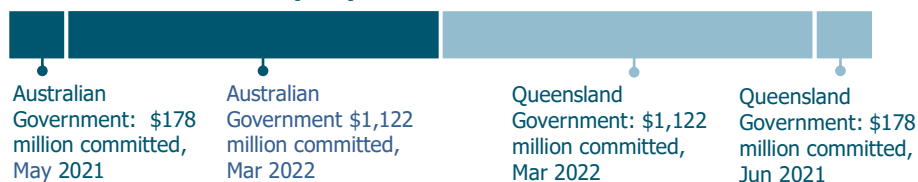


CAPITAL COST

\$2,440 million (P50, outturn)

\$2,598 million (P90, outturn)

FUNDING COMMITTED (P90)



Review summary

Infrastructure Australia has evaluated the business case for **Logan and Gold Coast Faster Rail (Kuraby to Beenleigh section)** in accordance with our Statement of Expectations, which requires us to evaluate project proposals that are nationally significant or where Australian Government funding of \$250 million or more is sought. As the project is fully funded 50:50 between the Australian and Queensland governments, it is not eligible for inclusion on the *Infrastructure Priority List*.¹

Transport demand between Brisbane and the Gold Coast is growing rapidly, fuelled by sustained population and economic growth in South East Queensland (SEQ). The Logan and Gold Coast Faster Rail (Kuraby to Beenleigh) project includes increasing rail capacity, modernised rail systems, upgraded train stations and road access, a new

¹ The Infrastructure Priority List only identifies those proposals which are seeking investment.

stabling facility, level crossing removals and a dedicated active transport facility.

The proponent's business case reports that the costs of the project will outweigh the quantifiable societal benefits, with a Benefit Cost Ratio (BCR) of 0.62 and a net present value (NPV) of -\$816.6 million.² At a 4% discount rate, the BCR increases to 1.1, with an NPV of \$280.3 million, recognising the longer-term benefit profile of rail infrastructure. While the largest share of quantified benefits is attributable to reduced crowding for existing users, due to improved service frequencies, there are some social and operational benefits associated with the project that are not easily quantifiable. For example, the network and system integration benefits are expected to be significant and fundamental to the future development of the broader rail network.

Noting that the cost of the project significantly exceeds the quantifiable benefits, it is possible that the scope is beyond what is required to address the service need. We recommend further assessment of scope inclusions and value engineering to provide greater certainty of the economic feasibility of the preferred solution.

In addition, COVID-19 impacts on public transport patronage have been significant, with a reduction on the SEQ network of approximately 30%.³ Although further consideration of medium to long-term demand analysis could provide confidence around the timing of the project, we note that the project has been identified as critical in supporting the transport task for the 2032 Olympic and Paralympic Games. However, the impacts of the Olympics have not been estimated in the economic appraisal. The business case identifies that delaying the project by 5 years increases the BCR to 0.81, which suggests further refining the project's timing and staging is warranted. Any further analysis should also consider the impact of labour and resource constraints and the current inflationary environment, with the proponent's scenario modelling estimating that a 20% increase in costs would reduce the BCR to 0.51.

The Logan and Gold Coast Faster Rail project responds to a clear infrastructure need and will provide additional transport network capacity, and in particular, rail network capacity between Brisbane and the Gold Coast. We recognise that the upgrades on the Kuraby to Beenleigh section are the first stage in improving capacity and service frequency on the broader corridor, and these benefits will be realised as other projects are progressed, rather than being quantified in the business case for this project. However, we recommend detailed assessment of the scope, timing and costs are undertaken as part of future delivery to ensure that the project will maximise the return on investment.

Project description

The key features of the scope include:

- approximately 18.7 kilometres of two additional rail tracks from Kuraby Station to Beenleigh Station and associated rail systems (overhead lines and traction power). The existing corridor will also be widened and realigned to accommodate new and supporting infrastructure
- signalling, namely European Train Control System (ETCS) L2 between Salisbury and Varsity Lakes
- seven station upgrades and one station relocation to improve accessibility (including disability access compliance), safety and amenity, platform straightening and new pedestrian bridges
- new Trinder Park Station relocated to the straightened section of track to improve train speeds and connectivity to the rail network
- park 'n' ride upgrades, including a new multistorey carpark at Beenleigh Station (with an integrated bus interchange) and extra parking at all stations except Edens Landing station
- upgraded cattle siding at Holmview to accommodate full length cattle trains and reduce impact on the adjacent main line
- new stabling facility at Ormeau with additional capacity
- five level crossing removals
- 16 bridges (duplications or replacements) and one rail tunnel duplication
- active transport corridor along the full alignment and eight new active transport bridges.

