Australian Government | Infrastructure Australia

BUSINESS CASE EVALUATION SUMMARY

Melbourne Airport Rail

PURPOSE OF EVALUATION
Proposal seeking funding

EVALUATION OUTCOME
Not recommended for the Infrastructure Priority List at this time

ASSESSMENT FRAMEWORK STAGE

1 DEFINING PROBLEMS AND OPPORTUNITIES
2 IDENTIFYING AND ANALYSING OPTIONS
3 DEVELOPING A BUSINESS CASE
PROJECT DELIVERY
4 POST COMPLETION REVIEW

LOCATION
Melbourne, Victoria

GEOGRAPHY
Fast-growing cities

SECTOR
Transport

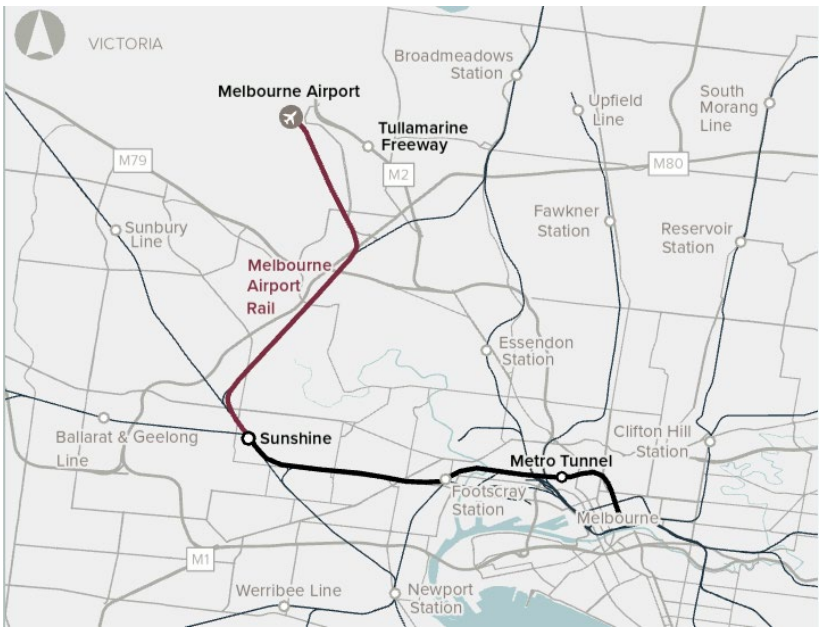
OUTCOME CATEGORY
Efficient urban transport networks

PROPONENT
Victorian Government

INDICATIVE DELIVERY TIMEFRAME
Construction start: 2022
Completion by: 2029

EVALUATION DATE
8 September 2022

CAPITAL COST
$11,285 million (P50, outturn)
$11,590 million (P90, outturn)



FUNDING COMMITTED/SOUGHT

Australian Government: $5,000 million committed Nov 2020

Victorian Government: $5,000 million committed Nov 2020

Funding gap: $1,590 million

Review summary

Infrastructure Australia has evaluated the business case for **Melbourne Airport Rail** in accordance with our Statement of Expectations, which requires us to evaluate proposals that are nationally significant or where Australian Government funding of $250 million or more is sought. **At this point in time, Melbourne Airport Rail has not been progressed on the Infrastructure Priority List.**

The strategic need for Melbourne Airport Rail is strong and there will be long-term benefits. However, based on the information we received as part of the evaluation, we recommend further work is undertaken to improve certainty of the cost estimates, cost escalation risk, and outcomes of stakeholder engagement, particularly with Melbourne Airport. Given these issues and that residual capacity on the Tullamarine Freeway undermines short-

term benefits, further investigation is warranted on the timing of the proposal and to provide greater certainty of costs and maximise societal benefits.

Over the last decade, passenger and air freight volumes at Melbourne Airport have grown substantially, underpinned by strong economic and population growth. 37 million passengers passed through the airport in FY2019, 52% higher than a decade previously. Melbourne Airport is also a major commercial centre, supporting 20,600 full-time equivalent employees directly, and 20,900 jobs working in airport-related businesses surrounding the precinct. It is also a key trade hub, around 17% of Australia's international air freight by value travels through Melbourne Airport.[1] This growth in passenger demand and economic activity, coupled with a lack of alternative transport options, has led to unreliable journey times and worsening congestion on the roads accessing Melbourne Airport, in particular the Tullamarine Freeway, the airport's primary connection to Greater Melbourne and the CBD. *Melbourne Airport to the CBD public transport capacity* is a nationally significant problem and was included on the *Infrastructure Priority List* in 2016.

