VAGO
Victorian Auditor-General's Office

Case study:

City Loop fire and safety upgrade

February 2025

City Loop fire and safety upgrade

The City Loop fire and safety upgrade has delivered critical safety-related improvements to sub-surface stations in the Melbourne underground rail loop.

Upgrades include installing modern smoke detection, smoke extraction and sprinkler systems. It also built fire and smoke refuges for people with limited mobility.

Figure 1: City Loop fire and safety upgrade in Flagstaff Station

Source: Victorian Infrastructure Delivery Authority.

Key project data

2024–25 BP4 project name:	City Loop fire and safety upgrade (stage 2) and intruder alarm
Previous reporting name:	N/A
Project lifecycle phase:	Practical completion (handover to operator and defects phase)
Financial year when first disclosed:	2016–17
Current approved cost (TEI):	$464.61 million
Original approved cost (TEI):	$132.86 million
Cost variance analysis:	Increased by 249.69% ($331.75 million)
Expected completion date:	Quarter 2 2023–24
Original completion date:	Quarter 4 2019–20
Time variance analysis:	Delayed by 18 quarters (3.5 years)
Responsible (BP4) entity:	Victorian Rail Track (VicTrack)
Delivery entity:	Victorian Infrastructure Delivery Authority(VIDA)
Approval authority:	Department of Transport and Planning (DTP)

Note: BP4 is Budget Paper 4: State Capital Program. TEI stands for total estimated investment.

Project summary

Project description and purpose

In October 2012, the Victorian Ombudsman found that a 'major incident in the MURL could pose considerable risks for commuters travelling through the tunnels, for persons in the MURL stations and in buildings above them'.

The government funded this project in 2016 as the second stage of critical fire and safety upgrade works within the MURL at Parliament, Flagstaff and Melbourne Central stations.

The project scope includes:

- sprinkler systems upgrade
- platform smoke extraction systems
- extraction fans and other smoke evacuation shaft equipment upgrades
- smoke barriers around some open-sided inter-platform escalators
- fire rated and smoke-protected safety refuges for persons with limited mobility
- integrating new safety systems into the MURL's technical and operating environment.

Project status

Red, Amber and Green (RAG) status

The criteria we used for this RAG assessment can be found at the end of this case study.

Figure 2: Entity self-assessment compared to VAGO assessment

	Scope	Cost	Time	Benefits
Entity self-assessment	Green	Green	Green	Green
VAGO assessment	Green	Green	Green	Amber

Note: Entity self-assessments were made in the specific project survey. Based on the information VIDA provided and survey responses, VAGO assessed benefits as amber because benefits measurements processes are not fully developed and baseline data to measure benefits achievement is insufficent.
Source: VAGO.

Cost, time and scope performance

The project is nearly complete and is currently delivering within its approved scope, cost and time targets.

VIDA told us that the project's operational milestone was achieved on 16 April 2024 and physical works completion was achieved 15 days later on 1 May 2024. Practical completion was achieved in September 2024.

Final completion is expected in quarter 2 2023-24,, with all safety works now operational. These project milestones are defined in the project's contract.

There are some final cosmetic works to be performed, such as plaster patching and painting. Other issues to resolve include site rectification, defects and final finishes in some stations, as agreed with Metro Trains Melbourne (MTM), the metropolitan train franchise operator.