The scope does not include constructing infrastructure for the relocation of Loganlea station, procuring additional rollingstock or repurposing of the Beenleigh stabling site as these elements are being progressed separately.

Further information about the project can be found at [Logan and Gold Coast Faster Rail](#).

² Using a 7% real social discount rate and P50 capital cost estimate.

³ A comparison of average weekly boardings between 2018 and 2021, shows public transport patronage reduced by 63% in SEQ. <https://www.brisbanetimes.com.au/national/queensland/how-brisbane-public-transport-explains-covid-s-impact-on-tourism-city-work-20211117-p599oz.html>

Review themes

Strategic Fit	The case for action, contribution to the achievement of stated goals, and fit with the community.
Case for change	<p>The following problems and opportunities are identified in the business case:</p> <ol style="list-style-type: none">1. high growth in demand for travel between Brisbane and the Gold Coast2. track infrastructure does not support the corridor's strategic function and future network requirements3. poor operational speed and efficiency along the rail corridor4. stations no longer meet accessibility, connectivity and level of service needs for customers using the rail corridor5. increase social equity in the community by improving modal choice and connectivity for the socially isolated. <p>Prior to the COVID pandemic, the Kuraby to Beenleigh section of the Gold Coast Rail Line was operating at maximum capacity, with many commuters required to stand on trains for extended periods. Express services were reaching standing room only by Altandi Station, about 18 minutes south of the CBD, each hour of the peak period.</p> <p>Express and all-stops services share a single track through the Kuraby to Beenleigh section, which creates a bottleneck for the flow of trains and restricts service numbers along the entire Brisbane to Gold Coast rail corridor. Express services are given priority, impacting the frequency and reliability of suburban (all-stops) services. In each hour of the peak, two suburban services are delayed by between four and six minutes mid-journey (at Bethania) to enable express trains utilising existing passing loops to pass without delay.</p> <p>Train frequencies are limited by existing infrastructure and signalling to a maximum of 12 trains per hour (tph) between Kuraby and Beenleigh, and eight tph between Beenleigh and the Gold Coast. However, only six tph can operate between Beenleigh and the Gold Coast, as the mixing of services restricts operations by making two to three train paths per hour unusable during peak periods.</p> <p>The <i>Gold Coast rail line and stations improvement: Kuraby to Beenleigh</i> was identified as a nationally significant problem and added to the <i>Infrastructure Priority List</i> as an early-stage (Stage 1) proposal in 2018.</p>
Alignment	<p>The project aligns with the strategic planning and operational objectives of many key Australian, Queensland and local government policy and planning documents.</p> <p>The <i>10-Year South East Queensland Rail Network Strategy</i> identifies an upgrade between Kuraby and Beenleigh as a critical near-term priority, one of three major infrastructure projects necessary to deliver the future service concept for the SEQ rail network. Specifically, the strategy outlines how the rail network will be redesigned to 'untangle' the network and transition to three new sectors to independently operate an uplift in services through the Brisbane CBD to meet projected passenger demand.</p> <p>The project is also supported by the Australian Government's National Faster Rail Agency (NFRA) and is proposed to lay the foundation for future faster rail between Brisbane and the Gold Coast, consistent with the NFRA's Faster Rail Plan and Prospectus and broader passenger rail agenda.</p> <p>The proponent also identifies the project as a key piece of infrastructure to ensure the success of the 2032 Olympic and Paralympic Games, particularly in supporting the efficient movement of spectators travelling to event locations across the region in conjunction with daily transit needs. With decentralised accommodation supplies across the region, particularly in the Gold Coast, the project is expected to help better connect key venues located in Brisbane and the Gold Coast. However, the impacts of the Olympics have not been estimated in the economic appraisal, and no broader modelling or strategy has yet been developed demonstrating what supporting infrastructure is needed for the Olympics.</p>
Network and system integration	<p>The project is a key component of the Queensland Government's planned SEQ future rail</p>

network. *SEQ Rail Connect*⁴ identifies that the network be restructured into three sectors. The north-south spine (Sector 1), which includes the Brisbane to Gold Coast rail corridor, will connect the northern and southern regions of SEQ while supporting faster rail. Services on this sector will run via Cross River Rail and will deliver improved journey times through upgraded infrastructure.