While Melbourne's population fell during the COVID-19 pandemic, it is still forecast to overtake Sydney as Australia's largest city by 2031, which will in turn increase demand at the airport. The Melbourne Airport Rail proposal would provide a new and accessible public transport connection for airport users, particularly those travelling via regional rail, and those living west of Melbourne's CBD, and complement proposed transport and land use investments, including Sunshine Station precinct, the Western Rail Plan and Suburban Rail Loop.

The proposal aligns with a broad range of state and federal policies, with the presented option being the outcome of several decades of planning. While independent research indicates strong community support for the proposal, with over 80% of Victorians in favour of an airport rail service, the business case does not provide evidence of how community and stakeholder engagement outcomes have been incorporated in the design and delivery of the proposal. Evidence of how cultural heritage and environmental issues are being managed was not provided to Infrastructure Australia, noting federal environmental approvals are currently being sought according to *Environment Protection and Biodiversity Conservation Act* requirements.

The proponent's economic modelling indicates that the Net Present Value (NPV) of the proposal is -$3,794 million with a Benefit Cost Ratio (BCR) of 0.5, and -$2,936 million with a BCR of 0.6 when wider economic benefits (WEBs) are included.[2] Based on our review, and when potential upside and downside risks to monetised economic outcomes are considered, the economic benefits of Melbourne Airport Rail do not outweigh its economic costs at this time. We note that the proponent's reporting of the BCR is at a 4% discount rate, which returns a NPV of $89 million and a BCR of 1.0 (excluding WEBs). With the inclusion of WEBs, this further increases to an NPV of $1,789 million and a BCR of 1.2 at a 4% discount rate.

A key driver of the economic result is the timeframe for delivery and the high frequency rail service an airport connection necessitates, which increases costs. Although construction completion is expected in 2029, most benefits do not materialise until the (recently widened) Tullamarine Freeway reaches capacity, forecast in 2036. Consequently, the business case forecasts lower passenger volumes on a volume-to-capacity basis for the first 10 years of operation, before ramping up substantially in the 2040's. This indicates that construction could be deferred to better align with forecast demand and still ensure an operational airport rail service before the Tullamarine Freeway reaches capacity.

Once delivered, Melbourne Airport Rail would improve living standards for Victorians through reduced transport network congestion and improved travel options, health outcomes and environmental impacts. As the Tullamarine Freeway reaches capacity, the rate that benefits accumulate increases substantially. After 2036, greater uptake of the airport rail service uplifts capacity improvements to Melbourne's transport network, and enhances the network's reliability, resilience to disruption and delivers productivity improvements to transport users. The business case indicates that the proposal would create transport network and urban growth benefits, particularly for the movement of goods and people on Melbourne's roads as more people shift to airport rail over time.

Given the proposal's proposed delivery timeframe, high capital value and complexity, the proponent has adopted a procurement and packaging approach that seeks to minimise risks. As a result, the planned procurement approach of Alliance contracting for the highest value capital works pushes significant cost price risk on to the proponent to manage. Overcoming delivery complexity, interface and stakeholder risks, potential market capacity and capability constraints, and achieving time and cost objectives are, therefore, key challenges

[1] 2019 International Airfreight Indicator - Infrastructure Partnerships Australia

[2] Using a 7% real social discount rate, P50 capital cost estimate and base case including Suburban Rail Loop – North.

that will require active management by the proponent. Rail Projects Victoria (RPV), as the delivery agency, will need to be resourced to capably manage these challenges, noting it is already delivering a $30 billion pipeline of rail investments. Key stakeholder engagement is ongoing and remains a significant risk to the proposal's cost, time and benefits. Engagement with Melbourne Airport may impact the final design of project elements, particularly the airport station which could consequentially impact the passenger experience.

While we recognise that procurement for several delivery packages is well progressed, and that the proponent is firming capital cost estimates as part of procurement, we recommend that the optimum timing of delivery is further investigated. There are strong reasons for progressing with the proposal, but further certainty of scope and costs, together with alignment of delivery to demand, would reduce risk and maximise the return for taxpayers, especially as benefits only substantially accrue later as the Tullamarine Freeway reaches capacity. Deferral would also allow transport planning to better consider the impact of Suburban Rail Loop (SRL) on the design and patronage of Melbourne Airport Rail, noting that the development of SRL North has a downward impact on demand for Melbourne Airport Rail.