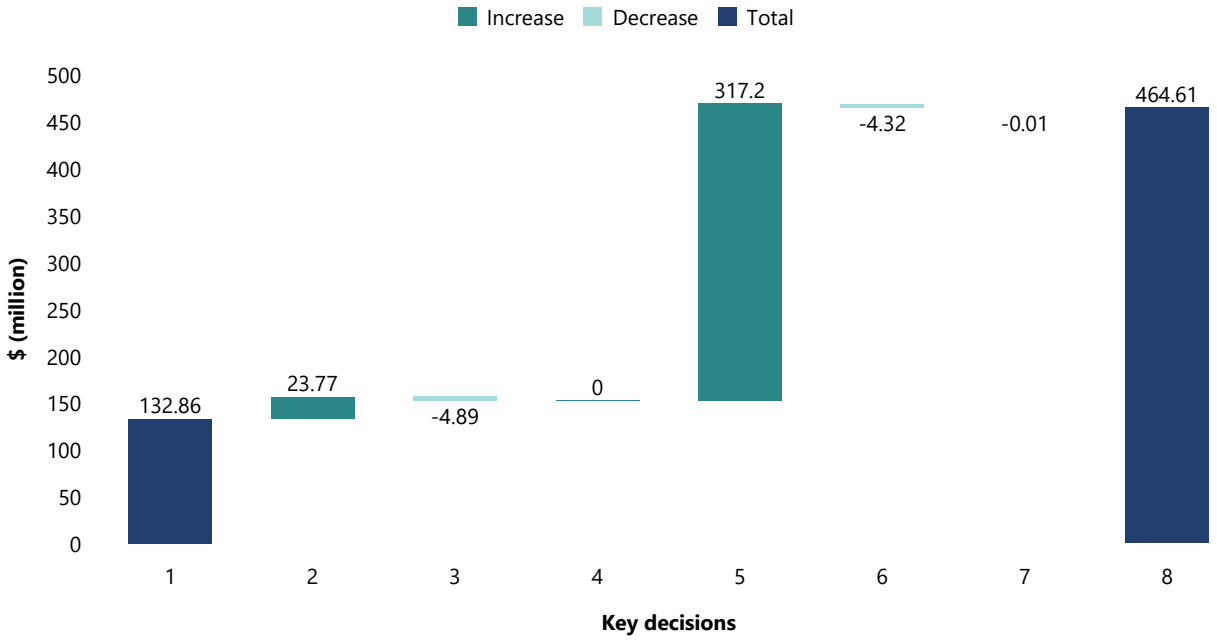
Risks and emerging pressures

Most material project risks and pressures were resolved through the decision in late 2020 by the government to adopt an alliance contracting model. This resulted in a project procurement and costing reset.

Practical completion and final functionality commissioning, site remediation, station finishes and reliability inspections will need to be managed carefully throughout the project close-out phase.

The alliance will need to focus on producing a quality outcome that meets scope expectations and expected benefits from the project, particularly the safety and functionality aspects. MTM, as an alliance participant, is expected to be heavily involved in final close-out works.

Figure 3: Budget changes to the City Loop fire and safety upgrade



Legend

Key decision	Date and detail
1	2016–17 BP4: original TEI
2	2018–19 BP4: TEI increased to meet additional scope and design requirements
3	2018–19 BP4: TEI decreased due to capital reallocation to operating expenditure
4	2021–22 BP4: TEI TBC following the original contractor entering administration
5	2022–23 BP4: TEI increased due to project scope changes and market conditions
6	2023–24 BP4: TEI decreased due to capital reallocation to operating expenditure
7	2024–25 BP4: TEI decreased due to capital reallocation to operating expenditure
8	2024–25 BP4: current TEI

Source: VAGO.

Variance analysis

There has been a significant and material, or nearly 250 per cent, TEI variance from the original project's commencement in 2016 to now. The current scope and approach was confirmed in 2022.

VIDA told us this cost increase was due to needing to do additional smoke and fire modelling and project re-scoping. This identified a requirement for larger fans, different wiring, standby generators and associated structural and engineering works, which all had an impact on project cost.

There was limited evidence available for us to view and understand the decision-making processes that led to the project's first iteration. The original approach was to be delivered as a state-nominated franchisee project. This would be overseen by MTM, under Public Transport Victoria's (PTV) direction. PTV is now defunct as an entity and its functions have been incorporated into DTP.

DTP was unable to maintain this original approach after the main works contractor's business collapsed and was not able to appoint a new builder to take over the incomplete works.