The current two-track section between Kuraby and Beenleigh creates a bottleneck for this vision and limits train speeds, reliability and the capacity to provide more train services to the Logan and Gold Coast regions. Significant technical and operational analysis has defined the scope of the project to ensure a technical solution that can deliver the necessary operational requirements to meet the forecasted demand and realise future objectives for the corridor.

Solution justification

A preliminary evaluation included a comprehensive comparable assessment of two shortlisted options for the project, and included economic, financial, commercial and affordability analysis. The preferred option was found to achieve the maximum potential capacity of the track section, marginally improve travel times, improve reliability, and provide flexibility in train operations for the longer term. Despite having a higher BCR, the other shortlisted option was shown to deliver sub-optimal operational and customer outcomes. The options analysis and preferred option selection was reconfirmed at the business case stage.

Overall, we agree with the proponent's analysis that the preferred option provides improved longer-term outcomes, greater capacity for the corridor and is likely to enable faster rail services and higher capacity trains in the future. We consider the options analysis to be robust and evidence based, as it has been informed by both demand and rail network operational modelling to consider the long-term corridor needs and outcomes.

Stakeholder endorsement

The proponent acknowledges that engagement with the broader community will be critical to the successful delivery of the project. Extensive community consultation (over 2,200 engagements) was undertaken in September and October 2021, which found there to be strong community support for upgrading the rail line and improving rail services in the Logan and Gold Coast areas. This support is important given the delivery of the project requires considerable land acquisitions.

Societal Impact **The social, economic and environmental value of the proposal, as demonstrated by evidence-based analysis.**

Quality of life

The business case reports that, at a 7% discount rate, the costs of the project will outweigh the quantified societal benefits. However, the proponent recommends considering the project at a 4% discount rate due to the long appraisal period and intergenerational benefits. At 4% discounting, the benefits of the project marginally outweigh the costs. The project will improve community safety and accessibility by removing level crossings and upgrading stations, and provide additional transport options for residents, encouraging greater social inclusion and equity of access.

Wider Economic Benefits (WEBs) are also estimated to deliver \$159.1 million in positive externalities from changes in accessibility resulting from the project.

Productivity

The main benefits demonstrated by the rail operational modelling include a turn-up-and-go passenger experience with trains arriving every five minutes during peak times, more even timing patterns and improved reliability. Speeds on the local road network in Logan City are also expected to improve as congestion reduces as level crossings are removed.

The project will enable the design speed of the line to be lifted from 100km/h to 140km/h so trains can travel faster (averaging 50km/h for suburban all-stops trains and 73km/h for express services, including dwell times at stations). However, the business case estimates that these speed increases will only deliver minor journey time savings. The travel time benefits estimated for existing users includes 'in vehicle' time as well as elements such as access/egress, waiting and interchange time. Crowding disbenefits have also been

⁴ *SEQ Rail Connect* is a blueprint for how the Queensland Government will shape the rail network to meet the future needs of the South East Queensland region:

<https://www.tmr.qld.gov.au/About-us/Corporate-information/Publications/SEQ-Rail-Connect>

captured.

Environment The project will be referred to the Commonwealth Government under the *Environment Protection and Biodiversity Conservation Act* (EPBC Act) after community consultation is finalised. The outcome of this referral could have significant time and cost implications for the project if biodiversity offsets are required. Once environmental costs are accounted for, the BCR could reduce.

Sustainability A sustainability assessment of the Reference Project has been undertaken in accordance with the Infrastructure Sustainability Council guidelines, and Queensland government sustainability frameworks. We consider the proponent's Infrastructure Sustainability Management Plan to be robust and agree that the proposed design initiatives improve the project's sustainability.