In taking the proposal forward, the proponent should consider measures that could prompt the behavioural change required to shift road users to Melbourne Airport Rail earlier, thereby capturing upside potential to maximise benefits and improve the economic case. This could include competitive rail fares, road user/ congestion charges and media campaigns. Upgrades to on-road priority for airport bus services would maximise the capacity, efficiency and reliability of the existing public transport connection until Melbourne Airport Rail is delivered.[3]

Proposal description

Melbourne Airport Rail[4] is a proposed integrated heavy rail line between Melbourne Airport and Sunshine Station, which would provide a 30-minute travel time between Melbourne Airport and the CBD. The key components of the Melbourne Airport Rail scope are:

- a new elevated railway station at Melbourne Airport
- a track pair starting at the Airport station and transitioning into an elevated viaduct at Mercer Drive that continues across Sharps Road and the Western Ring Road (M80) – the track continues on an embankment toward and through the Albion-Jacana freight corridor from Steele Creek, including a new bridge crossing over the Maribyrnong River, and a twin track flyover past Albion Station after which the track merges into the Sunbury Line just before entering Sunshine Station
- futureproofing for an intermediate station (proposed at Keilor East)[5]
- works at Sunshine Station to enable delivery of Melbourne Airport Rail
- an additional order of five High Capacity Metro Train (HCMT) 7-car sets
- protection and relocation of utility services, including ExxonMobil jet fuel pipeline and Ausnet high-voltage transmission lines
- freight reconfiguration from Airport West to Albion
- line-wide rail systems that are interoperable with those being incorporated into the Metro Tunnel.

Review themes

Strategic Fit	**The case for action, contribution to the achievement of stated goals, and fit with the community.**
Case for change	A strong case for change has been demonstrated, with the following two key problems underpinning the need for Melbourne Airport Rail: 1. Limited transport connections to Melbourne Airport constrain passenger access

[3] See recommendation 10.9.1, *Victoria's 30-year Infrastructure Strategy* (2016)

[4] Further information about the proposal can be found on the Melbourne Airport Rail - Victoria's Big Build website.

[5] On 21 September 2022, the Victorian Government announced that the Keilor East station would be built as part of delivering the airport rail (see New Station For Melbourne's West As Part Of Airport Rail | Premier of Victoria). This announcement was made after the business case was submitted to and evaluated by Infrastructure Australia. Economic analysis on the impact of building Keilor East station on the proposal's overall benefits and costs have not been provided to Infrastructure Australia.

2. Increasingly congested links to Melbourne Airport limit Victoria's economic prosperity.

Transport network performance in Melbourne is expected to deteriorate significantly, with trips to Melbourne Airport on existing modes forecast to double from 180,000 trips on an average weekday in 2021, to 370,000 trips a day by 2056. The recently widened Tullamarine Freeway is forecast to reach >90% capacity in 2036, with travel times expected to almost double by 2056. Average private vehicle travel times from National Employment and Innovation Clusters (NEICs)[6] to Melbourne Airport will increase, with the AM peak car travel time from Sunshine NEIC to Melbourne Airport increasing from 22 minutes in 2021 to 35 minutes in 2056. Reliability of travel time is also expected to decrease due to growing road network congestion.

Melbourne Airport to the CBD public transport capacity is identified as a medium term (5-10 years) nationally significant problem on the *Infrastructure Priority List*.

Alignment

The proposal aligns to a broad range of state and federal policies, including:

- Victoria's 30-year Infrastructure Strategy (2016), which recommends the construction of a rail link between Melbourne Airport and central Melbourne within 15-30 years, to provide a higher capacity and higher quality service for interstate and international visitors to travel from Melbourne Airport to the central city.
- Victoria's Priority Precincts plan (2019), in which the Victorian Government views Melbourne Airport Rail as an enabler of development in Sunshine. The proposal will enhance the capacity of travel between the CBD and the precinct, facilitating improved access to the Victoria University campuses, Sunshine Hospital and other opportunities created under its designated NEIC status.
- The *Heads of Agreement to Deliver the Melbourne Airport Rail Link Business Case* (2019) between the Australian and Victorian Governments, which agreed for a rail line to be constructed from the CBD to the Airport via Sunshine, with construction to commence by the end of 2022.
- Infrastructure Australia – Australian Infrastructure Plans 2021 and 2016, which highlight:
    - the need for improved integration of regional passenger transport networks to support liveability and economic sustainability, and
    - growing demand for air travel and the importance of high-frequency rail links between major airports and city centres, to facilitate the efficient movement of people between Australia's major cities.