The amended project TEI, confirmed via revised costings done by DTP and VIDA, has not deviated from expectations since it was approved in 2022.

Impacts of scope and other changes

There has been a 3.5-year delay to the project since the project was first announced. Revised project timelines were agreed in conjunction with confirmation of the new delivery approach.

Most of this delay occurred before scope and other changes were agreed by government, and prior to project delivery being allocated to VIDA by DTP.

The delay was not anticipated because the project's original contractor's business suddenly collapsed. The delay was unable to be addressed until a new delivery approach was confirmed by government, which appointed VIDA as delivery agency and used one of its already contracted alliances to complete the works.

Around a year of delays were due to PTV, the Department of Treasury and Finance (DTF) and the former Office of Projects Victoria assessing appointment of a new delivery agency and the new procurement approach. Another round of delays occurred after VIDA was required to do further development work to seek the release of more project funding from central contingency.

This lengthy delay to the safety upgrade works implies that during this period, the risks identified in the Victorian Ombudsman's report as well as DTP's own updated safety modelling were not mitigated. This means that underground City Loop stations may have been relatively less safe than they could have been.

However, massive train patronage reductions during the COVID-19 pandemic did reduce the number of passengers in the City Loop, resulting in a decreased exposure of passengers to a safety risk from fire and smoke events.

Since the works commenced under VIDA's oversight, time variance has been negligible.

Key funding stakeholders

Stakeholders

This project is fully funded by the Victorian Government.

Project benefits

Benefits

The project's original expected benefits are mainly safety-focused. They are predicated on reducing impact from fire, smoke or explosion. The new fire and smoke safety refuges installation also gives more safety to commuters, especially for people with limited mobility or low capacity to self-evacuate.

There is also a deeper benefit from gaining assurance that the MURL stations are meeting contemporary expectations for fire and rail safety, especially in the context of a new adjoining metro line that has had to meet modern standards and requirements for evacuation, firefighting and safety.

The project assurance review conducted in May 2021 recommended, among other things, that the business case should be updated to include a benefits management plan (BMP) and metrics.

VIDA told us that a BMP review was undertaken in July 2022. DTP, VIDA and MTM agreed on 2 benefits for assessment after project delivery:

- benefit 1: improved station safety by increasing the available safe evacuation time and increasing the capacity to safely accommodate trapped people

- benefit 2: reduced exposure to costs arising from smoke and fire damage by increasing the extent of sprinkler coverage and reducing the percentage of station space affected by smoke.

DTF has recently requested VIDA to undertake a standalone Gate 6 review, which is due 6–18 months after project completion, in accordance with the project assurance plan. This is a requirement of the government's high value high risk (HVHR) process.

VIDA confirmed that a 'lessons learnt' review will be conducted following practical completion, which may capture additional benefits arising from project delivery, where these are evident. A value for money (VfM) report will also be prepared in accordance with the *National Alliance Contracting Guidelines: Guidance Note 4 Reporting Value-for-Money Outcomes* (September 2015) after the project reaches practical completion.

The VfM report will detail the extent to which the project achieved the benefits documented in the business case. The VfM report will be an input to a future Gate 6 review to be organised by DTF.

Governance and assurance

Governance and assurance

This project has had a troubled history. It was heavily affected by the original contractor's collapse, which triggered severe cost and time overruns. The government changed the previous procurement approach of state-directed franchisee works as part of the decision-making processes for the project.

Some of the original works components (such as tunnel intruder detection and alarm systems) were performed by MTM because these were not in the previous contractor's scope of works.

Completing the project involved a range of key decisions by government and detailed analysis of an appropriate response to the project's scope, which involve critical safety works.

The project was allocated to VIDA and pursued as an additional works package within an existing VIDA alliance. This existing alliance has MTM as a non-owner participant.

This decision meant that the project was inducted into the existing governance and oversight processes used by VIDA with its contracted alliances, as well as the broader VIDA governance and assurance environment. These systems are well-established.