Resilience The proponent's business case identifies that the project will provide efficient, sustainable and resilient public transport infrastructure, which will underpin SEQ's livability and global competitiveness, and that it will drive social and economic prosperity by enabling interaction between businesses, workers to access job opportunities and residents and visitors to enjoy leisure activities. We agree with the proponent that from a broader social benefits perspective, the project supports efficient land use outcomes with development around public transport, which may also reduce congestion on the road network.

Deliverability **The capability to deliver the proposal successfully, with risks being identified and sufficiently mitigated.**

Ease of implementation The project is proposed to be delivered over a six-year program (with significant expenditure projected to commence in FY2023), and cashflows are relatively evenly spread over this period. This reflects the large amount of upfront expenditure on property acquisition to protect the corridor, along with the sequencing of the main construction works to 2027 followed by a significant period of testing, commissioning, safety assurance and operational readiness. Given current market conditions, completion and opening dates will be confirmed following procurement.

Property acquisitions are planned to take place as part of early and enabling works to mitigate the risk of property price escalation. Analysis in the business case tested one option for a staged delivery compared to a base case of the project option and found no significant economic benefit delivering the staged option. Under the staged scenario, local residents and rail users could face an extended construction period and placemaking and legacy infrastructure benefits would be delayed.

Capability & capacity There are currently capacity constraints impacting the infrastructure market with regard to labour and materials, which could impact the project's cost and schedule. Each of these risks will need to be mitigated and managed to realise the outcomes set out in the business case.

Project governance The Queensland Government's Department of Transport and Main Roads (TMR), in conjunction with Queensland Rail (QR), would jointly deliver the project through existing governance and delivery mechanisms. Existing organisational structures are in place to manage delivery, with roles defined between TMR, QR, NFRA and the Australian Government.

The proposed delivery model includes four packages and was developed in response to market sounding. The proposed packaging aims to mitigate identified risks and maximise opportunity to deliver value for money, and includes:

- early and enabling works to be managed by TMR
- level crossing removals utilising a dual Early Contractor Involvement with a Design and Construct contract
- rail corridor works utilising a collaborative delivery model
- ETCS L2 Deployment to be delivered by an already established alliance.

We support the proposed packaging approach as it responds to market sounding and

seeks to mitigate risks associated with working in a live operating rail environment. However, further value engineering will provide greater clarity on the scope of each package and the cost of the project overall.

Risk The business case identifies a risk contingency that equates to 27.7% of the base cost estimate, which is lower than the 30-40% range recommended by TMR's Project Cost Estimating Manual. However, this guidance is for standard-sized projects and may be conservative given this project's scale and complexity, which puts further risk on the current contingency level. While the proponent has identified risks appropriately to support the cost estimate, and the cost estimate has been the subject of an independent peer review, a number of major risks remain, including significant property acquisitions, rail systems and network integration, and delivery of the project in an operating rail environment.

Lessons learnt The proponent has not yet completed a Post Completion Review Plan. The proponent has an established benefits management framework that will enable the proponent to manage, measure and monitor benefits and optimise outcomes beyond project completion. The proponent's benefits realisation plan supporting the business case will guide this process.

Given the scale and magnitude of the project, we encourage the proponent to publish the findings of any reviews undertaken to capture the lessons learned from design and delivery for the benefit of future projects.

Economic appraisal results (preferred option)

The proponent's cost-benefit analysis (CBA) reports that the economic costs of the project will outweigh the social, economic and environmental benefits, with a BCR of 0.62 and a NPV of -\$816.6 million, using a 7% real discount rate and P50 capital cost estimates. The proponent recommends considering the project at a 4% discount rate due to the 57-year appraisal period and the potential for intergenerational benefits. At a 4% discounting, the benefits of the project marginally outweigh the costs, delivering a BCR of 1.10 and an NPV of \$280.3 million (P50 costs).

	Discount rate:	4%	7% (central)	10%
Core evaluation results¹	BCR:	1.10	0.62	0.36
	NPV (\$m):	\$280.3	-\$816.6	-\$1,118.6

Key benefits measured:

The key quantified benefits of the project are:

- public transport benefits, including travel time savings, station amenity benefit and fare revenue (70.6% of total benefits)
- road user benefits, including travel time savings, vehicle operating costs, travel reliability and level crossing grade separation benefits (24.7%)
- non-user benefits including avoided externalities, safety benefits, improved health outcomes and residual value (4.7%).