Network and system integration

The proposal is compatible with the existing and future public transport network. It provides connectivity to regional Victoria via the existing rail network at Sunshine Station and considers compatibility with future planned rail projects. The Melbourne Airport Rail proposal would support demand on Melbourne Metro and the airport station has been designed to integrate with the future Suburban Rail Loop – North.

Solution justification

Integrated heavy rail via Sunshine Station and connecting to the CBD via Sunbury tracks and the Metro Tunnel is the presented option in the business case.

This outcome was determined through the 2018 Melbourne Airport Rail Link Strategic Appraisal, which first considered strategic modal interventions, followed by an assessment of alternative public transport modes, and then alternative route options. The 2018 Appraisal evaluated the four shortlisted heavy rail alignment options identified in earlier corridor studies – the Sunshine, Maribyrnong, Craigieburn and Flemington routes. The 2018 Appraisal recommended the Sunshine Route as the preferred rail link between Melbourne Airport and the CBD as it:

- offers superior connections to more areas of Melbourne through its integration with the Metro Tunnel.

[6] National Employment and Innovation Clusters (NEICs)

	• offers superior connections to regional Victoria through an upgraded Sunshine Station interchange. • could be delivered earlier and at a significantly lower cost than other route options that offered a comparable level of benefit. The option presented in the business case is consistent with the findings of the 2002 Melbourne Airport Transit Link Study and the 2012 Melbourne Airport Rail Link Study. The business case built upon previous analysis, with the presented option supported by a combination of quantitative and qualitative evidence and a preliminary economic analysis. However, alternative strategic interventions and modes that scored very similarly to the presented option, including potentially lower cost options, were eliminated at early stages of the options development process on qualitative grounds. There is a risk therefore that the proposal does not represent the most economically efficient and cost-effective response to the identified problem. It is a limitation of the business case that the presented option (integrated heavy rail between Melbourne CBD and Melbourne Airport via Sunshine Station) was the only option considered in detail.
Stakeholder endorsement	The business case indicates there has been a large number of engagement interactions with local councils, community groups and special interest groups through a variety of channels, mostly online. There appears to be strong community support for the proposal, with independent research indicating that most Victorians (over 80%) favour an airport rail link. The stakeholder engagement process included input from Aboriginal Victoria/First People-State Relations, Bunurong Land Council Aboriginal Corporation and Wurundjeri Woi Wurrung Cultural Heritage Aboriginal Corporation, although the outcomes of those processes or the mitigation/avoidance activities required to reduce impact on environment and/or cultural heritage have not been provided to Infrastructure Australia. Despite the volume of stakeholder interactions, the business case does not detail how the proponent has or will use stakeholder and community feedback to inform the design and delivery of the proposal.
Societal Impact	**The social, economic and environmental value of the proposal, as demonstrated by evidence-based analysis.**
Quality of life	The business case demonstrates that the proposal is expected to improve living standards for Victorians through reduced transport network congestion and improved travel options and outcomes, thereby freeing up time for other more valued purposes. Reduced car dependency, an expected outcome of the project, would lead to improved health outcomes and reduced environmental impacts. A key impact is the reduction in variable travel times from the CBD to the airport using public transport. In peak periods, Melbourne Airport Rail would deliver a faster journey between Melbourne Airport and the CBD (30 minutes), compared with Melbourne City Express SkyBus, where the journey time (AM peak) is projected to be 30 minutes in 2026, 40 minutes in 2031 and 66 minutes in 2056.
Productivity	Melbourne Airport Rail would deliver capacity improvements to the transport network, thereby improving network reliability, enhancing the network's resilience to disruption and delivering productivity improvements to transport network users. The business case includes an analysis of the economic contribution of Melbourne Airport Rail to the Victorian and national economies, identifying that the proposal will generate an additional $16.2 billion in Gross State Product (under a 4% discount rate).[7] The analysis also shows a sustained improvement in productivity post implementation.
Environment	The business case does not include estimates of environmental offset costs. A list of relevant planning and environmental approvals for the state and Federal governments has been identified, and risks associated with them have been included in the risk register.