The project is HVHR and has had several gateway and project assurance reviews. The first project assurance review focused on the overall project and whether the state should appoint VIDA to deliver remaining works through an existing alliance. The second project assurance review focused on the project's transition to VIDA and the design development process.

The Gate 4 review focused its recommendations on whole-of-government communications and the need for more detailed fire and smoke modelling and resource planning. We saw evidence that these recommendations were acknowledged and addressed.

Procurement approach

Alliance contracting model

For the second phase of the project, there is good evidence of a detailed procurement analysis and identification of which existing VIDA alliance would be most appropriate to take on this project.

Open book costing and risk sharing approaches are inherent to alliance contracting and this was applied to the reset project to generate new cost and time forecasts.

Delivery was performed by an existing VIDA– alliance with appropriate technical capability and delivery capacity, plus a track record of working on complex rail projects in a brownfield environment.

Having MTM in the alliance also embedded operational coordination and rail safety interfaces because MTM is the accredited rail operator and is accountable to the Office of the National Rail Safety Regulator for passenger safety in the rail environment.

VIDA told us that it often delivers complex projects in brownfield environments that require significant stakeholder involvement. This challenge is increased by the need to coordinate critical occupations within an operating rail network.

VIDA considers that the alliance approach is suited to projects with this complexity profile because:

- risks and opportunities are shared to overcome project issues more quickly, avoid risk premiums and adversarial behaviour
- it facilitates active participation by the state
- key stakeholders (such as MTM) are incentivised to align with delivery partners
- the cost, risk and reward regime incentivises all participants to deliver efficiently
- the performance risk and reward regime incentivises meeting other state objectives in excess of project objectives (for example, skills, sustainability and diversity)
- the same team develops and delivers the project, resulting in the state having earlier visibility of true project costs
- project costs are open book and transparent
- commercial terms are locked in due to the framework contract in place.

There is also an expectation that risks are shared collaboratively and dynamically managed by parties best able to manage them, and that key decisions should be made in the spirit of best for project.

Better practice

Better practice

A number of better practice project delivery and procurement matters are embedded and encouraged by the alliance model. The safety upgrade works have benefited from applying them.

In particular, there are inherent processes and controls in an alliance model that require openly examining and collaboratively resolving unexpected cost increases, as well as minimising disputes.

VIDA said that its alliances are incentivised to improve and innovate through key performance indicators and adopting other alliances' initiatives.

A benchmarking process has been used to actively assess projects in development against previously completed similar projects to track and compare costs in all building disciplines, as well as safety, time and disruptions. VIDA said this allows it to apply lessons learnt from previous projects and make sure alliances are utilising best-practice solutions and improvements.

It has also developed an online resource to share information and lessons learnt (including videos) across the level crossing removal program and the alliance workforce. VIDA said this tool is regularly updated and used extensively.

RAG rating definitions

Rating	Scope	Cost	Time	Benefits
Red	Current approved project scope is at risk and requires action and a decision by the government	Project is likely to be more than 20% over its current approved budget	Project is likely to be more than 6 months behind its current approved schedule	Project benefits measurement systems are not in place and baseline and progress data for project benefits described in the business case, investment logic map (ILM) or BMP is not available
Amber	Scope risks are emerging but are being managed and no action or decision is required by the government at this point in time	Project is likely to be 11–20% over its current approved budget	Project is likely to be 4–6 months behind its approved schedule	Project benefits measurement systems are immature and baseline and progress data for project benefits described in the business case, ILM or BMP is unreliable
Green	Current approved project scope is clear and can be delivered within budget and schedule	Project is likely to be 0–10% over its current approved budget	Project is likely to be 0–3 months behind its current approved schedule	Project benefits measurement systems are well developed and baseline and progress data for project benefits described in the business case, ILM or BMP is reliable and up to date
N/A				There are no tangible or measurable benefits specified in the project's business case or objective(s)

Source: VAGO.