The business case also identified benefits that have not been able to be quantified including supporting 'place based' planning by providing for precinct revitalisation, infill development and enhancing employment accessibility in and between Logan and the Gold Coast.

The business case also identifies that as rail infrastructure is delivered and passenger demand is spread across an uplift in services, rail services become a viable alternative to private vehicle trips, drawing more users to public transport and reducing congestion for the remaining road users. In particular, more people will be likely to take public transport to Brisbane's CBD. Public transport is expected to account for almost 57% of all daily trips in 2041, up from 49.4% in 2019, with public transport mode share increasing from 5.5% to 8.7% for journey to work trips produced by the Gold Coast in 2041. However, as this project involves upgrade of an existing line rather than a new connection, there isn't expected to be a material mode shift on this corridor.

Operational benefits that are not necessarily quantifiable or have limited quantitative impact on the economic appraisal, include stabling, station upgrades, rail systems, level

crossing removals and active transport infrastructure. Additionally, key benefits that could not be quantitatively captured by the CBA include the project's role in realising the Queensland Government's vision for the SEQ rail network, its capacity to capitalise on Cross River Rail to boost public transport patronage and reduce car use, and its support for more sustainable travel choices through the delivery of active transport connections and upgraded stations.

Key observations and issues

The proponent's economic analysis identifies that a five-year delay to construction of the project results in a material increase of the NPV, from -\$816.6 million to -\$294.41 million, and BCR from 0.62 to 0.81⁵. It could be inferred from this that consideration to delaying the project, from the current opening in 2028, is warranted. However, a delay would need to consider that the project has been identified as vital to supporting the 2032 Olympic and Paralympic Games.

The project could benefit from further value engineering to identify cost reduction measures and to confirm impacts on the cost estimate of items not currently included, such as the cost of multiple delivery contracts and construction impacts.

Our evaluation also identified some potential upside opportunities to the project's BCR and NPV and quantitative analysis, including:

- broader community benefits, precinct revitalisation and the project's ability to influence land use and infill development along the corridor
- scenario analysis or real options analysis that builds on the project and further improves travel time savings, potentially including changed service patterns and integrated modal interchanges.

Equity and distribution impact analysis for socially disadvantaged areas of the community may also provide for further context and support to the project. WEBs have been calculated for agglomeration effects, increased labour supply and imperfect markets. As only proximity measures are considered and cluster impacts are unknown, WEBs only account for 11% of benefits, which appears to be conservative for a project that addresses capacity constraints for travel into the Brisbane CBD.

(1) Costs reported in this table are based on P50 cost estimates.

Project development

The project has been developed in line with the Queensland Government's Project Assessment Framework, which includes a Strategic Assessment of Service Requirements (SASR) and a Preliminary Evaluation (PE), prior to the business case being completed. The SASR identified a prioritised list of seven asset and non-asset options to progress to the PE.

A long list of seven options was initially considered by the PE that included non-infrastructure (Better use) responses as well as infrastructure options ranging from 'improving existing' to 'new build'. The long list of options included:

- Option 1 – Amend stopping patterns of services (Better use)
- Option 2 – Rationalise stations – including corresponding bus network service improvements (Better use)
- Option 3 – Implement signalling upgrades (Improve existing)
- Option 4 – Additional track infrastructure - supporting infrastructure such as station upgrades (New build)
- Option 5 – Provide additional passing loops (Improve existing)
- Option 6 – Selected track realignments (Improve existing)
- Option 7 – Higher capacity trains (Improve existing).

The PE assessed the options from a technical perspective through multi-criteria analysis, and applied a 'hurdle assessment' which considered each options' ability to meet strategic service plans. These assessments determined that the provision of additional track infrastructure (Option 4) was the only standalone option that would be able to meet the desired 2036 strategic service plans. Option 4 was adopted as Initial PE Option 1 (PE1), and the remaining long list options were combined as Initial PE Option 2 (PE2).