[7] The proponent did not include an estimate of Gross State Product under a 7% discount rate.

	The Minister for Planning has determined that an Environmental Effects Statement (EES) is not required for Melbourne Airport Rail under state laws. RPV, the delivery authority for the proposal, will seek planning approval for the project on state land under Clause 52.36, which was added to the Victoria Planning Provisions in May 2021 to establish a standard planning approval process for projects that do not require an EES.[8] Environmental approval requirement considerations by the Australian Government under the Environmental Protection and Biodiversity Conservation Act are underway. An approved Major Development Plan will be required to progress construction of the project on Airport land.
Sustainability	Melbourne Airport Rail responds to long-term drivers of change (population growth in the environs of Melbourne and the broader airport catchment drives the need for public transport to Melbourne Airport) and reduces car dependency and GHG emissions with clear sustainability benefits. RPV is developing a Sustainability Design Strategy for Melbourne Airport Rail to inform the contractual requirements. This will inform the design and construction activities undertaken during delivery. The proponent should consider the emissions profile of the proposal in construction and consider its impact on achieving net zero emissions.
Resilience	The proposal would enhance the reliability of a trip between Melbourne CBD and the Airport, and the provision of an alternative mode of access to the Airport will improve the resilience of the transport network to respond to planned and unplanned events. The proposal has also considered some future-proofing elements, specifically provision for a future intermediate station at Keilor East. This allows for flexibility to respond to unanticipated additional demand and accelerated population and land-use changes.
Deliverability	**The capability to deliver the proposal successfully, with risks being identified and sufficiently mitigated.**
Ease of implementation	The business case outlines a detailed program development process, including a comprehensive assessment of risk. The required supporting activities to implement the proposal, such as land acquisition, governance and regulatory consideration have not been completed but appear to be identified and next steps adequately considered. The timeframes for delivery represent a major risk given the overall size and complexity of the proposal and the current capacity of the construction market in Victoria and Australia.
Capability & capacity	RPV is a capable delivery organisation. RPV is delivering Victoria's largest ever rail infrastructure pipeline, with more than $30 billion invested in metropolitan and regional rail projects. It has a track record in the delivery of similar projects, providing a fair level of confidence in its ability to deliver the proposal given adequate resourcing. Infrastructure Australia's 2021 Infrastructure Market Capacity Report forecasts labour shortages across a range of infrastructure resources critical to this proposal that are expected to persist until the end of 2024. Challenges resulting from current market constraints have been acknowledged as a high-level risk in the business case's risk register, with potential risk mitigation strategies provided. Market capacity, appetite and capability was also a key consideration for proposed delivery models. Nevertheless, potential shortfalls in market capacity to deliver the proposal within estimated cost and planned timeframes is a major ongoing risk to be managed, particularly given the high capital value and complexity of the proposal, and the significant number of interfaces and stakeholders.
Project governance	The proposal would be delivered by RPV, with the Department of Transport (DoT) as the project sponsor. This governance model is already in use within Victoria and has mature and established governance processes to deliver major transport projects. This model provides

[8] See https://bigbuild.vic.gov.au/projects/melbourne-airport-rail/planning/planning-approvals

	confidence that the proposal's benefits can be achieved. Construction delivery is proposed to be split into seven different packages (including an early works package), predominantly split geographically. We recognise that the proponent has adopted a procurement and packaging approach that seeks to minimise risks posed by interfaces and delays. Three different procurement models for the seven packages are: • Managing Contractor model: Early works package • Alliance model: Airport Package; Viaduct Package; Corridor Package; and Sunshine/Albion Package and Rail Systems Package • Incentivised Target Cost model: ARTC Package; Maribyrnong River Bridge Package While the assessment of delivery models only considered a narrow set of alternatives, the overall packaging and planned procurement approach appear appropriate. However, we note that adopting an Alliance model for the highest value/ risk packages pushes significant construction price risk to the proponent to manage, requiring a capable and well-resourced public sector counterparty to ensure value for money outcomes are achieved from the construction contract. The outcome of stakeholder engagements represent ongoing risks. The development and implementation of key agreements, including with Melbourne Airport, are critical governance and risk mitigation activities that are required to be completed and actively managed. Protracted delay to finalising these agreements could impact the proposal's schedule and cost.
Risk	The risks of delivering the proposal have been identified and most risks can be appropriately managed. The risk process included a schedule risk assessment to estimate the contingency allowances associated with completion dates and inform contingent time allowances. The risk register by the proponent corresponds with the key risks outlined on Infrastructure Australia's Risk Dashboard. However, significant residual risks include the level of design (which influences cost estimates), the outcomes of stakeholder engagement, cost escalation, supply chain shocks and market capacity with the high volume of infrastructure projects entering delivery phase over the forward estimates.[9] At the final business case stage, a higher level of design specification and thus cost estimate accuracy would be expected, particularly noting the overall level of quantified risk and contingency which is lower than typically observed and does not necessarily reflect the lower level of design. Finalising and operationalising agreements with key stakeholders are recognised as significant risks post-mitigation, although the consequence of these risks (rated as moderate with a 30-day adjusted risk value), given their potential wide-ranging impacts (time, design costs, construction cost, benefits) do not appear to match their potential significance. Final stakeholder agreements may impact key elements of the design, which could impact the desirability of the proposal, its patronage and associated economic and financial outcomes.
Lessons learnt	A preliminary Benefits Management Plan has been developed, which includes key performance indicators (KPIs) to quantify the impacts of the proposal, a targeted date for review and the owner responsible for reviewing each KPI. There is also evidence that experience from across the delivery of other projects by RPV, the Major Transport infrastructure Authority (MTIA), DoT and other international projects has been considered and incorporated into the proposal. We recommend the Benefits Management Plan is strengthened to cover the full Project Completion Review Plan requirements included in the Infrastructure Australia Assessment Framework (Stage 4).

Economic appraisal results

[9] 2021 Infrastructure Market Capacity report | Infrastructure Australia

The proponent's economic modelling found that the NPV of the proposal is -$3,794 million with a BCR of 0.5. Including wider economic benefits (WEBs), the NPV is $-2,936 million with a BCR of 0.6. Varying the discount rate to 4% and 10% results in a BCR (excluding WEBs) of 1.0 and 0.3 respectively. We note the proponent's reporting of the BCR is at a 4% discount rate. The results using a 7% discount rate (and sensitivity testing under a 10% discount rate) were provided by the proponent's economic modelling to align with the requirements of the Infrastructure Australia Assessment Framework. After aligning core assumptions to recommended guidance, and considering potential upsides and risks to the quantification of economic benefits, Infrastructure Australia considers the BCR is potentially significantly overstated (see 'Key observations and issues' below).

Risk contingencies were calculated separately to the capital cost estimates. A contingency allowance of $2,002 million (P50) or $2,244 million (P90) was determined to monetise risk to the project – 22% to 24% of the overall risk adjusted cost. This is on the lower end of quantified risk and contingency relative to other business cases we have assessed. Additionally, P90 risk contingencies are only 12% higher than P50 risk contingencies, a smaller margin than typically observed.

Results included in the following table represent the mid-point of the probability analysis range completed for the central case. The proponent put forward two base cases to reflect uncertainty of the proposed Suburban Rail Loop (SRL) North, and indicated that the base case include SRL North for reporting purposes given that Victorian transport planning includes the delivery of SRL North in the 2050s. We note that this leads to a lower BCR estimate versus a base case without SRL North.

	Discount rate:	**4%**	**7% (central)**	**10%**
Core evaluation results	**BCR:**	1.0	0.5	0.3
	NPV ($m):	89	-3,794	-4,995
Results with WEBs	**BCR:**	1.2	0.6	0.4
	NPV ($m):	1,789	-2,936	-4,504

Key benefits measured:

Key benefits monetized in the economic appraisal include:

- Public transport user benefits, which accrue from changes to public transport service levels, such as improvements to capacity, quality and convenience.
- Road user benefits, which principally accrue due to some road users switching from car to public transport. Consequently, there is less congestion on the roads, and other road users, including freight vehicles, benefit.
- Crash cost savings, which also result from users switching from car to public transport, resulting in fewer vehicle-kilometres travelled on the network and therefore fewer crashes occurring.
- Environmental externality cost savings, which also result from fewer vehicle-kilometres travelled and thereby reducing environmental externalities.
- Improved health outcomes – public transport users walk or cycle an average of 41 minutes per day, compared to eight minutes per day for car users. For those users switching to public transport, their level of physical activity is likely to increase.
- Option and non-use value – publicly available research indicates that most Victorians (over 80 per cent) favour an airport rail link. As such, there exists a willingness to pay for this type of infrastructure, irrespective of whether they use it. Victorians therefore attach significant value to having an option to take rail to the airport. Option and non-use value is considered relevant for this economic appraisal as Melbourne Airport Rail provides a new rail service that will increase travel choice.
- Residual values – several Melbourne Airport Rail assets, in particular rail infrastructure and bridge structures, are estimated to have an economic life (value) that extends beyond the 50-year evaluation period.