Assessment of PE2 revealed that to achieve the required service throughput, the existing Gold Coast express services would need to be slowed down to an all-stopping service. With this outcome, PE2 was not palatable and would not align with the broader SEQ Rail Connect. Consequently, the proponent developed a third option, PE3. PE3 was developed as a minimal infrastructure option, initially comprising amended stopping patterns, signalling upgrades, and additional

⁵ At a 7% discount rate with the P50 costs.

passing loops. This option was developed to maintain express services and a higher level of overall service; however, this can only be achieved through decreased service frequency at individual stations between Kuraby and Beenleigh.

The additional track infrastructure options considered in the PE included both a three-track (interim/staged) alignment option and a four-track (long-term/ultimate) alignment option. The PE found that when compared to a four-track alignment, the three-track alignment:

- would restrict operational flexibility as four tracks provide the opportunity for 'recycling' of additional counter-peak trains in order to run more peak trains
- would require express trains to be slowed or additional counter-peak overtaking infrastructure in the vicinity of Kuraby and Woodridge to accommodate additional counter-peak services
- third platforms (platforms on all tracks at all stations) would be required to support the tidal reversal of the express track utilisation in the peak direction. Many of the key changes to stations, formation, structures, track, power, communications and signalling would require major site mobilisation, significant possessions and challenging planning.

In addition, market sounding found that, if all tracks were going to be utilised in the short to medium term, then it would be sensible to build all four tracks at once and that there would be no material cost savings by staging track work (three tracks as an interim stage) if early works are conducted to future proof for a fourth track.

Project engagement history

The project was previously assessed at Stage 1 of the Assessment Framework and placed on the *Infrastructure Priority List* as the *Gold Coast Rail Line and Station Improvements: Kuraby to Beenleigh*. This early-stage proposal identified five potential options and confirmed that delivery timeframes would be finalised following evaluation of the business case.



Detailed economic appraisal results

The following table presents a breakdown of the benefits and costs stated in the business case.

Benefits and costs breakdown

Proponent's stated benefits and costs	Present value (\$m,2021/22)			% of total for 7% results
	4%	7%	10%	
Discount rate (real)				
Costs				
Total capital costs (P50)	\$1,892.6	\$1,697.6	\$1,529.6	79.6%
Operating costs	\$853.2	\$435.3	\$251.8	20.4%
Total costs^{1,2}	\$2,745.8	\$2,133.0	\$1,781.4	100%
Benefits				
Travel time savings (public transport)	\$1,863.7	\$816.0	\$411.7	62.0%
Station amenity benefits	\$10.5	\$7.8	\$5.9	0.6%
Farebox resource cost correction	\$230.0	\$105.4	\$55.4	8.0%
Travel time savings (road user)	\$583.5	\$250.0	\$123.6	19.0%
Vehicle operating cost savings	\$81.8	\$35.9	\$18.0	2.7%
Travel time reliability	\$88.5	\$36.9	\$17.7	2.8%
Level crossing grade separation	\$5.3	\$2.6	\$1.5	0.2%
Avoided externality costs	\$1.9	\$0.3	-\$0.2	0.0%
Safety	\$27.0	\$12.1	\$6.2	0.9%
Improved health outcomes	\$88.3	\$40.5	\$21.3	3.1%
Residual value of asset	\$45.7	\$9.0	\$1.9	0.7%
Total benefits¹	\$3,026.1	\$1,317.0	\$662.8	100%
Net present value (NPV)³	\$280.3	-\$816.6	-\$1,118.6	n/a
Benefit-cost ratio (BCR)⁴	1.10	0.62	0.36	n/a
Wider economic benefits (WEBs)				
WEB1 – Agglomeration benefit	\$329.6	\$143.6	\$71.2	90%
WEB2 – Labour supply benefit	\$19.7	\$8.4	\$4.0	5%
WEB3 – Imperfect markets	\$16.8	\$7.2	\$3.5	5%
Total benefits, including WEBs¹	\$3,392.2	\$1,476.1	\$741.6	100%
Net present value (NPV), including WEBs³	\$646.4	-\$657.5	-\$1,039.8	n/a
Benefit-cost ratio (BCR), including WEBs⁴	1.24	0.69	0.42	n/a

Source: Proponent's business case

(1) Totals may not sum due to rounding.

(2) Costs reported in this table are based on P50 cost estimates.

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

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