WEBs are excluded from the core evaluation results but are appropriate to capture as

	potential upside given the nature and likely effect of the proposal. The proponent also qualitatively evaluated the following benefits for their impact on economic outcomes. They were not included in the economic appraisal due to the lack of reliable data and approach to quantification: • Improved public transport travel time reliability – Melbourne Airport Rail provides improved travel time reliability compared with road-based access to Melbourne Airport via SkyBus services. This is likely to benefit airport users by reducing the additional time added to a journey to allow for the probability of arriving late and potentially incurring a large cost in the form of a missed flight. A lack of data and standard approach to monetisation makes this benefit difficult to monetise. While not specifically quantified, reliability benefits impart upside potential to the BCR. • Sunshine Station upgrades, which are expected to deliver amenity improvements to customers. • Reduced roadway (maintenance) costs – the proposal will reduce car use across Greater Melbourne, with even a modest reduction in volumes providing large savings as fewer cars reduce road wear and tear. • Construction disruption – a range of construction related impacts are captured in the economic costs (including business disruption and costs to mitigate impacts). • The potential for land use change was explored as part of the business case but was not determined to be substantive. The proponent is investigating second round land value benefits in and around Sunshine Station from Melbourne Airport Rail and other complementary rail investments as part of the development of the Sunshine Station precinct.
Key observations and issues	The base case and incorporation of demand inputs into the economic appraisal have been completed in accordance with the Infrastructure Australia Assessment Framework guidance. However, the following downside risks have been identified that potentially lead to significantly overstated economic benefits in the business case: • Rail externality disbenefits such as air and noise pollution and greenhouse gas emissions during operation of Melbourne Airport Rail have not been monetised, resulting in slightly overstated externality benefits. • Benefits associated with a reduction in transfers and transfer penalties (users prefer transferring from rail-to-rail rather than rail-to-bus) have been monetised using parameters from the Victorian Integrated Transport Model (VITM) and validated against observed data. The Melbourne City Express-to-rail transfer penalty applied (15 minutes) is higher than Australian Transport Assessment and Planning (ATAP) Model Specific Guidance – Public Transport (2021) guidelines, which would overstate the benefits.[10] However, while this assumption diverges from the ATAP guidelines, it is applied consistently across state-based modelling. • Vehicle operating cost savings have been monetised through use of the ATAP – PV2 (2016) guidance, as opposed to the Infrastructure Australia Assessment Framework recommended guidance of Austroads (2012). This approach potentially overstates the economic benefits. • Option and non-use values have been monetised with reference to UK Department for Transport TAG guidance. Parameter values provided in ATAP M1 (2021) are lower, such that this approach may overstate the benefits of the proposal. • Residual values have been calculated through use of the replacement cost approach, as per Victorian Department of Treasury and Finance guidelines. This approach applies the capital cost of the asset at the end of the appraisal period and discounts

[10] The Skybus-to-rail transfer penalty applied (15 minutes) is higher than recommended in ATAP – M1 (2021) guidelines (10 minutes). See: M1 Public transport | Australian Transport Assessment and Planning (atap.gov.au)

it to a present value. This approach does not adjust the capital cost to reflect asset lives relative to the appraisal period and results in a slightly overstated benefit.

The cost estimate presented in the business case has a lower level of confidence than recommended by the Infrastructure Australia Assessment Framework. This is due to different elements of the proposal's design being at different levels of maturity. For a proposal that is progressing to procurement, a higher level of design specification and cost estimate accuracy would be expected, particularly noting the overall level of quantified risk and contingency, which is lower than typically observed and does not necessarily reflect this lower level of design.

The proponent's economic analysis included a highly detailed and comprehensive treatment of uncertainty through scenario testing, which included potential COVID-19 impacts, emerging vehicle technologies and changes in transport pricing policy. The level of uncertainty analysis is appropriate considering the scale of the proposal, while noting that reported sensitivity outcomes did not include the base case with SRL North.

The modelled impacts of COVID-19 were observed to reduce benefits associated with Melbourne Airport Rail, as delayed land use growth and increased working from home rates considered as part of this test reduce road network congestion and result in road-based access to Melbourne Airport remaining a favorable choice for a longer duration. This analysis adds further basis for re-assessment of the optimum timing for delivery of the proposal.

Similarly, autonomous and shared autonomous vehicle (AV) uptake were observed to result in a considerable reduction in economic benefits. This is largely driven by the ability of AVs to use the road network more efficiently through platooning, which increases road network capacity without any corresponding infrastructure enhancements. In turn, this leads to reduced congestion and a reduction in the attractiveness of public transport. Together, these factors yield an overall drop in Melbourne Airport Rail patronage, driving down public transport user and road user benefits.

Proposal development

The 2018 Melbourne Airport Rail Link Strategic Appraisal identified a range of strategic interventions and consolidated these into six options, which were then qualitatively evaluated based on their identified benefits, cost, delivery time and social and environmental risk. The six strategic options included:

1. Business as Usual
2. Existing public transport focus
3. Airport mass transit focus
4. Road based focus
5. Alternative airport focus
6. Pricing / productivity focus.

The airport mass transit focus option was determined as the preferred option via a qualitative Investment Logic Mapping (ILM) -based multi-criteria analysis. This resulted in the following four modes being considered for airport mass transit:

1. Bus rapid transit
2. Light rail
3. Standalone heavy rail
4. Integrated heavy rail.

Integrated heavy rail was determined as the preferred mode via a qualitative ILM-based multi-criteria analysis. No modelling or economic analysis was completed to support this analysis.

Four potential route options for integrated heavy rail between Melbourne CBD and the Airport were then considered, with the Sunshine Station route identified as the preferred option, again through an ILM-based multi-criteria analysis, drawing upon qualitative and quantitative evidence.

The 2021 Melbourne Airport Rail business case then refined the 'city access' options between Sunshine Station and Melbourne CBD, with the metro tunnel alignment determined as the preferred option. Under this alignment, the Airport rail service would connect to the CBD via the Sunbury Line track pair and the Metro Tunnel. This conclusion was supported via a quantitative travel time comparison analysis, a qualitative assessment and a preliminary economic analysis (noting no details of the preliminary economic analysis were provided).

One option – integrated heavy rail between Melbourne CBD and Melbourne Airport via Sunshine Station – was progressed through to the remainder of the business case.

Proposal engagement history

EARLY-STAGE PROPOSAL	POTENTIAL INVESTMENT OPTIONS	INVESTMENT READY PROPOSAL
Recommended for the Infrastructure Priority List: February 2016	Not submitted for Infrastructure Priority List consideration at Stage 2.	Not recommended for the Infrastructure Priority List: September 2022

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
Discount rate (real)	**4%**	**7%**	**10%**	
Benefits				
Public transport user benefits	$3,560	$1,793	$1,022	40%
Road user benefits	$3,218	$1,589	$887	35%
Externalities (non-user benefits)	$720	$373	$220	8%
Option and non-use value	$1,064	$515	$290	11%
Residual value of assets	$1,035	$210	$45	5%
Total benefits[1]	**$9,596**	**$4,480**	**$2,463**	**100%**
Costs				
Capital costs (P50)	$8,310	$7,262	$7,110	93%
Operating, maintenance and renewal costs	$1,196	$602	$348	7%
Total costs[1]	**$9,506**	**$8,274**	**$7,458**	**100%**
Net present value (NPV)	$89	-$3,794	-$4,995	n/a
Benefit-cost ratio (BCR)	1.0	0.5	0.3	n/a
Wider economic benefits (WEBs)				
Agglomeration benefits	$1,543	$782	$449	15%
Labour market deepening benefits	-$4	-$2	-$1	0%
Output increase in imperfectly competitive markets	$160	$78	$43	1%
Total Benefits including WEBs[1]	**$11,295**	**$5,338**	**$2,954**	**100%**
Net present value (NPV)[2], including WEBs	$1,789	-$2,936	-$4,504	n/a
Benefit-cost ratio (BCR)[3], including WEBs	1.2	0.6	0.4	n/a

Source: Proponent's Business case modelling

(1) Totals may not sum due to rounding.

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

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